PART I

DIURETIC AND NEPHROPROTECTIVE ACTIVITY OF *AVURI KUDINEER*

(*Indigofera tinctoria.linn*)

&

PART II

ANALGESIC AND ANTI-ARTHRITIC ACTIVITY OF *VELVANGA CHUNNAM*

The dissertation Submitted by

G.PRIYADARSINI

Under the Guidance of

Dr.V.VELPANDIAN, M.D(S)

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GOVT. SIDDHA MEDICAL COLLEGE,

CHENNAI-106

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled **"Aphrodisiac activity of Venthamarai magarantha chooranam (*Nelumbo nucifera, Gaertn*)" and "Broncho dilator activity of Marichiyathi Maththirai"** is a bonafide and genuine research work carried out by me under the guidance of **Dr. M. Pitchiah kumar M.D (Siddha)**, Lecturer, Post Graduate Department of Gunapadam, Govt.Siddha Medical College, Arumbakkam, Chennai-106 and the dissertation has not formed the basis for the award of any Degree, Diploma, Fellowship or other similar title.

Date: **Signature of the Candidate**

Place: Chennai **Dr. S. M. Vahitha bi**

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CERTIFICATE BY THE GUIDE

This is to certify that the dissertation entitled **"Aphrodisiac activity of Venthamarai magarantha chooranam (*Nelumbo nucifera,Gaertn*)" and "Broncho dilator activity of Marichiyathi Maaththirai"** is submitted to the Tamilnadu Dr.M.G.R.Medical University in partial fulfillment of the requirements for the award of degree of M.D (Siddha) is the bonafide and genuine research work done by **Dr.S.M.Vahitha bi** Under my supervision and guidance and the dissertation has not formed the basis for the award of any Degree, Diploma, Associateship, Fellowship or other similar title.

Date: **Seal and Signature of the Guide**

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ENDORSEMENT BY THE HOD, PRINCIPAL/HEAD OFTHE INSTITUTION

This is to certify that the dissertation entitled **"Aphrodisiac activity of Venthamarai magarantha chooranam (*Nelumbo nucifera,Gaertn*)" and "Broncho dilator activity of Marichiyathi Maaththirai"** is a bonafide work carried out by Dr.S.M.Vahitha bi under the guidance of **Dr. M. Pitchiah kumar, M.D (Siddha)**, Lecturer, Post graduate department of Gunapadam, Govt.Siddha Medical College, Chennai - 106.

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Date: ***Date:***

Place: Chennai **Place:** Chennai

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1. INTRODUCTION

Siddha system of medicine stands on the world yet on its own power of knowledge, medicines and its medicinal process. Today medical science search trains of medicine to reach the treatment of diseases and meet failures most of the time rendering the patient into many adverse consequences. Symptomatic relief, tolerance to the the drug, adverse reaction, toxic symptoms are the stations of the medical trains which also deviated from the healthy life pathway.

This is because modern drugs aimed at the cellular mechanism of the body to cure the disease. One drug will aimed at one mechanism and can be applied to the conditions which demands similar mechanism of the drug. If one mechanism is altered by the drug, the other mechanism will be moved either in up regulation / down regulation at the cellular level. Ultimately leads to disturbed homeostasis of the body. Hence modern drug should be withdrawn as soon as symptoms relieved but if withdrawn again the symptoms may continue in most of the chronic diseases namely Arthritis, Chronic Nephritis, Chronic Hepatitis, etc.

New researches should be made in the field of curation of the diseases not merely relieving symptoms. Curation of any disease will be said to be produced only when the injured tissues again starts working in the normal way or it should be formed in normal strength to perform the actions. Thus there is a need for the researcher to move their spectacle in an alternate way from the modern medical field to view the ancient system of medicine.

Siddha system holds the jungle of medicinal materials and process of them. In that one see a variety of medicines starting from the soil to the mountain, from seeds to trees, from insects to elephants and they works in a harmony with the environment. *Siddhars* approached / observed the body in a divine 96 different principles of the nature.They given the treatment for every alteration of the normal health based on the 96 principles. The Pharmacodynamics and Pharmacokinetics of drugs works in the way of *Panchabootham*[5 Basic Elements], *Arusuvai* [Six Tastes],2 *Veeriyam*[Net Vital Pharmacokinetic Potential],3 *Pirivu* [Pharmacodynamic Potential] which explain the mechanism not even at the cellular level but at the DNA level and also quote why DNA had been laid in such a way for an individuals.

Medicine of the *siddha* also produces the toxic effects if not processed properly or if taken in large doses not followed the regimen during drug delivery, etc. But *siddha* medicines as it holds large group of medicines, it answers the toxic symptoms produced

by the drug in the way of general, appropriate and even exact antidotes. Hence every medicine synchronise with food materials to give maximum cure to the patients and relieve them from the disease. Also a single material in the *siddha* possesses numerous activities due to its constituents and can be given to various diseases.

Using *siddha* drugs is like using a seed [single component] and a tree multiple [component].One can use either or both depends upon the condition. In that way they mentioned the therapy as *'Aegamooligai Prayogam'* [Single Herb Treatment] and '*Kootu Prayogum'* [Multiple Mixtures of Drug] .It should be revealed that in multiple mixture of drug they use high potential drugs which is compensated by the other drug materials. In the Single Herbs treatment too, the Net Vital Pharmacokinetic Potential should be maintained in a normal way after drug delivery by food materials.

The Indigo is one of the single herbal drugs mentioned in the *siddha* system used for treating multiple toxic symptom produced by other metallic, mineral preparation. Hence if the toxicity ensues in the body or accumulates in the body, there is a need to eliminate the toxic substances at first and detoxifies the existing toxins and rejuvenates the injured tissues in course of time in order to continue the life. Modern medicine ensures the elimination but not detoxification and rejuvenation. The Indigo has Hepatoprotective, Anti-Oxidant property and is regarded as '*Kayakarpa Mooligai'* in *siddha*. Since it is also mentioned for *'Sobhanasini'* [Diuretic] activity it is regarded to be useful for the treatment of dropsy or oedema like condition. The oedema results from three major organs namely heart, liver, kidney if injured by extrinsic toxins of biological and chemical in origin, resulting in the necrosis of the tissues and failure of its function results.

Modern medicines fail to ensure the treatment and rely on transplantation of the tissues which harms the patients both physically, mentally and economically. Current surgeries, hemodialysis, make additional burdens, and such treatment procedures too not successful for all. It takes many procedures to perform, many cautions to be monirtored, many drugs should be taken to fulfil the treatment. *Siddha* system demand the nature as the source and worth little amount economically to use the product and cures the diseases with full back up of constituents.

Since Indigo possess Hepatoprotective, Anti-oxidant, Rejuvenating type of activity it can cure the aetiology of the oedema in addition to the elimination of excess accumulation of body fluids without producing burdening effect to the kidneys. Hence

the lacuna of research exists on Indigo for its Diuretic, Nephroprotective, Cardioprotective, Chelating activities to ensure the treatments. This dissertation progressess to ensure that the ‘Diuretic and Nephroprotective activity’ of the Indigo.

2. **AIM AND OBJECTIVES**

The Aim of the Study is to prove the efficacy of the *'Avuri Kudineer'* for Diuretic and Nephroprotective activity. Conditions like Oedema, Hypertension, and Renal calculus demand the necessity of diuretics for treatment.

Synthetic Diuretics like Loop Diuretics [Frusemide], Thiazide like Diuretics accomplish the the demand but cannot be applied for long term as they produce decrease in concentration of electrolytes which in turn results in serious conditions. Diuretics like loop diuretics, thiazides are synthetics in nature and do not accomplish any active constituents, nutrients or any other medicinal or tonic properties to mankind.

'Avuri kudineer' is a absolute herbal drug which offers actions of elimination of excess body fluids as in dropsy [oedema]. In addition to the elimination of fluids [diuresis], detoxification of toxins via Hepatoprotection, Anti-oxidant, Tonic, Anti-microbial activity is also executed by Indigo.

Indigo, thus in addition to diuresis it also protects the organs which rely on the cause of oedema, and also cures/control the diseases which demand diuresis.In *Siddha* Literature, the study drug was mentioned for '*Sobhanasini*', [Diuretic] *[sobha*-oedema] but it is not now used in general practice to treat oedema and diuretic demanding conditions. Hence the Aim of the Study is to prove the efficacy of the *'Avuri Kudineer'* for Diuretic and Nephroprotective activity.

The objectives are

The drug was studied in the following aspects.

1. Literature reviews.
2. Pharmacognasy of Indigo.
3. Chemical Analysis of Indigo.
4. Toxicological activity.
5. Pharmacological activity.
   a. Diuretic.
   b. Nephro protective.
6. Clinical study.
7. Statistical analysis of the results.

3. LITERATURE REVIEW

3.1. BOTANICAL ASPECT of *Indigofera tinctoria:*

Benthem and Hooker's Classification:

Kingdom	:	Plant Kingdom.
Division	:	Phanerogram
Sub-Division	:	Angiosperms
Class	:	Dicotyledons
Sub-Class	:	Polypetalae
Series	:	Calyciflorae
Family	:	Leguminosae
Sub-Family	:	Fabaceae
Genus	:	*Indigofera*
Species	:	*tinctoria*

Vernacular Names:

Tamil	:	*Avuri, Aviri Neli*
English	:	*Indigo, Indian indigo*
Hindi	:	Nili
Telugu	:	*Nili Chettu, Nili, Aviri*
Kannada	:	*Karunili, Neeligida*
Malayalam	:	*Nilam, Amari*
Marathi	:	*Neel*
Oriya	:	*Nili, Nila*
Punjabi	:	*Neel*
Assamese	:	*Nilbam*
Bengali	:	*Nil*
Urdu	:	*Neel*

CHARACTERS:

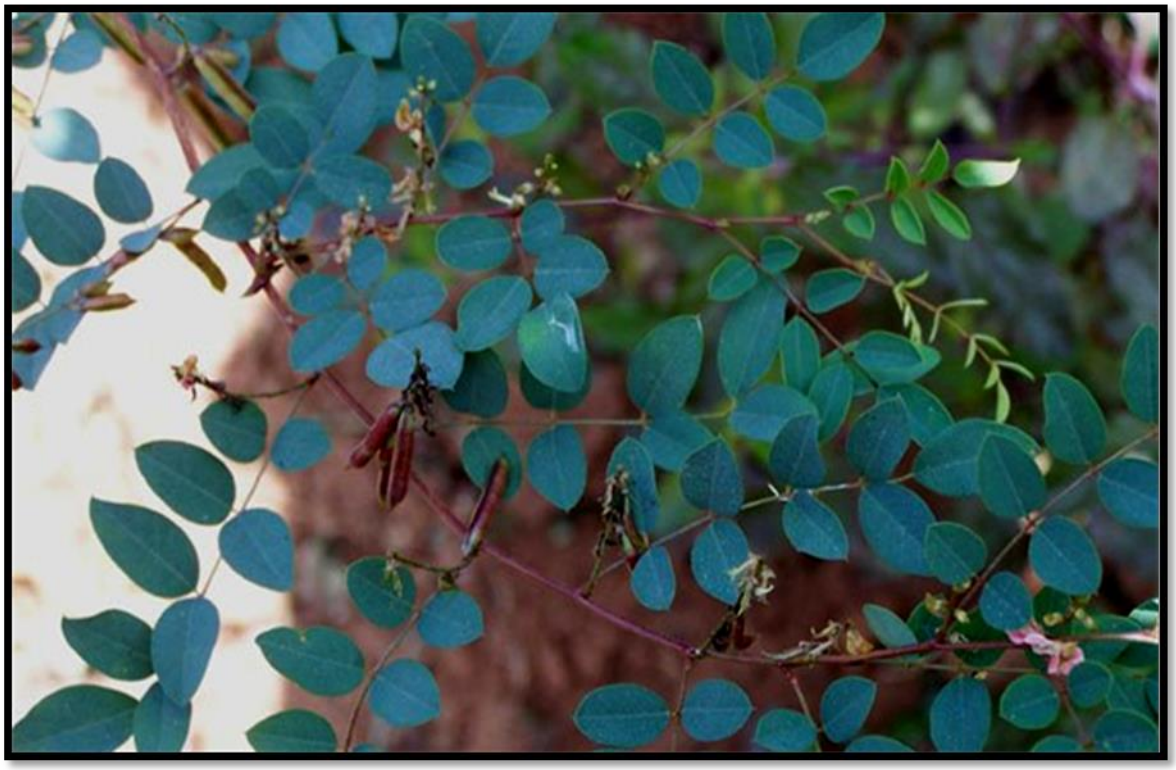
Indigo is an erect, slightly hairy shrub, 1 to 1.5 meters high, found throughout India and widely cultivated in many parts of the country.

Tap root having lateral roots, pale yellow to light yellowish-brown, hard, woody, cylindrical, nearly smooth except for a few having scattered lenticels; odour not distinct; taste slightly bitter.The stem is woody, hard, slender, cylindrical, 0.1 to 1.5 cm in dia., surface smooth, lenticels present; yellowish-green to greyish-brown in colour; no

characteristic odour and taste.The leaves are compound, imparipinnate; leaflets 9 to 13; 1 to 5 cm long and 0.3 to 1.2 cm wide, oblong or oblanceolate with short mucronate tip; pale green to dark green, no characteristic odour and bitter in taste.

Test for purity of indigo [dried]:

It is its lightness and its bronze appearance when scratched;It should also float when immersed in water. It is of deep blue colour approaching to violet and has neither taste nor smell.



Indigofera tinctoria

3.2. GUNAPADAM ASPECT

mThp:

,r;nrb ,e;jpahtpy; vy;yh gFjpapYk; gapuplg;gLk; nrb MFk;.

,jpypUe;J fpilf;Fk; ePy kUe;Jf;fhf rpwg;ghf Vw;Wkjp nra;ag;gLfpd;wJ .

gad;gLk; cWg;Gfs;: ,iy> Nth;.

Rit: ifg;G

jd;ik : ntg;gk;

gphpT: fhh;g;G

nra;;if:

- Kiwg;ntg;gfw;wp
- El;GOf; nfhy;yp
- ntg;gKz;lhf;fp

---Fzghlk; %ypif g.v.48

- **Nrhghehrpdp**
- tp\ehrfhhp
- tpajhNgjfhhp
- kyfhhp
- cw;rhffhhp

-gjhh;j;j Fz tpsf;fk; %yth;f;fk; g.v.43

Fzk;;: ,iy.

‘ chpayT hpjioj;jhd; XJ gjpndz;
mhpaeQ;iQj; jpd;wth;f;Fk; MFk;- njhpthpa
thjntg;G fhkhiy ike;jh; FWkhe;jQ;
rPjk; mfw;We; njhp.”

‘rd;dp gjp%d;WkQ; re;njhbj;j thj Kjy;
cd;D tplf;fbAk; XLq;fhd;-kpd;Dq;
fThpepwk; cz;lhFq; fhrpdpAs; ey;y
mThpapiy jd;dhy; mwp.” ---Fz ghlk; nghUl; gz;G g.v. 48

Fzk;:

- jhtuf; fe;j %y gjpndz; tp\q;fs; ePq;Fk;
- thj Ruk; Nghk;
- fhkhiy Nghk;
- Foe;ijfl;F cz;lhk; khe;jk; Nghk;
- fgg;gpzpfs; NghFk;

- ❖ rd;dp Nghk;
- ❖ fPy;thjk; Nghk;
- ❖ Nkdp nghd;dpwk; MFk;.

mThpapd; NtW ngah;fs;:

‘ mThpAl Ngh;jidNa awpaf; NfS
mUzd; Nghy; epwkhd G\;gpahFk;
fThpnad;w fhtpuq; frg;gpwrz;lq;
fr;rz;l fhyFzj;----t
ehtf;fdkh khh;Rt khh;f;fk;
uj;j G\;gpahFQ;
rThp nad;wr; rz;lhr; rl;RfpakhF
rhj;jpaNjh uThpAl nraYkhNk **“--------**Nghf Kdpth; epfz;L g.v. 66

- ✶ mUzd; (#hpa epwkhd) G\;gpahFk;.
- ✶ fhtp – mThp
- ✶ frg;gp –ifg;G Rit nfhz;lJ
- ✶ rz;lq; fr;rz;ld;----fhyDf;fhyd;.
- ✶ fThp-------mThp vd;W nrhy;y nghd;dpwk; jUk;
- ✶ Rtkhh;fk;-----mThp vd;W nrhy;y NjtNyhf ,d;gk; cz;lhFk;
- ✶ uj;j G\;gp MFk;
- ✶ rThp / rdp vd;gtupd; fz;MFk;.

mThp Xh; fw;g %ypif :

Nghf Kdpth; fw;gk; 300 ,y; >

mThpia fw;g %ypifapy; Nrh;j;Js;shh;.
‘Nfndd;w fUney;yp fwj;j nehr;rp
Nfbahd fUtPop fWj;j thio
Fhndd;w fhpa fhprhiy NahL
fWg;ghd **ePyp**nahL fhpa Ntyp **“----**Nghf Kdpth; fw;gk; 300 ,y;g.v20
Nfhuf;fh; kiy thflj;jpYk; (g.v .37)>
Nghfh; kiy thflj;jpYk; (g.v.57)>
fUT+uhh; thj fhtpak; 700 (g.v.29)>
mThpia fhafw;g %ypifahf gad;gLj;Jk tpjk;; $wg;gl;Ls;sJ.

‘ey;FNthk; ePypf w;gq; nfhs;thag;gh
eykhf mThpaJ r%yk; thq;fpr**;”** ---fUT+uhh; thj fhtpak; 700>g.v.29>

Kiw:

- mThp nrbia ‘tq;F uq;F” vd;w rhgepth;j;jp cUke;jpuj;ij 15 Kiw Xjp vLj;J
- epoypy; cyh;j;jp vLj;J nghb nra;J rh;f;fiuAld; (fUk;G> gid) $l;b ntUfbasT
- gpukhzk; MW khjq; nfhs;s fpotSk; Fkudhthd;.
- ,g;gb xU tUlk; cz;z rUt rpj;jpAk; milayhk;.

mThp gad;gLk; tpjk;:

- mThp ,iyia FbePhpl;L toq;f Nkw;Fwpg;gpl;l Neha;fs; FzkhFk;.

mThp NrUk; kUe;Jfs;:

- ePh;f;fl;L>Nrhig Neha; ePf;Fk;

  kUe;J tiffspy; mThp NrUjpwJ A+fp itj;jpa rpe;jhkzp
- NkYk; fy;yilg;G Neha; glyj;jpy; g.v. 424>427.

  kUe;J tiffspy;mThp NrUjpwJ.
- ethr;rhur; nre;J}uk;---Nfhuf;fh; re;jpuNuif g.v 52
- ee;jp nkOF—rpj;j kue;Jfs; nra;Kiw g.v 152.
- <u ntq;fha vz;nza;--mf];jpah; 2000g.v 212.
- Kfhgpurhj ,sfk;---mf];jpah; itj;jpa rpe;jhkzpg.v266-267.
- ehAUtp tpahjp cUz;il----ruNge;jpuh; itj;jpa Kiwfs; ghz;L Nuhf rpfpr;ir.g.v.13-14.
- tPugj;jpu vz;nza; ---gpuhz ul;fhkph;j rpq;Jg.v.355.

FbePh;

FbePh;: cs; kUe;J tif.

,‡J cyh;e;j ruf;FfisahtJ> <ukhAs;s ,iyfisahtJ ,bj;J> mjw;Fr; nrhy;yg;gl;Ls;s mstpd; gb jz;zPh;tpl;L ,uz;bw;nfhd;whtJ> ehd;Ff;nfhd;whtJ> MWf; nfhd;whtJ> ,Wgj;Jehd;Ff;F xd;whfthtJ fha;r;rp fha;r;rp tbf;fl;b vLj;Jf; nfhs;tjhk;.

NtW ngah;fs;:

‘kUe;JePh; FbePUz;zPh; toq;fpa f\hag; Nguhk;”

—rpj;j kUe;jhf;fpay; tpjpfSk; nra;KiwfSk; g.v.100

kUe;J ePh;> FbePh;> cz;zPh;> f\hak; vd;gJ NtW ngah;fs; MFk;

MAl; fhyk;: 1 rhkk;

FbePh; nra;Kiw tiffs;:

,uz;L tiffs;

1.fha;r;rp tbj;jy; Kiw

2.Cwy; FbePh;

1.fha;r;rp tbj;jy; Kiw:

ruf;Ffis ,bj;J chpaePh;>nghUs;tpl;L chpa msT Kiwg;gb fha;r;rp FWf;fptbj;Jf; nfhs;tjhFk;.

2.Cwy; FbePh; Kiw:

ruf;Ffis chpa ePh;g;nghUspy; Cwitj;J tbfl;b vLj;Jg; nfhs;tjhFk

fha;r;Rk; Kiw/gf;Ft Kiw:

- gad;gLk; ePh;: Vhp> Fsk;> Cw;W> Mw;W ePh; MFk;. kw;wit MfhJ.
- kpjf;ff; $ba ruf;Fis gprpd;> G+f;fs;> khT tiffs;> fpopf;fl;b Jyhae;jpukhf nra;Jf; nfhs;tjhFk;.
- khkprk;> gl;il>,iy> fha;>gok;>jhdpak;> jdpNa fha;r;rp vLj;Jf; nfhs;tjhFk;.
- milf;FbePh;> njhiff; FbePh;> Mfpatw;wpy; ruf;Ffisj; jdpNa fha;r;rf; $lhJ.
- Fbf;Fk; FbePh;-vl;by; xd;whf fha;r;r Ntz;Lk;

FbePh; cl;nfhs;Sk; tpjp:

milf;FbePh; -1 ehisf;F %d;W Ntis.

kw;w FbePh;---1 ehisf;F ,uz;L Ntis.

Xt;nthU NtisAk; Gjpjhff; fha;r;rp Fbf;f Ntz;Lk;.

FbePh; rPuzkhFq; fhyk;:

3 ehopif (72 epkplq;fs;).

3.3 SIDDHA ASPECT OF THE DISEASE

Nrhig Neha ;:

NtW ngah;fs;:

Nrhig Neha;> Nrhif Neha;> Cjy; Neha;> tPf;f Neha;> njhk;ig Neha;.

,ay;G:

clypd; FUjp nfl;L > cly; ntSj;J> if> fhy;> Kfk;> tapW> Kjypad ,aw;iff;F khwhf Cjpf; nfhz;Nl Nghjy; MFk;.

Neha; tUk; top:

‘ghq;fhd rd;dpgh jr;Ruq;fs;
gfh;rpj;jg; gpuikrd;dp gutyhYk;
Njq;fhq;d gd;dhe; jPz;l yhYk;
rpy;tplq;fs; Njfj;jp Yhw yhYk;
Mq;fhd rpiwapUj;j ybgLj yhYk;
mNef top elf;fif kiy apUf;if ahYe;
jhq;fhd ryf;fiufs; jdyp ypUj;jy;
rhk;gy;kz; khjtplha; Nrhig ahNk**.”**

- rd;dp
- Ruq;fs;
- rpj;jg;gpuik
- ehfj;jPz;ly;
- rpy;tplq;fs; Njfj;jpy; Cwy;
- rpiwapUj;jy;
- mbgLjy;
- neLJ}uk; elj;jy;
- kiy thrk; ,Uj;jy;
- Mw;wq;fiuapy; neLq;fhyk; ,Uj;jy;
- rhk;gy;;> kz; cl;nfhs;Sjy;
- khjtplha; NfhshWfs;.

Neha; FwpFzq;fs:;

‘Nrhifap dpyf;fzq;Nfs;
Nrhh;T iffhy; fl;Fz;lhk;

- Njud; fupry;

- iffhy; Nrhh;T cz;lhFk;
- cztpy; gw;wpd;ik
- J}f;fk;
- xU nghpa igia Nghy; tPq;Fk;
- Fuq;fpd; fhijg;Nghd;W fhjhFk;
- fhfj;jpd; fz; NghNy MFk;
- cly; Nrhk;gYf;F ciwAshFk;.
- cly; FUjpapd;wp ntSg;ghFk;.

Nrhig tiffs;:

- thjk;
- gpj;jk;
- fgk;
- Kf;Fw;wk;

t.v.	**Neha; FwpFzq;fs;**	
1.	tsp Cjy;	Neha; tUk; Kd;Nd cly; tw;wp Cjy;

		cly; td;ik Fiwjy; J}f;fk; nfLk; nrhpahik ,isg;G ehSf;F ehs; cly; CJk;
2.	moy; Cjy;	cly; kQ;rs;/rptg;G epwkhFk; ,isg;G jiytyp kaf;fk; the;Jp
3.	Ia Cjy;	cly; ntSf;Fk; Fsph; Ruk; J}f;fk; nfly; Cop Neha; Nghd;W Ngjpahjy; Fuy; newptjhFk; cly; KOikAk; ,uj;jk; Rue;J tPq;Fk;.
4.	Kf;Fw;w Cjy;	ngz;fspd; Nfhgk; nfhs;sy; cly; tPf;fk; Ruk; tapWf;fopjy; Mrdf; fLg;G cz;lhFk;

Kf;Fw;w NtWghL:

- FUjp - gpj;jk; td;ik FiwT
- tspapy; mghdd; td;ik FiwT
- tpahdd; td;ik FiwT
- ‘fgkhd ePuJtpd;wpr; Nrhif tuhJ” - ↑ fgk;.

kUj;Jtk;:

- ,e;Nehapy; gpwe;j Fw;wj;ijj; jzpj;J> clypY}wpa ePiu ntspg;gLj;j Ntz;Lk;.
- FUjpad; td;ikiag; ngUf;fp clw;F Cl;lj;ijj;juf; $baJk; >
- rpWePiuf;fopf;ff; $baJk;> vUf;fl;il Xopf;ff; $baJkhd FbePh;> gw;gk;> nre;J}uk;> ,itfis toq;f Ntz;Lk;.

- my;ypf;fpoq;F nghb
- fLf;fha;g; nghb
- mar;rk;gPuk; fw;gk;
- mag;gpUq;fuh[f; fw;gk;
- rpj;j kz;Luk;
- neUQ;rpy; FbePh;
- ePh;Ks;spf;FbePh;
- milf;FbePh;
- ntbAg;Gr;Rz;zk;
- ntbmd;dNgjp nre;Jhuk;
- ney;yp fw;gk;.
- [ykQ;rhp
- ez;Lf;fy; gw;gk;
- rpyhrj;J gw;gk;.
- kw;Wk; gy rpWePiug; fopf;Fk; kUe;Jfs;.

3.4. MODERN ASPECT OF THE DISEASE.

OEDEMA:

DEFINITION:

Oedema ('swelling') formerly known as dropsy or hydropsy, is an abnormal accumulation of fluid beneath the skin or in one or more cavities of the body.

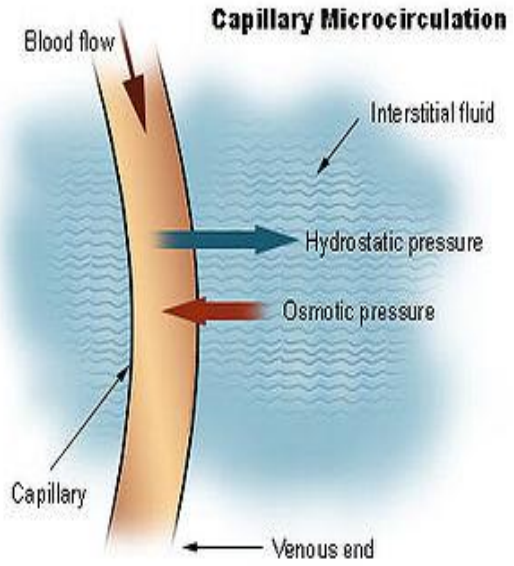
Generally, the amount of interstitial fluid is determined by the balance of fluid homeostasis, and increased secretion of fluid into the interstitium or impaired removal of this fluid may cause edema

AETIO-PATHOGENESIS:

Six factors can contribute to the formation of edema:

1. increased hydrostatic pressure
2. reduced oncotic pressure within blood vessels
3. increased tissue oncotic pressure
4. increased blood vessel wall permeability e.g. inflammation
5. obstruction of fluid clearance via the lymphatic system
6. Changes in the water retaining properties of the tissues themselves.

Raised hydrostatic pressure often reflects retention of water and sodium by the kidney Starlings equation and starling's forces.



$$J_v = K_f([P_c - P_i] - \sigma[\pi_c - \pi_i])$$

- $([P_c - P_i] - \sigma[\pi_c - \pi_i])$ is the net driving force,
- K_f is filtration coefficient the proportionality constant, and
- J_v is the net fluid movement between compartments.

By convention, outward force is defined as positive, and inward force is defined as negative. The solution to the equation is known as the net filtration or net fluid

movement (J_v). If positive, fluid will tend to *leave* the capillary (filtration). If negative, fluid will tend to *enter* the capillary (absorption).

Starling's forces are the major determinants in the development of edema.
According to Starling's equation, the movement of fluid depends on six variables:

1. Capillary hydrostatic pressure (P_c)
2. Interstitial hydrostatic pressure (P_i)
3. Capillary oncotic pressure (π_c)
4. Interstitial oncotic pressure (π_i)
5. Filtration coefficient (K_f)
6. Reflection coefficient (σ)

AETIO-CLASSIFICATION BASED ON CLINICAL MANIFESTATIONS:

(i)Generalised: Results from cardiac,renal,liver pathology.

(ii)Localised: Other forms of oedema
Liver disease and/or kidney disease:

A fall in osmotic pressure results in oedema. Both of these organs is vital in maintaining fluid balance in the body, and if severe disease is present in either of these organ systems, edema can develop. Examples include: cirrhosis of the liver, chronic kidney disease, and acute kidney failure.

The edema of kidney disease can cause swelling in the lower legs and around the eyes People with cirrhosis can develop pronounced swelling in the abdomen (ascites) or in the lower legs (peripheral edema)

Heart failure: A rise in hydrostatic pressure is the reason. If the heart is weak and cannot pump blood efficiently, blood will pool in particular areas of the body, which will cause fluid to leak from the blood vessels into the surrounding tissues.

If the right side of the heart is weak, pressure will build in the peripheral tissues in the body (hands, ankles, feet, legs). This is referred to as peripheral edema.If the left side of the heart is weak, pressure will build in the lungs, causing pulmonary edema.

Pregnancy: Edema during pregnancy may occur because pregnant women have a greater volume of fluid circulating in the body, and because they also retain more fluid. A woman may also experience postpartum edema.

Medications: Edema may be caused by a variety of medications, for example, steroids, calcium channel blockers (CCBs), thiazolidinediones, nonsteroidal antiinflammatory drugs (NSAIDs), estrogens, etc.).

Venous insufficiency: This is a common condition in which blood does not return to the heart efficiently from the peripheral areas of the body (for example, the ankles, legs, feet, hands), which results in edema. This typically results in edema in both legs.

Idiopathic edema: Accumulation of fluid in surrounding tissues with no identifiable cause is referred to as idiopathic edema.

Cerebral edema It is extracellular fluid accumulation in the brain. It can occur in toxic or abnormal metabolic states and conditions such as systemic lupus or reduced oxygen at high altitudes. It causes drowsiness or loss of consciousness.

Chemosis - edema of the mucous membrane of the eyeball and eyelid lining

Papilledema - swelling of the optic disc (where the optic nerve enters the eyeball); usually associated with an increase in intraocular pressure

Pitting and Non-Pitting oedema:

- Cutaneous edema is referred to as "pitting" when, after pressure is applied to a small area, the indentation persists for some time after the release of the pressure. Peripheral pitting edema, as shown in the illustration, is the more common type, results from water retention. It can be caused by systemic diseases, pregnancy in some women, either directly or as a result of heart failure, or local conditions such as varicose veins, thrombophlebitis, insect bites, and dermatitis.
- Non-pitting edema is observed when the indentation does not persist. It is associated with such conditions as lymphedema, Lipoedema and myxedema

INVESTIGATION:

Depends upon the cause of disease.
Liver function test
Renal function test
Complete haemogram
Serum electrolytes
Ultrasonogram of abdomen.

OEDEMA TREATMENT

- Treatment of edema includes several components:
- Treatment of the underlying cause (if possible).
- Reducing the amount of salt (sodium) in your diet. Sodium, which is found in table salt, can worsen edema. Reducing the amount of salt can help to reduce edema.
- In many cases, use of diuretic, to eliminate excess fluid. Diuretics are a type of medication that causes the kidneys to excrete more water and sodium, which can reduce edema.
- Compression stocking and elevating the legs may also be recommended.
- Body positioning-Leg, ankle, and foot edema can be improved by elevating the legs above heart level for 30 minutes three or four times per day.
- Not all types of edema require treatment. Edema related to pregnancy or menstrual cycles is not usually treated.

DIURESIS:

Diuretic: Anything that promotes the formation of urine by the kidney.

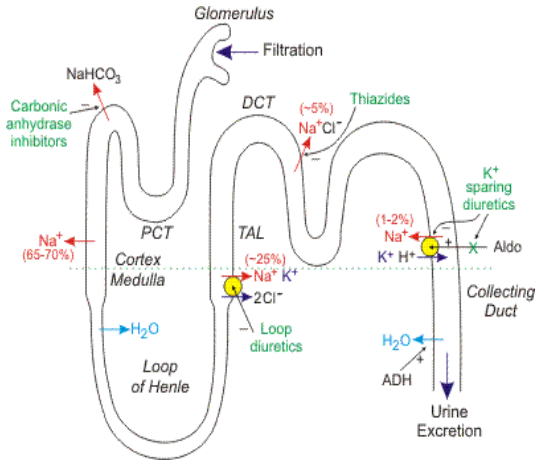
The word "diuretic" comes from a combination of the Greek ‘dia-‘=thoroughly + ‘ourein’ =to urinate = to urinate thoroughly.

Diuresis may be due to a huge number of causes including metabolic conditions such as diabetes mellitus (in which the increased glucose level in the blood causes water to be lost in the urine); substances in food and drink (such as coffee, tea, and alcoholic beverages); and specific diuretic drugs.

MECHANISM OF ACTION OF DIURETICS:

The diuretics are generally divided into four major classes, which are distinguished by the site at which they impair sodium reabsorption.

- Loop diuretics act in the thick ascending limb of the loop of Henle
- Thiazide-type diuretics in the distal tubule and connecting segment (and perhaps the early cortical collecting tubule)
- Potassium-sparing diuretics in the aldosterone-sensitive principal cells in the cortical collecting tubule
- Acetazolamide and mannitol act at least in part in the proximal tubule



TARGETS OF TYPES OF DIURETICS:

Carbonic anhydrase inhibitors	acetazolamide,[8] dorzolamide	inhibit H^+ secretion, resultant promotion of Na^+ and K^+ excretion	proximal tubule
Loop diuretics	bumetanide,[8] ethacrynic acid,[8] furosemide,[8] torsemide	inhibit the Na-K-2Cl symporter	medullary thick ascending limb
Osmotic diuretics	glucose (especially in uncontrolled diabetes), mannitol	promote osmotic diuresis	proximal tubule, descending limb
Potassium-sparing diuretics	amiloride, spironolactone, triamterene, potassium canrenoate.	inhibition of Na+/K+ exchanger: Spironolactone inhibits aldosterone action, Amiloride inhibits epithelial sodium channels[8]	cortical collecting ducts
Thiazides	bendroflumethiazide, hydrochlorothiazide	inhibit reabsorption by Na^+/Cl^- symporter	distal convoluted tubules
Xanthines	caffeine, theophylline, theobromine	inhibit reabsorption of Na^+, increase glomerular filtration rate	tubules

USES OF DIURETICS

- In medicine, diuretics are used to treat heart failure, liver cirrhosis, hypertension and certain kidney diseases.
- Patients suffering from congestive heart failure are often prescribed loop diuretics.The reason is that loop diuretics are very powerful and offer maximum water loss.
- The reduction of fluid in blood reduces pressure on the heart, so that its efficiency of pumping blood is increased.However, these drugs do little to lower blood pressure.
- In that case, thiazide diuretics are more effective hypertension medications.
- They bring about the loss of sodium, chlorine and water which helps in lowering of blood pressure.
- Thus, thiazide is the most recommended diuretic drugs for hypertension.
- Potassium sparing diuretics are helpful for congestive heart failure patients.
- However, these drugs are to be given in combination with loop diuretics and thiazide diuretics.
- Diuretics are often abused by sufferers of eating disorders, especially bulimics, in attempts at weight loss.

COMPLICATIONS OF DIURETICS:

Class	Adverse Side Effects	Drug Interactions
Thiazide	• hypokalemia • metabolic alkalosis • dehydration (hypovolemia), leading to hypotension • hyponatremia • hyperglycemia in diabetics • hypercholesterolemia; hypertriglyceridemia • increased low-density lipoproteins • hyperuricemia (at low doses) • azotemia (in renal disease patients)	• hypokalemia potentiates digitalis toxicity • non-steroidal anti-inflammatory drugs: reduced diuretic efficacy • beta-blockers: potentiate hyperglycemia, hyperlipidemias • corticosteroids: enhance hypokalemia
Loop	• hypokalemia • metabolic alkalosis • hypomagnesemia • hyperuricemia • dehydration (hypovolemia), leading to hypotension • dose-related hearing loss (ototoxicity)	• hypokalemia potentiates digitalis toxicity • non-steroidal anti-inflammatory drugs: reduced diuretic efficacy • corticosteroids: enhance hypokalemia • aminoglycosides: enhance ototoxicity, nephrotoxicity
K^+-sparing	• hyperkalemia • metabolic acidosis • gynecomastia(aldosterone antagonists) • gastric problems including peptic ulcer	• ACE inhibitors: potentiate hyperkalemia • non-steroidal anti-inflammatory drugs: reduced diuretic efficacy
Carbonic anhydrase inhibitors	• hypokalemia • metabolic acidosis	

DIURETICS AND HYPERTENSION:

Most patients with hypertension, of which 90-95% have of unknown origin (primary or essential hypertension) are effectively treated with diuretics. Antihypertensive therapy with diuretics is particularly effective when coupled with reduced dietary sodium intake.

Cardiovascular effects of diuretics:

- ❖ Through their effects on sodium and water balance, diuretics decrease blood volume and venous pressure.
- ❖ This decreases cardiac filling (preload) and, by the Frank-Starling mechanism, decreases ventricular stroke volume and cardiac output, which leads to a fall in arterial pressure.

- The decrease in venous reduces capillary hydrostatic pressure, which decreases capillary fluid filtration and promotes capillary fluid reabsorption, thereby reducing edema if present.
- There is some evidence that loop diuretics cause venodilation, which can contribute to the lowering of venous pressure.
- Long-term use of diuretics results in a fall in systemic vascular resistance (by unknown mechanisms) that helps to sustain the reduction in arterial pressure.
- Thiazide diuretics are more effective hypertension medications.
- The vast majority of hypertensive patients are treated with thiazide diuretics.
- Potassium-sparing, aldosterone-blocking diuretics (e.g., spironolactone) are used in secondary hypertension caused by hyperaldosteronism, and sometimes as an adjunct to thiazide treatment in primary hypertension to prevent hypokalemia.

DIURETICS AND RENAL CALCULUS:

Abnormal formation of tiny crystals in kidney and urinary tract and obstructing the flow of urine through it.There are different types of kidney stones. The exact cause depends on the type of stone.Stones can form when urine contains too much of certain substances. These substances can create small crystals that become stones. The stones take weeks or months to form.

Calcium stones are most common. Calcium can combine with other substances, such as oxalate (the most common substance), phosphate, or carbonate to form the stone. Cystine stones can form in people who have cystinuria. This disorder runs in families and affects both men and women. Struvite stones are mostly found in women who have a urinary tract infection. These stones can grow very large and can block the kidney, ureter, or bladder. Uric acid stones are more common in men than in women.

Treatment

Treatment depends on the type of stone and the severity of symptoms.Kidney stones that are small usually pass on their own. 6 - 8 glasses of intake of water per day to produce a large amount of urine.Pain can be severe enough to need narcotic pain relievers.

Medications include

- Diuretics
- Allopurinol (for uric acid stones)
- Antibiotics (for struvite stones)
- Phosphate solutions
- Sodium bicarbonate or sodium citrate

3.5. LATERAL RESEARCH

Phyto-chemical studies:

- **Indirubin(I)-red isomer Detection:**Studies on the acetylation and NMR reassignment of Indirubin derivatives;Indirubin (I) is a dark red isomer of the blue indigo.Both are natural dyes which are found in plants such as Indigofera tinctoria;/Cuong,et.,al,Institute of chemistry. MAPA June 2010 vol.32 no.3.
- **Flavoinal separation**: Flavanoids and apigenin,kaempferol,luteolin, from Indigofera tinctoria was more frequent in callus cultures; more in leaves and less in roots.Kamal,et.,al,Herba polonica V 36(1-2),p3-7,1990.

Pharmacological activities:

- **Indigitone / Hepatoprotective**: Fractionation of petroleum ether extract of the aerial parts of IT yielded a bioactive fraction**, indigtone** which showed significant dose-related hepatoprotective activity against CCl4-induced liver injury in rats and mice. B Singh, et., al / Phytotherapy Research, Volume 15, Issue 4, pages 294–297, June 2001
- **Snake bite envenomation:** Snake bite envenomation of *indigofera tinctoria* among gounda tribals of elakiri and Jawadhi hills in tamilnadu.Masilamani, et. al, Seminar on research in ayurveda and siddha,CCRAS,Newdelhi,p40,20-22 march 1995. Masilamani,et.,al,/Bulletian of Medico Ethno-botanical Research,vol,18,No,3-4,1997,page,117-122
- **Anti-HIV activity:** Anti-HIV activity of *Indigofera tinctoria* against replication of HIV-1 and HIV-2 strains.Kavimani, Hamdard Medicus V (43), p5-7, 2000.
- **Hypolipidemic**: Study of the chloroform fraction of the alcoholic extract of *Indigofera tinctoria* showed a significant activity. Anju Puri, Tanvir Khaliq, S. M. Rajendran et.,al /Journal of Herbal Pharmacotherapy,2007,Vol.7,No.1Pages 57-64
- **Status Epilepticus Benefit / Antioxidant**: The ethanol extract of *Indigofera tinctoria* was found to be useful in controlling lithium/pilocarpine-induced status epilepticus in albino rats. The extract also exhibited both invitro and invivo antioxidant activities. G Asuntha,et.,al,/Tropical Journal of Pharmaceutical Research April 2010; 9 (2): 149-156
- **Antinociceptive:** Study showed that *Indigofera tinctoria* has be peripheral analgesic effect. Saravana Kumar,et.,al /J. Pharm. Sci. & Res. Vol.1(2), 2009, 31-37
- **Anthelmintic:** The methanol extract exhibited maximum anthelmintic activity against Pheretima posthuma, Gunasekaran Balamurugan,et.,al,/Int J Drug Dev & Resp, Dec 2009;1(1):157-160

- **Antiproliferative Activity:** Study showed the flavanoidal fraction of a methanolic extract of the aerial parts of the plant inhibited the profliferation of human Non-Small Cell lung cancer A-549 cells through cell cycle control and

apoptosis Gunasekaran Balamurugan, et.,al/,Int J Drug Dev & Resp, Dec 2009;1(1):157-160

- **Anti-Neoplastic activity:**At theraprutic dosage synthetic indirubin the component response for Anti-cancer action and *Indigofera tinctora* yielded marked inhibition of Lewis lung cancer and walker carcinosarcoma.,Xiujuan J,et.,al/Acta pharma 1981,16(2),146-148,Chinese,7,ref
- **Indirubin / Anti-Tumor / Anti-Leukemia / Anti-Inflammatory**: Studies have shown Indirubin inhibits cyclin-dependent kinases in tumor cells. Study have shown anti-inflammatory effects in animals. Meisoindigo, a metabolite of Indirubin, shares similar properties. Paitoon Aobchey,et.,al / Chiang Mai J. Sci. 2007; 34(3) : 329-337
- **Anti-Inflammatory:**Sudesh gaidhavi,et.,al,/Bulletin of Medico Ethno-botanical Research,vol.XXVI,No,3-4,July-dec,2005,page,41-46.
- **Anti-Diabetic**: The methanolic extract of the dried leaves of *Indigofera tinctoria* showed significant decrease in blood glucose levels in alloxan-induced diabetic rabbits.Verma S M,et.,al,/International Journal of Toxicological and Pharmacological Research 1(2);42-43
- **Antimicrobial:** Indigofera tinctoria showed good antimicrobial activities against all the test microbes - E coli, P aeruginosa, S aureus, B subtilis - at all concentrations.S.Selvakumar,et.,al/.Int.J.PharmTechRes.2010,2(3)
- **Anti-Tumor / Anti-CDK**: Study strongly suggest the inhibition of CDK activity in human tumor cells is a major mechanism by which indirubin derivatives exert potent antitumor efficacy. Marko D,et.,al / Br J Cancer. 2001 Jan;84(2):283-9.
- **Indirubin / Anti-Breast Cancer**: Study showed indirubin has an inhibitory effect on MCF-7 human breast cancer cells growth. Essential factors were incubation time of treatment and indirubin concentration. Paitoon Aobchey,et.,al / Chiang Mai J. Sci. 2007; 34(3)329-337.

4. MATERIALS AND METHODS

4.1. IDENTIFICATION AND AUTHENTIFICATION OF DRUG:

Plant material: The plant *Indigofera tinctoria*, *linn*, was collected at *Siddha* Medicinal Plants and Garden [SMPG], Mettur, Tamilnadu, weighing about 5 kgs.

The Plant material is then authentified at Government *Siddha* Medical College, Chennai, by the Professors of P.G.*Gunapaadam* [Pharmacolgy] Department.

PURIFICATION OF THE DRUG:

The plant material namely leaves of Indigofera *tinctoria* is then removed from any foreign matters like sand, and picked from petioles and stem parts and kept in sun shades. After the plant is freed from moisture [dried] it is then coarsely powdered and kept in a container.

PREPARATION OF *AVURI KUDINEER* [Indigo Decoction]:

As per the literature the '*Kudineer* was made with Indigo leaves as per *Gunapaadam mooligai vaguppu* p.no.48.

The 25gms of coarse powder of indigo leaves was taken.

To this 400ml of water [16 parts to indigo leaves] is taken in a container and both are mixed well and kept in a stove and heated at a slow flame.

This is continued till the liquid is reduced to $^{1}/_{8}$ of the total volume.

This is about 50ml of the net decoction ['*kudineer'*].

The decoction is then filtered and the plant residue is discarded.

This decoction had been used for phytochemical analysis, pharmacological activity and clinical studies.

PICTORIAL REPRESENTATION OF DRIED LEAVES OF
Indigofera tinctoria

PICTORIAL REPRESENTATION OF AVURI KUDINEER

4.2. STANDARDISATION of *AVURI KUDINEER*

4.2.1. PHARMACOGNOSTIC ASPECT:

Indigofera tinctoria, linn

Collection and authentication of the materials:

The plant *Indigofera tinctoria,linn.,* was collected at Siddha Medicinal Plants and Garden [SMPG], Mettur,TamilnaduThe Plant material is then authentified at Government *Siddha* Medical College, Chennai, by the staffs of P.G.*Gunapaadam* [Pharmacolgy] Department

Staining:

Leaf, petiole and petiolule were fixed in FAA solution (70% ethyl alcohol, formalin and acetic acid in the ratio of 90 ml: 5 ml: 5 ml). The materials were left in the fluid for three days, after which they were washed in water and dehydrated with tertiary butyl alcohol. Paraffin wax was infiltered and the specimens were embedded in wax for sectioning.

Alcoholic safranin (0.5%) counter stained with 0.25 % fast green. This schedule gave good results for studying the histology of different tissues of the plant organs. All sides, after staining in safranin were dehydrated by employing graded series of ethyl

Alcohol (30 %, 50%, 70 %, 90 % and absolute alcohol) and stained fast green in clove oil and xylol-alcohol (50-50) and passed through xylol and mounted in DPX mountant (Johansen 1940).

Clearing of leaves for studying stomatal number and stomatal index was done by using 5% sodium hydroxide along with chlorinated soda solution supplemented with gentle heat. Quantitative microscopy was carried out and values were determined as per the procedure given in Wallis (1997). Photomicrographs were taken with the help of Nikon Eclipse E200 Microscope.

4.2.2.1 PHYSICO-CHEMICAL ANALYSIS: PROCEDURES:

Total ash

Two grams of grounded air-dried material was accurately weighed in a previously ignited and tared silica crucible. The drug was gradually ignited by raising the temperature to 450°C until it was white. The sample was cooled in a desiccator and weighed. The percentage of total ash was calculated with reference to air-dried drug.

Acid Insoluble ash

The ash was boiled with 25 ml of 2 M hydrochloric acid for 5 minutes, the insoluble matter was collected on an ash less filter paper, washed with hot water, ignited, cooled in a desiccator, and weighed. The percentage of acid insoluble ash was calculated with reference to the air-dried drug.

Water Soluble ash

The ash was boiled with 25 ml of water for 5 minutes, the insoluble matter on ash less filter paper collected, washed with hot water, ignited, cooled in a desiccator, and weighed. The weight of the insoluble matter from the weight of the total ash was subtracted; the difference represents the water soluble ash. The percentage of water insoluble ash was calculated with reference to the air-dried drug.

Moisture content:

The shade-dried drug was grounded in a mixer grinder. The powder passed through #40 and retained on #120. Accurately weighed 10 g of # 40/120 drug powder was kept in a tared evaporating dish. This was dried at 105°C for 5 hours in tray drier and weighed. The drying was continued and weighing was done at one-hour interval until difference between two successive weighings corresponds to not more than 0.25 percent.

Drying was continued until a constant weight was reached with two successive weighings after drying for 30 minutes and cooling for 30 minutes in a desiccator was showing not more than 0.01 g difference.

Potential of Hydrogen **(pH):**

The pH scale is logarithmic and runs from 0.0 to 14.0 with 7.0 being neutral. Readings less than 7.0 indicate acidic solutions, while higher readings indicate alkaline or base solutions.

4.2.2.2 INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROMETRY (ICP-OES)

Inductively coupled plasma atomic emission spectroscopy (ICP-AES), also referred to as inductively coupled plasma optical emission spectrometry (ICP-OES), is an analytical technique used for the detection of trace metals.

It is a type of emission spectroscopy that uses the inductively coupled plasma to produce excited atoms and ions that emit electromagnetic radiation at wavelengths characteristic of a particular element.

The intensity of this emission is indicative of the concentration of the element within the sample.

4.2.2.3. FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR)

INSTRUMENT DETAILS**:**

Model	**: Spectrum one: FT-IR Spectrometer**
Scan Range	**: MIR 450-4000 cm-1**
Resolution	**: 1.0 cm-1**
Sample required	**: 50 mg, solid or liquid.**

Fourier Transform Infrared Spectroscopy (FTIR) is an analytical technique used to identify mainly organic materials. FTIR analysis results in absorption spectra which provide information about the chemical bonds and molecular structure of a material. The FTIR spectrum is equivalent to the "fingerprint" of the material and can be compared with cataloged FTIR spectra to identify the material.

FOURIER TRANSFORM INFRARED SPECTROSCOPY ANALYTICAL CAPABILITIES:

- Identifies chemical bond functional groups by the absorption of infrared radiation which excites vibrational modes in the bond
- Especially capable of identifying the chemical bonds of organic materials
- Detects and Identifies organic contaminants
- Identifies water, phosphates, sulphates, nitrates, nitrites, and ammonium ions
- Detection limits vary greatly, but are sometimes $<10^{13}$ bonds/cm^3 or sometimes sub monolayer
- Useful with solids, liquids, or gases

To confirm the acid and basic radicals of the trial drug to ensure the inorganic constituents

4.2.2.4. CHEMICAL ANALYSIS OF TRIAL MEDICINES:

To confirm the acid and basic radicals of the trial drug to ensure the inorganic constituents

Preparation of Sodium Carbonate extract:

2 gm of the sample is mixed in 20 ml of distilled water.The solution is soaked for24 hours, the filtrate is taken.

I.TEST FOR ACID RADICALS:

Test for Sulphate: 2 ml of the above prepared extract is taken in a test tube. To this add 2ml of 4% Ammonium oxalate solution.2ml of extract is added with 2ml of dilute hydrochloric acid until the effervescence ceases off. Then 2ml barium chloride solution is added.

Test for Chloride: 2ml of extract is added with dilute nitric acid till the effervescence ceases. Then 2ml of silver nitrate solution is added.

Test for Phosphate: 2ml of the extract is treated with 2 ml of Ammonium molybdate solution and 2ml of concentrated nitric acid.

Test for Carbonate: 2ml of the extract is treated with 2ml of magnesium sulphate solution.

Test for Sulphide: 1 gm of the substance is treated with 2ml of concentrated Hydrochloric acid

Test for Nitrate: 1gm of the substance is heated with copper turnings and concentrated sulphuric acid and viewed the test tube vertically down.

Test for Fluoride and oxalate: 2ml of the extract is added with 2ml of dilute acetic acid and 2ml of calcium chloride solution and heated.5 drops of clear solution is added with 2ml of dilute sulphuric acid and slightly warmed to this, 1 ml of dilute potassium permanganate solution is added.

Test for Nitrite: 3 drops of the extract is placed on a filter paper. On that, 2 drops a Acetic Acid and 2 drops of Benzidine solution is placed.

Test for Borate: 2 pinches of the substance is made into paste by using Sulphuric acid and Alcohol (95%) and introduced into the blue flame.

II.TEST FOR BASIC RADICALS:

Test for lead: 2 ml of the extract is added with 2 ml of Potassium iodide solution

Test for Copper: One pinch of substance is made into paste with concentrated Hydrochloric acid in a watch glass and introduced into the non luminous part of the flame.2ml of the extract is added with excess of Ammonia solution

Test for Aluminium: To the 2 ml of extract. Sodium Hydroxide solution is added in drops to excess.

Test for Iron: To the 2 ml of extract, 2 ml of Ammonium Thiocyanate solution is added. To the 2 ml of extract, 2 ml of Ammonium Thiocyanate solution and 2 ml of concentrated Nitric Acid is added.

Test for Zinc: To the 2 ml of extract Sodium Hydroxide solution is added in drops to excess.

Test for Calcium: 2 ml of the extract is added with 2 ml of 4% Ammonium Oxalate solution.

Test for Magnesium: 2ml of extract, Sodium Hydroxide solution is added in drops to excess.

Test for Ammonium: 2 ml of extract few ml of Nessler's Reagent and excess of Sodium Hydroxide solution are added.

Test for Potassium: A pinch of substance is treated with 2 ml of Sodium Nitrite solution and then treated with 2 ml of Cobal Nitrate in 30% glacial Acetic acid

Test for Sodium: 2 pinches of the substance is made into paste by using Hydrochloric acid and introduced into the blue flame.

Test for Mercury: 2 ml of the extract is treated with 2 ml of Sodium Hydroxide solution.

Test for Arsenic: 2 ml of extract is treated with 2 ml of silver Nitrate solution.

4.2.2.5. PHYTO-CHEMICAL ANALYSIS

Sl. No	EXPERIMENT	OBSERVATION
I.	**Test for Tannins:** A plant sample dried powder 0.5 gm is boiled in 20 ml of water and filtered.The filterate 2 ml is taken and 3-5 drops of $Fecl_2$ (0.1%) is slowly added to it.	Forms a brownish-green or bluish- black colour.
II.	**Test for Phlobatannins:** An aqueous 2 ml of plant sample is boiled in a hot water bath with 1 ml of aqueous Hcl	A red precipitate is deposited
III.	**Test for Saponin:** A powdered 2 gm of plant sample is boiled with 20 ml of distilled water,then filtered,the filterate is added with fresh 5 ml of distilled water and shaken vigorously.	Permenant or persistant froth is not formed.The froth is not turned in to emulsion by adding three drops of olive oil.
IV.	**Test for Flavonoids:** An aqueous filterate of plant sample is mixed with 5 ml of dilute Ammonium solution and few drops of concentrated H_2SO_4 is slowly added through the sides of the test tube.	Yellow colour formed and disappears on standing.When 1% Alluminium solution is added in this mixture re-formation of yellow colour.
V.	**Test for steroids:** An ethonolic extract of plant sample 2ml is mixed with 2 ml H_2SO_4 and 0.5 gm Acetic anhydride.	The solution turns in to blue to green colour
VI.	**Test for Cardiac glycosides:** In 5 ml of plant Ethanolic extract, 2 ml of Glacial acetic acid, a drop of $Fecl_2$ and 1 ml of H_2SO_4 (slowly on the sides of the test tube) is added.	A brown ring indicates deoxy sugar of cardenolides/violet ring appears below brown ring/ in acetic acid layer a green ring is formed
VII.	**Test for Terpenoids:** In 5 ml of Ethanolic plant extract, 2 ml of chloroform and 3 ml of concentrated H_2SO_4 (slowly) is added.	A reddish brown interface layer is formed
VIII.	**Test for Carbohydrates:** An aqueous plant extract is boiled in a water bath with Benedict's solution.	A green or brick red or red precipitate shows the presence of reducing sugar

IX.	**Test for Alkaloids:** Alkaloids are identified by precipitate method **Mayer's reagent:** An aqueous plant extract of 2 ml is mixed with 2 ml of mayer's reagent **Wagner's reagent:** An aqueous plant extract of 2 ml is mixed with 2 ml of wagner's reagent **Dragendroff's reagent:** An aqueous plant extract of 2 ml is mixed with 2 ml of Dragendroff's reagent.	Forms whitish or yellowish cream colour precipitate Forms a brown or dark reddish precipitate Forms reddish brown precipitate
X.	**Test for Glycosides:** An aqueous plant extract of 2 ml is added with 1 ml of concentrated Hcl and boiled in a water bath for about 2 hours. The filtrate is separated and 3 ml of chloroform is added, then 10% of 1ml Ammonium solution is added.	Forms pink colour
XI.	**Test for Protein:** An aqueous extract /alcoholic extract of 2 ml is added with few drops of Biuret reagent and kept in hot water bath for 10 minutes.	Formation of light blue or Pale violet colour is absent
XII.	**Test for Phytosterols:** An ethanolic or a methonolic plant extract 2 ml is mixed with 2 ml of Acetic anhydride stirred well and heated for 2 minutes in hot water bath then allowed to cool.1 or 2 drops of H_2SO_4 is added with the mixture slowly through the sides of the wall .	Forms greenish blue layer on the upper surface
XIII.	**Test for Phenolic compounds:** About 2 ml of aqueous plant extract is mixed with 2 ml of $Fecl_3$ solution.	Formation of deep bluish green colour is absent
XVI.	**Test for Volatile oil:** An ethanolic plant extract of 2 ml is mixed with one or two drops of tincture in warm water bath in a screwed cap test tube.	Red colour is not appeared
XV.	**Test for Fixed oil:** One ml of ethanolic extract of plant sample is mixed with 1 ml of 1% copper sulphate solution and 5 drops of 10% sodium Hydroxide solution	Formation of a clear blue solution is absent

4.2.3. TOXICITY STUDY OF *AVURI KUDINER:*

PROEDURE OF ACUTE TOXICITY STUDY:

Animals:

Swiss mice (25—35 g), were housed at 22±2°C under a 12-h light/12 h dark cycle and with access to food and water *ad libitum*, were acclimatized to the laboratory for at least 1 h prior to testing. The animals were acclimatized for one week under laboratory conditions. For each experiment, one group of animals was used. The experiments reported on here were carried out in accordance with the current ethical and care guidelines for the care of laboratory animals and the investigation of experimental pain in conscious animals.

The experiments were approved by the local Ethics Committee of Vels University (XIII/VELS/COL/14/CPCSEA/IAEC/23.O9.11).The number of animals (6for group of treatment) and intensities of noxious stimuli used were the minimum necessary to demonstrate consistent effects of the drug treatments.

Acute toxicity studies

The acute oral toxicity study was carried out as per the guidelines set by Organization for Economic Co-operation and Development (OECD-425) received from Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). Animals are observed individually after dosing at least once during the first 30 minutes, periodically during the first 24 hours, with special attention given during the first 4 hours, and daily thereafter, for a total of 14 days, except where they need to be removed from the study and humanely killed for animal welfare reasons or are found dead. All observations are systematically recorded.

4.2.4.1.DIURETIC ACTIVITY OF *AVURI KUDINEER* IN RATS

PROCEDURE:

Drugs and chemicals:

2% CMC in normal saline (2ml/kg) was used as vehicle. Frusemide was obtained from loba chemicals Pvt Ltd. All experiments are conducted under ambient temperature and humidity. The Avuri kudineer was mixed uniformly in saline solution to achieve 100mg/ml as main stock solution and used in this study.

DIURTIC ACTIVITY:

Animals

Male Wistar rats weighing between 150 and 180 g were used for investigating the Diuretic effect *in vivo*. All animals were conditioned in standard metallic cages (6 rats per cage), fed standard laboratory diet *ad libitum* and allowed free access to drinking water. The animals were also kept in 12:12 hour light/dark cycle. The experimental rats were handled in strict compliance with CPCSEA and IAEC guidelines.

Grouping and Treatment

Six groups of six rats each were used. Rats were kept for fasting for 18 hrs before the study. The dose of *Avuri kudineer* (AKL and AKRL) was decided on the basis of acute toxicity study. The doses were given by oral route Group-I received 2% CMC in normal saline (2 ml/kg) and served as normal control. II-group received *Avuri kudineer* (AKL 500mg/kg). The third group received *Avuri kudineer* (AKL1000mg/kg). Similarly, the fourth and fifth groups received *Avuri kudineer* (AKRL 500 and 1000mg/kg) respectively. Sixth group of animals served as standard and treated with Frusemide (20 mg/kg). Immediately after administration of the drug, the rats were each placed in metabolic cages for 4hrs, specially designed to separate urine and feacal matter and observed at room temperature. The animals were denied food and water during the experiment. The urine volume (ml/day) was measured and then assayed for Na^+ and K^+ and Cl^- concentrations in mMol/l was measured by using routine methods.

Statistical analysis

All results are expressed as mean ± standard error. The data was analyzed statistically using ANOVA followed by Dunnett's Comparison Test.

4.2.4.2. NEPHROPROTECTIVE ACTIVITY OF *AVURI KUDINEER* AGAINST CISPLATIN-INDUCED NEPHROPATHY IN RATS

There is a growing interest of public in traditional medicine, particularly in the treatment of nephrotoxicity partly because of limited choice in the pharmacotherapy. In the present study, an effort has been made to establish the scientific validity for the nephroprotective property of Avuri kudineer using Cisplatin induced nephritic injury model in rats.

MATERIALS AND METHODS

Drug, Reagents and Stock solution preparation:

Cisplatin (VHB, Life sciences Inc., India), The Avuri kudineer was mixed uniformly in saline solution to achieve 100mg/ml as main stock solution and used in this study. Standard drug cystone was purchased from local market (Himalaya Drug Company, Bangalore, India).

Animals:

Mice of either sex weighing 25-30g and male Wistar rats weighing 150-200g were obtained from the animal house of Vels University. Animals were fed on conventional diets and water *ad libitum* and they were maintained under standard conditions of humidity, temperature (20-24°C) and light (12-h light: 12-h dark cycle). The rats were randomly assigned to control and different treatment groups, six animals per group. The Institutional Animal Ethics Committee approved the experimental protocol and the conditions in the animal house approved by Committee for Supervision on Experiments on Animals. The study was conducted in accordance with IAEC guidelines (Registration no.-XIII/VELS/COL/13/CPCSEA/IAEC/23.09.11). The animals were acclimatized for one week under laboratory conditions.

Experimental design

The dose limits were selected on the basis of oral acute toxicity studies in mice, in accordance with the OECD guidelines. Total fourty two wistar rats were divided randomly into seven groups of six animals each. Group I received oral dose of normal saline only for 14 days served as normal control. Group II received single dose of cisplatin (10 mg/kg of body weight; i.p.) on day 1 treated as control. Group III and IV received *Avuri kudineer* leaf extract at the dose levels of 500 and 1000mg/kg b.w. once in a day for 14 days after single dose of cisplatin on day 1. Group V and VI received *Avuri kudineer* root and leaf extract at the dose levels of 500 and 1000mg/kg b.w. once in a day for 14 days respectively along with the single dose of cisplatin as earlier considered as test groups respectively. After Cisplatin treatment, the animals were weighed, and 0.1-ml blood samples were taken for blood chemistry analysis of blood urea nitrogen and creatinine. Changes in blood urea nitrogen and creatinine were used to indicate differences in Cisplatin-induced nephrotoxicity between the drugs and vehicle treated rats.

Urine analysis

Urine was collected over 24 h on 14th day by keeping the test animals in individual metabolic cages. The volume of collected urine samples was measured followed by estimation of biochemical parameters, namely urine creatinine and urine albumin.

Biochemical assays

Blood samples were collected from the test animals under anesthesia by retro-orbital vein puncture using a fine capillary before sacrifice under ether anesthesia and centrifuged using the table top centrifuge (REMI) at 3000 rpm to get serum and parameters including creatinine, urea, albumin, and total protein were estimated. The biochemical estimations were done in a Biochemical-semi-auto analyzer by standard procedures using commercial kits for assessment of renal toxicity.

Histopathology

The kidneys were removed from the rats and organs were fixed using a formaldehyde solution (10% v/v of formaldehyde in normal saline), embedded with paraffin wax followed by preparation of tissue sections using a microtome for histopathological study.

Statistics

Data obtained in the experiment were expressed in terms of mean ± SEM. Statistical significance of data was assessed by analysis of variance (one-way ANOVA) followed by a comparison between different groups using "Dunnet" test. The significance level was set at $P<0.05$. The treatment group was compared with the control group

4.3. CLINICAL STUDY OF*AVURI KUDINEER:*

OBJECTIVES

- To evaluate the Diuretic and Nephroprotective activity of *Avuri Kudineer.*
- To explore the efficacy of *Avuri kudineer* in patients with Oedema, Hypertension, Urolithiasis.

DESIGN OF THE STUDY

Randomized controlled trial

STUDY CENTRE

Arignar Anna Government Hospital of Indian Medicine and Homeopathy, Arumbakkam, Chennai – 106.

STUDY PARTICIPANTS

Both men and women and members of all races and ethnic groups are eligible for this trial. Treatment will be administered on an *inpatient/outpatient* basis. The patients will be selected from the In-patient and Out-patient department of Arignar Anna Government Hospital of Indian Medicine and Homeopathy, Chennai – 106.

NUMBER OF SUBJECTS

Number of participants will be 40- 50.

At the beginning of the study, 50 patients will be treated with a low dose of the drug. If this dose does not cause bad side effects, it will slowly be made higher as new patients take part in the study. A total of 100 patients are the most that would be able to enter the study.

REGISTRATION PROCESS

To register a patient, the following documents should be completed by the investigator.

- Copy of required laboratory tests
- Signed patient consent form
- *Other appropriate forms (e.g., Eligibility Screening Worksheet, Registration Form).*

The investigator will then verify eligibility and will assign a patient study number, drug dose and register the patient on the study.

CRITERIA FOR INCLUSION

Patients with Oedema, Hypertension, and Urolithiasis are eligible for entry to the trial if the following criteria are satisfied.

The criteria of inclusion are:

1. **Oedema of lower extremity**

2. **Raised systolic and diastolic blood pressure ≥140/90.**
3. **Pain present in the either/both loins.**
4. **Patients with known urolithiasis with USG reports.**
5. **Uraemic Patients if possible.**

Co operative patients

The previous drug regimen if any have been with held for 24 hours before the clinical trial.

CRITERIA FOR EXCLUSION

- ❖ Severly ill patients.
- ❖ AIDS
- ❖ Malignancy
- ❖ Pregnant and lactating women
- ❖ TB
- ❖ Cardio vascular disorder
- ❖ Age below 10 years
- ❖ Syphilis

WITHDRAWAL CRITERIA

Patients will be removed from study when any of the criteria listed below applies. The reason for study removal and the date the patient will be removed must be documented in the Case Report Form.

In the absence of treatment delays due to adverse events, treatment may continue for 2 cycles or until one of the following criteria applies:

- ❖ Disease progression,
- ❖ Deterioration of vital signs with cardiac, respiratory, hepatic, renal and CNS changes.
- ❖ Intercurrent illness that prevents further administration of treatment,
- ❖ Unacceptable adverse event(s),
- ❖ Patient decides to withdraw from the study, or
- ❖ General or specific changes in the patient's condition render the patient unacceptable for further treatment in the judgment of the investigator.

ROUTINE EXAMINATION AND ASSESSMENT

The full details of history and physical examination of the patients is to be recorded as per the proforma (form I and I A). The clinical assessment will be done initially at the

end of 4 days, 7 days, 14 days and 21 days during treatment and at the end of the 21 days follow up (form II) to be done. The laboratory investigation and the physiological parameters will be recorded initially at the end of the treatment and at the end of follow up as per the proforma (form III). 24 hrs urine volume estimation will be done in all patients before and after the intake of the drug

TRIAL DRUG

AVURI KUDINEER

DOSAGE

30 ml B.D

Dose will be fixed after finding the LD50.

DURATION OF TRIAL

Study Period: 7-15days with 2 months follow up.

Total duration: 2 months

TREATMENT PLAN

ADMINISTRATION OF THE DRUG:

Form of the medicine	: Decoction
Route of Administration	: Enteral
Dose	: 30ml
Times of Administration	: Two times a day; before food
Duration	: 3-7 weeks

DIET RESTRICTION AND MEDICAL ADVISE

- The patients will be instructed to follow easily digestible foods.
- They will be advised to take tender coconut, and vegetables like radish, juice of plantain stem.Avoid bitter gourd, agathi greens, brinjal, and non-vegs.
- The patient will advise to cold damp climate.
- The patient will be advised to take rest. But prolonged immobilization should be avoided.
- The clinical improvement will be observed and recorded daily in the proforma of case sheet.

TRIAL CONDUCT

This study was conducted in compliance with the protocol approved by the Institutional Review Board, and according to Good Clinical Practice standards. No deviation from the protocol was implemented without the prior review and approval of the IRB except

where it may be necessary to eliminate an immediate hazard to a research subject. In such case, the deviation will be reported to the IRB

CLASSIFICATION OF RESULTS

1. **Good Response**

   Relief of Symptoms above 75% and improvement towards normalcy in laboratory parameters.

2. **Fair Response**

   50% to 75% relief in symptoms. Significant improvement in laboratory parameters.

3. **Poor Response**

   25% to 49% relief in symptoms and minimal improvement in laboratory parameters.

4. **No Response**

   No relief in symptoms and no significant improvement in laboratory parameters.

FOLLOW UP

Assessment was taken for every three days before treatment and after treatment. During this period clinical assessment (form II) and laboratory investigation (form III) was carried out.

STATISTICAL ANALYSIS

The data was tabulated and analyzed by students 'T' test.

ETHICAL REVIEW

This protocol and any amendments were submitted to the Institutional Ethical Committee (IEC) for formal approval to conduct the study. The decision of the IEC concerning the conduct of the study was made in writing to the investigator.

All subjects for this study were provided a consent form describing this study and providing sufficient information for subjects to make an informed decision about their participation in this study. This consent form was submitted with the protocol for review and approval by the IEC. The formal consent of a subject, using the IEC-approved consent form, was obtained before that subject is submitted to any study procedure. This consent form must be signed by the subject or legally acceptable surrogate, and the investigator-designated research professional obtaining the consent.

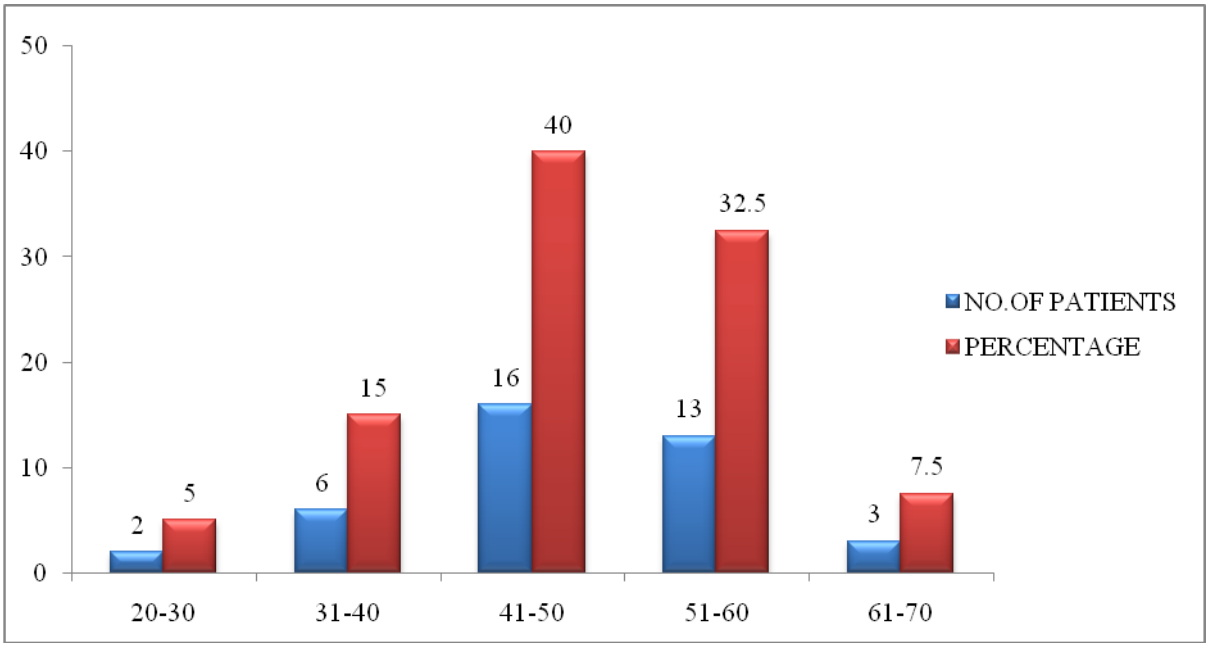
COMPLETION OF FORMS

All the forms (consent, form I and form II) can be completed in duplicate and the originals was sent to the Officer-in-charge, CBM unit, Institute of research in medical statistics, Mayor Ramanathan Road, Chetpet, Chennai – 31 by registered post. Form completed during a month was dispatched to CBM unit during the first week of the following month.

CLINICAL ASSESSMENT
4.3.2 AGE WISE DISTRIBUTION

SL. NO	AGE IN YEARS	NO. OF PATIENTS	PERCENTAGE (%)
1	20-30	2	5
2	31-40	6	15
3	41-50	16	40
4	51-60	13	32.5
5	61-70	3	7.5
TOTAL		40	100

4.3.2 .AGE WISE DISTRIBUTION



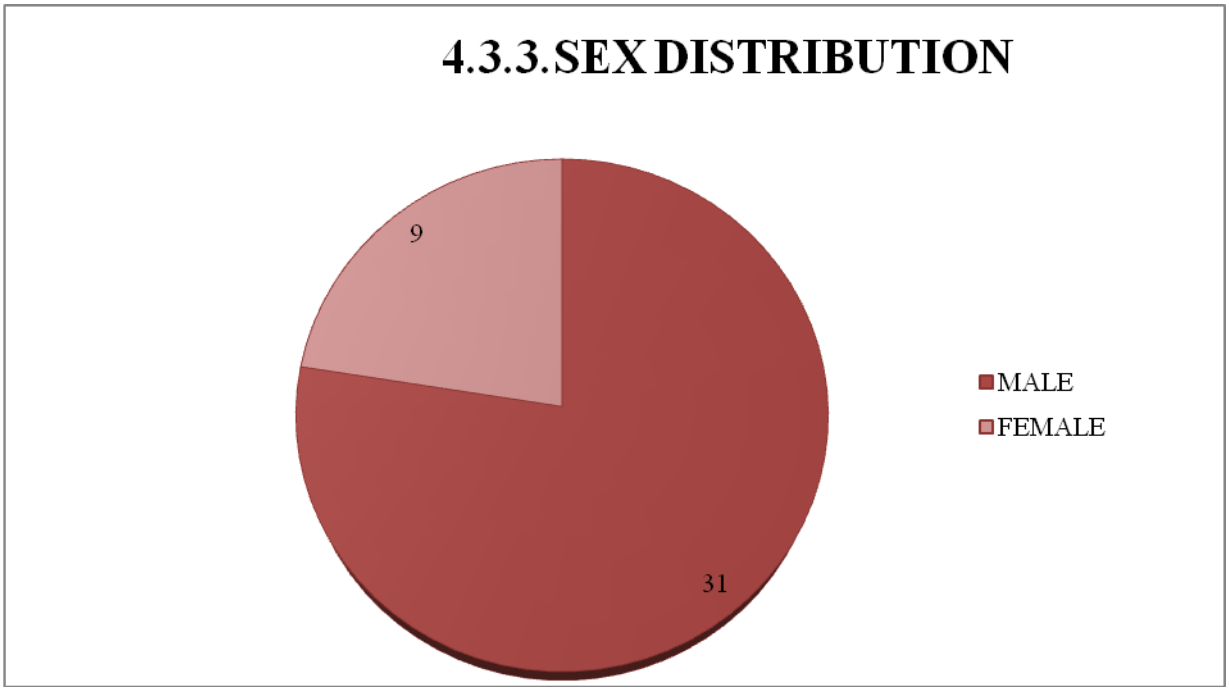
INFERENCE:

Among 40 patients,

- 2patients belongs to the age group of 20-30 years
- 6 patients belongs to the age group of 31-40 years
- 16 patients belongs to the age group of 41-50 years
- 13patients belongs to the age group of 51-60 years
- 3patients belongs to the age group of 51-60 years

4.3.2 .Table SEX DISTRIBUTION

SL. NO	SEX	NO. OF PATIENTS	PERCENTAGE
1	Male	31	77.5
2	Female	9	22.5
TOTAL		40	100



INFERENCE:

Among 40 patients,

- 31 patients were male
- 9 patients were female

4.3.3 CLINICAL STUDY ON *AVURI KUDINEER* IN IN AND OUT PATIENTS DEPT. FOR DIURETIC ACTIVITY

Sl.No.	I.P. No.	Name	Age/ Sex	Date of first visit	Symptoms	Date of last visit	Results
1.	4251	JAMAL BATCHA	48/M	8.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	28.8.2011	GOOD
2.	4326	RAMACHANDRAN	63/M	8.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	28.8.2011	FAIR
3.	4773	MUNUSAMY	50/M	9.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	29.8.2011	GOOD
4.	4720	KANUSAMY	55/M	9.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	29.9.2011	FAIR
5.	5218	SUBRAMANI	53/M	10.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	30.8.2011	FAIR
6.	5218	MURUGAN	50/M	10.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	30.8.2011	FAIR
7.	5541	MANAVALAN	62/M	11.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	30.8.2011	GOOD
8.	6234	PANDIYAN	52 /M	13.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	31.8.2011	FAIR
9.	7415	KANNAN	55/M	14.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	4.9.2011	GOOD
10.	7669	JEYAPAL	55/M	18.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	5.9.2011	FAIR

4.3.4. CLINICAL STUDY ON *AVURI KUDINEER* IN IN AND OUT PATIENTS DEPT. FOR DIURETIC ACTIVITY

Sl.No.	I.P. No.	Name	Age/ Sex	Date of first visit	Symptoms	Date of last visit	Results
11.	2164	SEKAR	48/M	31.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	19.9.2011	FAIR
12.	3143	MARIYAPPAN	45/M	5.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	25.9.2011	FAIR
13.	4424	LOGANATHAN	39/M	12.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	29.9.2011	GOOD
14.	7385	SEKAR	31/M	16.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	4.10.2011	FAIR
15.	8514	MOORTHY	50/M	20.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	10.10.2011	FAIR
16.	8967	JEYAGOPALAN	55/M	21.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	10.10.2011	GOOD
17.	8907	NEELAMEGAM	55/M	21.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	7.10.2011	FAIR
18.	9353	ARUMUGAM	45/M	22.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	10.10.2011	FAIR
19.	7654	SHAMSHED BEGAM	45/F	4.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	30.8.2011	GOOD
20.	8765	SHAHJAHAN	50/M	6.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	26.8.2011	FAIR

4.3.5. CLINICAL STUDY ON *AVURI KUDINEER* IN IN AND OUT PATIENTS DEPT. FOR DIURETIC ACTIVITY

Sl.No.	O.P. No.	Name	Age/ Sex	Date of first visit	Symptoms	Date of last visit	Results
21.	7865	ABDUL RAZEB	60/M	3.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	27.8.2011	FAIR
22.	7874	SUDHAKAR	51/M	3.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	19.8.2011	FAIR
23.	647	RATHANAVEL	55/M	4.8.2011	Pain present in the rt loin ,nausea,dizziness ,tiredness present	19.8.2011	GOOD
24.	2597	CHINNAPPA	56/M	10.8.2011	Swelling& pitting present in lower extremity,tiredness, present	24.8.2011	GOOD
25.	4576	MEGALA	39/F	2.8.2011	Pain present in the rt loin ,nausea,dizziness ,tiredness present	19.8.2011	GOOD
26.	7246	PONNURANGAM	41/M	16.8.2011	Pain present in the rt &ltloin ,nausea,dizziness ,tiredness present	4.9.2011	GOOD
27.	6908	BASKER	54/M	6.9.2011	Pain present in the rt loin ,nausea,dizziness ,tiredness present	29.9.2011	FAIR
28.	354	PARVATHY	58/F	25.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	15.9.2011	FAIR
29.	5692	GURUNATHAN	59/M	11.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	2.9..2011	FAIR
30.	7824	SAROJA	68/F	11.8.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	3.9.2011	FAIR

4.3.6. CLINICAL STUDY ON *AVURI KUDINEER* IN IN AND OUT PATIENTS DEPT. FOR DIURETIC ACTIVITY

Sl.No.	O.P. No.	Name	Age/ Sex	Date of first visit	Symptoms	Date of last visit	Results
31.	9516	PALANI	42/M	22.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	12.9.2011	FAIR
32.	7718	JYOTHI	49/F	29.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	16.10.2011	FAIR
33.	7746	SRINIVASAN	35/M	14.9..2011	Pain present in the rt loin ,nausea,dizziness ,tiredness present	20.10.2011	GOOD
34.	3131	SURAJ	25/M	23.9.2011	Pain present in the rt loin ,nausea,dizziness ,tiredness present	15.10.2011	GOOD
35.	9588	JEYAMANI	45/M	29.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	19.10.2011	FAIR
36.	3245	REVATHY	46/F	1.12.2011	Swelling pitting of the oedema present in lower extremity,tiredness	31.12.2011	GOOD
37.	3546	SELVI	40/F	5.12.2011	Swelling pitting of the oedema present in lower Extremity,tiredness	31.12.2011	GOOD
38.	3547	PRIYA	16/F	29.9.2011	Pain present in the rt loin ,nausea,dizziness ,tiredness present	19.10.2011	GOOD
39.	2597	SATHYA NATHAN	55/M	29.9.2011	Diziness, headache,loss of sleep,tiredness,difficulty in breathing	18.10.2011	FAIR
40.	7220	GANGAMMA L	6O/M	19.11.2011	Pain present in the rt loin ,nausea,dizziness ,tiredness present	11.12.2011	FAIR

4.3.7. GENERAL HAEMATOLOGICAL INVESTIGATION

Sl. No.	O.P. No.	Name	Age/ Sex	HAEMATOLOGICAL REPORT														URINE ANALYSIS					
				BEFORE TREATMENT				AFTER TREATMENT				ESR (mm)		Hb(Gm)		BL.UREA		BT			AT		
				TC CU/mm	DC			TC CU/mm	DC			BT		AT		BT	AT	ALB	SUG	DEP	ALB	SUG	DEP
					P	L	E		P	L	E	1 hr	1hr										
1.	4251	JAMAL BATCHA	48/M	8500	64	32	4	8500	52	44	4	12	11	9.0	9.3	27	28	NIL	NIL	NIL	NIL	NIL	NIL
2.	4326	RAMACHANDRAN	63/M	9800	62	33	5	9900	62	34	5	12	12	12.0	12.3	29	30	NIL	NIL	NIL	NIL	NIL	NIL
3.	4773	MUNUSAMY	50/M	6100	64	31	5	6300	51	44	5	12	14	11.0	11.6	35	37	NIL	NIL	NIL	NIL	NIL	NIL
4.	4720	KANUSAMY	55/M	9800	59	36	5	9800	59	37	4	11	12	13.0	13.6	32	31	NIL	NIL	NIL	NIL	NIL	NIL
5.	5218	SUBRAMANI	53/M	9200	52	39	9	9200	58	38	4	16	15	11.0	11.4	29	30	NIL	NIL	NIL	NIL	NIL	NIL
6.	5218	MURUGAN	50/M	7600	63	32	5	8000	52	44	4	16	15	12.0	12.4	30	28	NIL	NIL	NIL	NIL	NIL	NIL
7.	5541	MANAVALAN	62/M	9400	57	36	7	9100	60	36	4	15	14	12.0	12.7	23	22	NIL	NIL	NIL	NIL	NIL	NIL
8.	6234	PANDIYAN	52 /M	8700	59	35	6	8800	58	56	6	14	13	13.0	13.7	34	33	NIL	NIL	NIL	NIL	NIL	NIL
9.	7415	KANNAN	55/M	10400	63	31	6	9400	62	33	5	14	14	10.0	10.4	33	35	NIL	NIL	NIL	NIL	NIL	NIL
10.	7669	JEYAPAL	55/M	7600	48	46	6	7800	50	45	5	14	12	12.0	12.0	25	24	NIL	NIL	NIL	NIL	NIL	NIL
11.	2164	SEKAR	48/M	9000	49	45	6	9200	50	45	5	19	18	13.0	13.6	26	27	NIL	NIL	NIL	NIL	NIL	NIL
12.	3143	MARIYAPPAN	45/M	7400	53	41	6	7600	52	40	8	17	16	10.7	11.0	30	31	NIL	NIL	NIL	NIL	NIL	NIL
13.	4424	LOGANATHAN	39/M	9400	57	38	5	9500	59	36	5	14	14	10.6	10.8	25	24	NIL	NIL	NIL	NIL	NIL	NIL
14.	7385	SEKAR	31/M	10100	60	34	6	9200	60	36	4	18	15	11.0	11.1	34	33	NIL	NIL	NIL	NIL	NIL	NIL
15.	8514	MOORTHY	50/M	7800	55	38	7	7900	54	42	4	15	14	9.0	9.3	34	33	NIL	NIL	NIL	NIL	NIL	NIL
16.	8967	JEYAGOPALAN	55/M	9800	55	39	6	9800	55	41	4	13	12	10.2	10.1	37	36	NIL	NIL	NIL	NIL	NIL	NIL
17.	8907	NEELAMEGAM	55/M	9700	60	36	4	9800	60	35	5	14	13	10.6	10.0	29	28	NIL	NIL	NIL	NIL	NIL	NIL
18.	9353	ARUMUGAM	45/M	8600	55	39	6	8700	56	38	6	15	14	10.8	10.1	29	30	NIL	NIL	NIL	NIL	NIL	NIL
19.	7654	SHAMSHED BEGAM	45/F	8000	55	39	6	8000	57	37	6	14	15	11.0	10.1	35	37	NIL	NIL	NIL	NIL	NIL	NIL
20.	8765	SHAHJAHAN	50/M	9200	61	36	3	9300	62	35	3	15	13	9.0	9.9	28	29	NIL	NIL	NIL	NIL	NIL	NIL

Sl. No.	O.P. No.	Name	Age/ Sex	4.3.8 HAEMATOLOGICAL REPORT														URINE ANALYSIS					
				BEFORE TREATMENT				AFTER TREATMENT				ESR (mm)				BL.UREA		BT			AT		
				TC CU/mm	DC			TC CU/mm	DC			BT	AT	Hb(Gm)		BT	AT	Alb	Sug	Dep	Alb	Sug	Dep
					P	L	E		P	L	E	1 hr	1hr	BT	AT								
21.	7865	ABDUL RAZEB	60/M	9400	55	32	13	9500	57	33	6	15	14	9.0	9.3	23	22	NIL	NIL	NIL	NIL	NIL	NIL
22.	7874	SUDHAKAR	51/M	7600	48	46	6	7800	52	43	5	14	13	10.2	10.1	34	33	NIL	NIL	NIL	NIL	NIL	NIL
23.	647	RATHANAVEL	55/M	9700	59	36	5	9430	65	30	5	13	24	10.6	10.6	33	35	NIL	NIL	OPC	NIL	NIL	NIL
24.	2597	CHINNAPPA	56/M	9200	53	40	7	9200	53	42	5	14	12	10.8	10.8	25	24	NIL	NIL	NIL	NIL	NIL	NIL
25.	4576	MEGALA	39/F	7600	63	32	5	8000	52	44	4	16	15	12.0	12.4	30	28	NIL	NIL	OPC	NIL	NIL	NIL
26.	7246	PONNURANGAM	41/M	9400	57	36	7	9100	60	36	4	15	14	12.0	12.7	23	22	NIL	NIL	OPC	NIL	NIL	NIL
27.	6908	BASKER	54/M	8700	59	35	6	8800	58	56	6	14	13	13.0	13.7	34	33	NIL	NIL	NIL	NIL	NIL	NIL
28.	354	PARVATHY	58/F	9800	63	31	6	9400	62	33	5	14	14	10.0	10.4	33	35	NIL	NIL	NIL	NIL	NIL	NIL
29.	5692	GURUNATHAN	59/M	9800	64	32	4	8500	52	44	4	12	11	9.0	9.3	29	30	NIL	NIL	NIL	NIL	NIL	NIL
30.	7824	SAROJA	68/F	9600	62	33	5	9900	62	34	5	12	12	12.0	12.3	30	28	NIL	NIL	NIL	NIL	NIL	NIL
31.	9516	PALANI	42/M	6100	64	31	5	6300	51	44	5	12	14	11.0	11.6	23	22	NIL	NIL	NIL	NIL	NIL	NIL
32.	7718	JYOTHI	49/F	9800	59	36	5	9800	59	37	4	11	12	13.0	13.6	34	33	NIL	NIL	NIL	NIL	NIL	NIL
33.	7746	AALAMATHY	70/M	9200	52	39	9	9200	58	38	4	16	15	11.0	11.4	29	30	NIL	NIL	NIL	NIL	NIL	NIL
34.	3131	RABANI	37/M	7800	55	38	7	7900	54	42	4	15	14	9.0	9.3	30	28	NIL	NIL	NIL	NIL	NIL	NIL
35.	9588	JEYAMANI	45/M	9800	55	39	6	9800	55	41	4	13	12	10.2	10.1	23	22	NIL	NIL	NIL	NIL	NIL	NIL
36.	3245	REVATHY	46/F	9700	60	36	4	9800	60	35	5	14	13	10.6	10.0	34	33	NIL	NIL	NIL	NIL	NIL	NIL
37.	3546	SELVI	40/F	8600	55	39	6	8700	56	38	6	15	14	10.8	10.1	29	30	NIL	NIL	OPC	NIL	NIL	NIL
38.	3547	PRIYA	16/F	8000	55	39	6	8000	57	37	6	14	15	11.0	10.1	35	37	NIL	NIL	OPC	NIL	NIL	NIL
39.	2597	SATHYA NATHAN	55/M	9200	61	36	3	9300	62	35	3	15	13	9.0	9.9	28	29	NIL	NIL	NIL	NIL	NIL	NIL
40.	7220	GANGAMMAL	6O/M	8700	59	35	6	8800	58	56	6	14	13	13.0	13.7	34	33	NIL	NIL	OPC	NIL	NIL	NIL

4.3.9. 24 HRS URINE VOLUME BEFORE AND AFTER *AVURI KUDINEER*

S.NO	IP.NO	NAME	AGE/ SEX	24 HRS URINE VOLUME	
				BEFORE TREATMENT	AFTER TREATMENT
1.	4251	JAMAL BATCHA	48/M	950ML	1400ML
2.	4326	RAMACHANDRAN	63/M	1200ML	1860ML
3.	4773	MUNUSAMY	50/M	1500ML	2300ML
4.	4720	KANUSAMY	55/M	1400ML	2500ML
5.	5218	SUBRAMANI	53/M	1500ML	2250ML
6.	5218	MURUGAN	50/M	1200ML	1750ML
7.	5541	MANAVALAN	62/M	1200ML	1950ML
8.	6234	PANDIYAN	52 /M	1400ML	2100ML
9.	7415	KANNAN	55/M	1300ML	2030ML
10.	7669	JEYAPAL	55/M	1200ML	1830ML
11.	2164	SEKAR	48/M	950ML	1600ML
12.	3143	MARIYAPPAN	45/M	1000ML	1600ML
13.	4424	LOGANATHAN	39/M	1140ML	1700ML
14.	7385	SEKAR	31/M	1360ML	1860ML
15.	8514	MOORTHY	50/M	1650ML	2430ML
16.	8967	JEYAGOPALAN	55/M	1540ML	2100ML
17.	8907	NEELAMEGAM	55/M	1450ML	2030ML
18.	9353	ARUMUGAM	45/M	1350ML	1900ML
19.	7654	SHAMSHED BEGAM	45/F	950ML	1500ML
20.	8765	SHAHJAHAN	50/M	945ML	1500ML
21.	7865	ABDUL RAZEB	60/M	1070ML	1490ML

22.	7874	SUDHAKAR	51/M	1020ML	2395ML
23.	3663	CHINNAPPA	56/M	1300ML	2180ML
24.	647	RATHNAVEL	38/M	900ML	1700ML
25.	4576	MEGALA	39/F	980ML	1750ML
26.	7246	PONNURANGAM	41/M	900ML	1530ML
27.	6908	BASKER	54/M	1050ML	1900ML
28.	354	PARVATHY	58/F	1650ML	2100ML
29.	5692	GURUNATHAN	59/M	1250ML	1800ML
30	7824	SAROJA	68/F	2220ML	2960ML
31.	9516	PALANI	42/M	1300ML	1950ML
32	7718	SRINEEVASAN	35/M	1400ML	2150ML
33.	7746	SURAJ	25/M	1280ML	1750ML
34.	3131	RABANI	37/M	1350ML	1880ML
35.	9588	JEYAMANI	45/M	1530ML	2100ML
36.	3245	REVATHY	46/F	1400ML	2000ML
37.	3546	SELVI	40/F	1400ML	1900ML
38.	3547	HARIPRIYA	16/F	1150ML	1800ML
39.	2597	SATYANATHAN	55/M	1120ML	1800ML
40.	7220	GANGAMMAL	60/F	950ML	1600ML

RESULTS AND DISCUSSION

PHARMACOGNOSTIC ASPECT

Macroscopic features:

Avuri is an erect, slightly hairy shrub, 1 to 1.5 meters high, found throughout India and widely cultivated in many parts of the country

Leaf: Compound, imparipinnate; leaflets 9 to 13; 1 to 5 cm long and 0.3 to 1.2 cm wide, oblong or oblanceolate with short mucronate tip; pale green to dark green, no characteristic odour and bitter in taste.

Microscopic features:

Leaf

Lamina: Transverse section of lamina shows a dorsiventral structure (Fig. 3 S). Epidermis is single layered. It is characterized by common occurrence of angular folds in the anti-clinical walls by the development of papillae and frequently mucilaginous. Stomata present on both the epidermis. Trichomes present on both the surfaces but abundant on lower surface. The mesophyll is differentiated into outer 3 layered columnar closely packed palisade tissue and inner 2 to 4 layers of round to oval parenchymatous spongy tissue (Fig. 2 S).

A few patches of veins scattered between palisade and spongy tissues. A few prismatic calcium oxalate crystals are present in mesophyll cells.

Midrib - Transverse section of midrib shows a small depression on adaxial face and convexity on the abaxial face (Fig. 2 Q, R). Epidermis is made up of single layer of rectangular cells. The hypodermal region of adaxial side consists of 2 or 3 layers of collenchyma cells and abaxial side composed a single row of collenchyma cells. A single, collateral crescent shaped vascular bundle is situated in the centre. Pericyclic fibres present around the main vascular bundle. The ground tissue is made up of round to oval thin walled parenchyma cells. Prismatic and rod shaped crystals are seen in ground tissue and phloem parenchyma cells.

Epidermis in surface view

Adaxial foliar epidermal cells are penta- octagonal in surface view. The margins of the cells are slightly wavy (Fig. 2 U). It is perforated by paracytic stomata that are similar in size to those seen on abaxial epidermis but the frequency is less. The abaxial epidermis is made up of cells that are wavy in outline in surface view (Fig. 3 W). Unicellular and two armed trichomes are present.

Stomatal index for adaxial epidermis 12 - 16/ mm^2;

Abaxial epidermis 32 to 38/ mm^2;

Vein islet number 16 to 18/ mm^2 (Fig. 3 X);

Palisade ratio 3.

Trichomes:

There are 2 types of non glandular trichomes.

1. Unicellular trichome with curved up (Fig. 3 V).

2. Common occurrence of equal or unequal two armed trichomes (Fig. 3 T).

Powder:

Greenish gray; shows groups of mesophyll cells, aseptate fibres, pitted vessels; unicellular trichomes, two armed trichomes, simple, rounded to oval starch grains measuring 3 - 11 μm in dia., rarely oil globules, vessels with spiral thickening and prismatic crystals of calcium oxalate.

Fig. 1

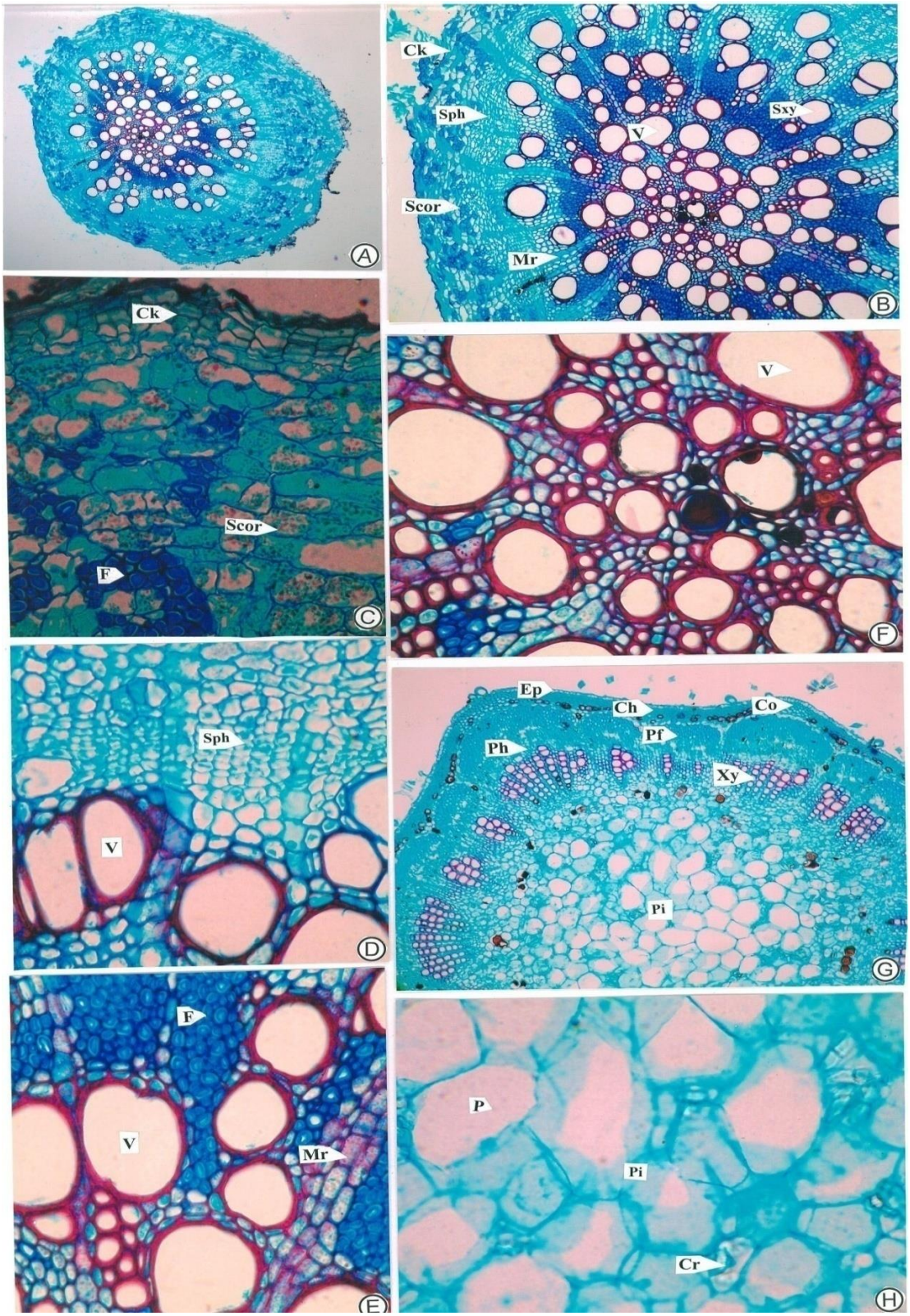
A	-	T.S. of root - Ground plan
B	-	T.S. of root – A portion enlarged
C	-	T.S. of root showing cork & cortex
D	-	T.S. of root showing phloem & xylem
E	-	T.S. of root showing vessels, medullary rays & fibre
F	-	T.S. of root - Central region
G	-	T.S. of stem - A portion enlarged
H	-	T.S. of stem - Pith showing crystals

Fig. 2

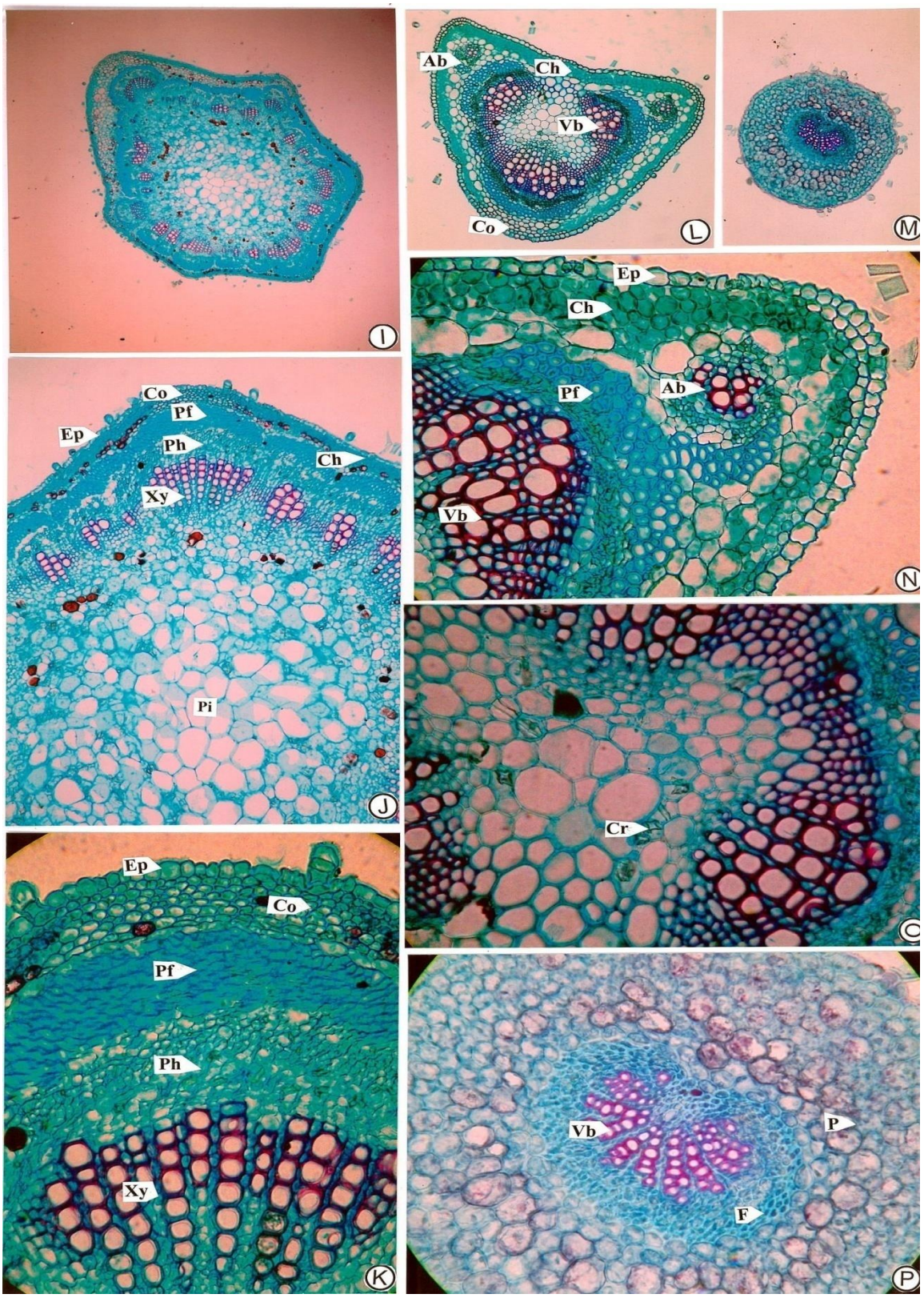
I	-	T.S. of stem - Ground plan
J	-	T.S. of stem - A portion enlarged
K	-	T.S. of stem - A portion enlarged
L	-	T.S. of petiole
M	-	T.S. of petiolule
N	-	T.S. of petiole showing accessory bundle
O	-	T.S. of petiole – Central region
P	-	T.S. of petiolule – Enlarged

Fig. 3

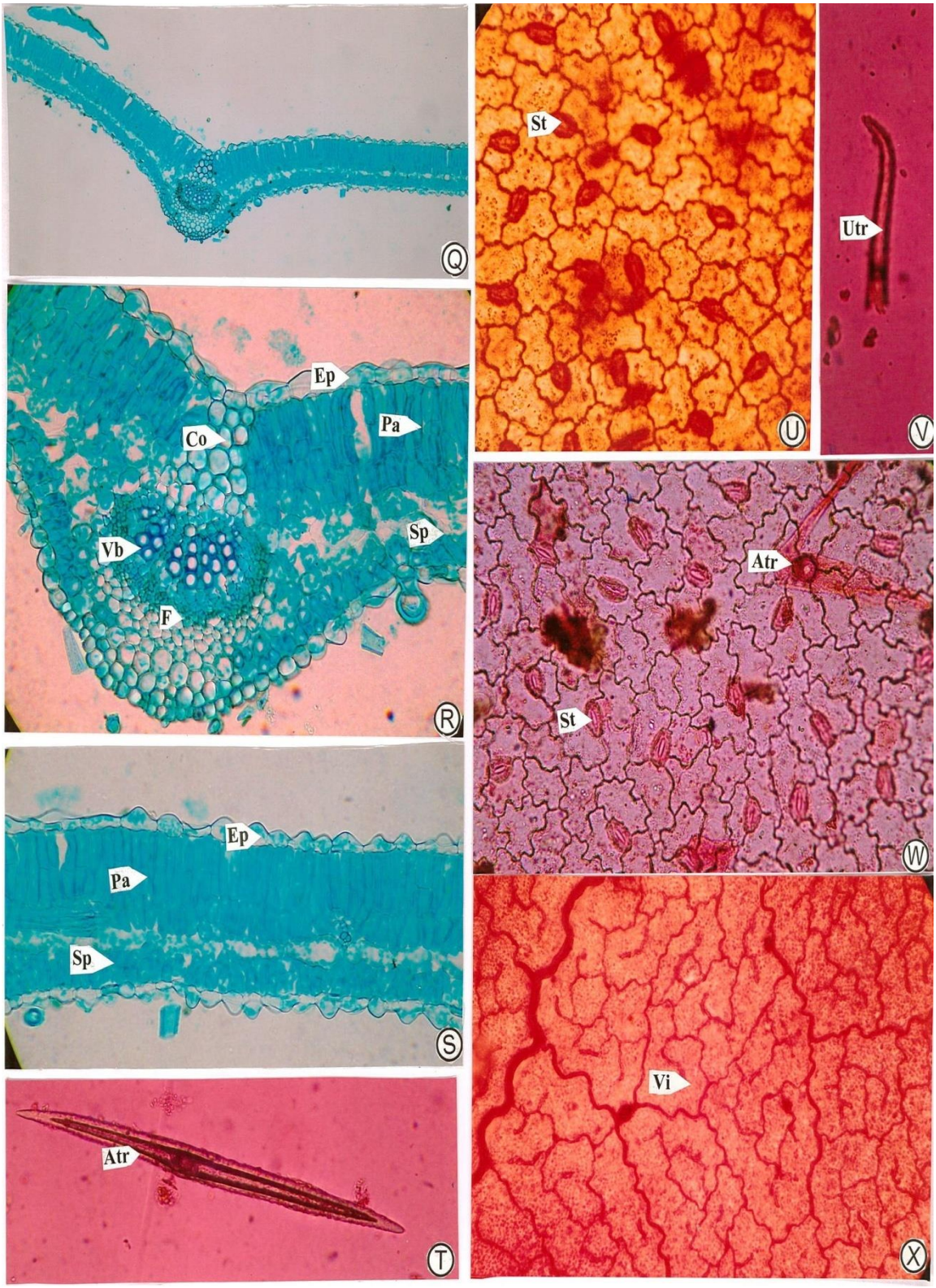
Q	-	T.S. of leaf
R	-	T.S. of midrib
S	-	T.S of lamina
T	-	Two armed trichome
U	-	Adaxial foliar epidermis
V	-	Unicellular trichome
W	-	Abaxial foliar epidermis
X	-	Vein islets



4.2.1.1. T.S. PLANT FIG 1



4.2.1.2. T.S. OF PLANT.FIG.2



4.2.1.3 .T.S OF PLANT.FIG.3

4.2.2.1 PHYSICO-CHEMICAL ANALYSIS:

S.No	Parameters	Results
1.	Ash(%w/w)	9.75
2.	Acid insoluble ash (%w/w)	0.93
3.	Water soluble ash(%w/w)	5.9
4.	Moisture content(%w/w)	8.66
5.	Water soluble extractive(%w/w)	11
6.	Alcohol soluble extractive(%w/w)	6.5
7.	pH	7.2-7.5

4.2.2.2. RESULTS OF ICP-OES OF INDIGO:

S.NO	ELEMENT	CONCENTRATION
1.	Ca	158.144mg/L
2.	Na	115.117mg/L
3.	K	195.248mg/L
4.	S	9.98mg/L
5.	P	59.873mg/L
6.	Hg	BDL
7.	Fe	62.152mg/L
8.	As	BDL
9.	Cd	BDL
10	Pb	BDL
11.	Mg	38.140mg/L

4.2.2.3. FTIR RESULTS:

A/NEC [The code given at IIT for *Avuri*-indigo is listed below:

Frequency bands	Functional groups	Symbols	Percentage
3404 cm^{-1}	- alcohols, phenols	O–H /–N–H groups	96%
2939 cm^{-1}	- ammonium groups	N–H groups	93%
2849cm^{-1}	-methylene groups	–C–H–groups	88%
2354 cm^{-1}	- ammonium groups	N–H groups	83%
2119 cm^{-1}	-alkynes	–C≡C–groups	78%
1622 cm^{-1}	-alkenes	–C=C– groups	93%
1388m^{-1}	-nitro	–N–O groups	86%

1227m^{-1}	-aliphatic amines	–C–N groups	84%
1012cm^{-1}	-alcohol/carboxylic, esters,ether.	–C–O groups	85%
987cm^{-1}	-alkenes	=C–H groups	84%
768cm^{-1}	-alkyl halides	C–Cl groups	78%
656cm^{-1}	-alkyl halides	C–Br groups	80%
562cm^{-1}	-alkyl halides	C–Br groups	78%

4.2.2.4. CHEMICAL ANALYSIS OF LEAVES OF AVURI

S.NO	ACID RADICALS	RESULT [**+**] / [**–**]
1.	SULPHATE	**+**
2.	CHLORIDE	**+**
3.	PHOSPHATE	**+**
4.	CARBONATE	**+**

4.2.2.5. RESULTS OF PHYTOCHEMICAL ANALYSIS:

PHYTOCHEMICAL ANALYSIS OF AVURI KUDINEER OF LEAVES COARSE POWDER

S.No:	PHYTOCHEMICALS	PRESENCE [+] /ABSENCE [–] CONCENTRATION OF KUDINEER			
		1/2	1/4	1/6	1/8
1.	CARDIAC GLYCOSIDES	+	+	+	+
2.	TERPENOIDS	+	+	+	+
3.	SAPONINS	+	+	+	+
4.	CARBOHYDRATES	+	+	+	+

DISCUSSION:

From the physico- chemical analysis of the indigo crude leaves powder,the acid insoluble ash value was than 1.0.less and it was revealed the quality of the drug.The extractives values also indicate the the quality of the drug and are helping us to interpret the digestion and solubility capacity of the crude extract.

From the ICP-OES analysis it shows the presence of K,Na,Ca,Fe,Mg,Fe,P which are mainly concerned with the osmotic regulation,membrane integrity, cellular metabolism and the buffers system of the body.Hence it is an anti-oxidant when taken daily.Since it contains K in large amounts the drug will not disturb the electrolyte imbalance to the

body compared to other drugs.The functional groups indicate the phytochemical contents ensuring the rich content of terpenoid by increased amount of alkenes.The chemical analysis it shows the presence of buffers of anions namely carbonate ,phosphate,sulphate,chloride radicals which enhances the osmotic regulation of the cells and its metabolism.In the phytochemical analysis comparison of the decoction of indigo is to reveal the content of the decoction at various concentrations which shows the presence of terpenoids and cardiac glycosides.The cardiac glycoside enhance the cardiac output to the kidneys and enhances the diuresis.The terpeoids are lipid soluble chemical found in decoction of indigo leaves.Terpenoids are anti-microbial,diuretic in action. The presence of carbohydrates rnhances the solubility and concentration of cardiac glycosides in decoction.

4.2.3. TOXICOLOGICAL STUDY OF *AVURI KUDINEER:*

RESULTS AND DISCUSSION:

In the acute toxicity study, Observations include changes in skin and fur, eyes and mucous membranes, and also respiratory, circulatory, autonomic and central nervous systems, and somatomotor activity and behavior pattern. Attention was directed to observations of tremors, convulsions, salivation, diarrhea, lethargy, sleep and coma. The principles and criteria summarized in the Humane End points Guidance Document taken into consideration.

Animals found in a moribund condition and animals showing severe pain or enduring signs of severe distress was humanely killed. When animals are killed for humane reasons or found dead, the time of death was recorded. Neither mortality nor any gross behavioral changes were observed during and after the treatment. The Avuri kudineer was found to be safe up to 5000 mg/kg. Hence, One-tenth and One fifth of the maximum tolerable dose was taken as an effective therapeutic dose.

4.2.3.Table 1: Dose finding experiment and its behavioral Signs of Toxicity of AKL

No	**Dose mg/kg**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	**500**	+	+	-	+	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-
2	**1000**	+	+	-	+	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-
3	**2000**	+	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	**5000**	+	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1. Alertness 2. Aggressiveness 3. Pile erection 4. Grooming 5. Gripping 6. Touch Response 7. Decreased Motor Activity 8. Tremors 9. Convulsions 10. Muscle Spasm 11. Catatonia 12. Muscle relaxant 13. Hypnosis 14. Analgesia 15.Lacrimation 16. Exophthalmos 17. Diarrhoea 18. Writhing 19. Respiration 20. Mortality

RESULTS AND DISCUSSION:

4.4.1DIURETIC ACTIVITY OF AVURI KUDINEER IN RATS

In the acute toxicity study, Observations include changes in skin and fur, eyes and mucous membranes, and also respiratory, circulatory, autonomic and central nervous systems, and somatomotor activity and behavior pattern. Attention was directed to observations of tremors, convulsions, salivation, diarrhea, lethargy, sleep and coma. The principles and criteria summarized in the Humane End points Guidance Document taken into consideration.

Animals found in a moribund condition and animals showing severe pain or enduring signs of severe distress was humanely killed. When animals are killed for humane reasons or found dead, the time of death was recorded. Neither mortality nor any gross behavioral changes were observed during and after the treatment. The *Avuri kudineer* was found to be safe up to 5000 mg/kg. Hence, One-tenth and One fifth of the maximum tolerable dose was taken as an effective therapeutic dose.

In the present study, Frusemide treated rats showed a significant increase in volume of urine and urinary excretion of sodium, potassium ($p<0.01$) but not chloride as compared to control while untreated rats did not show any significant increase in urine volume but has high electrolyte excretion potential. Higher electrolyte excretion ($p<0.01$) was observed in *Avuri kudineer* and significant increase in urine volume. The Avuri kudineer at high dose of 1000 mg/kg showed significant increase in volume of urine and also urinary excretion of sodium, potassium and chloride.

The *Avuri kudineer* has shown diuretic activity ($p<0.01$) wherein significant increase in Na^+ but not in K^+excretion when compared to control was observed. Results of present investigation showed that *Avuri kudineer* is most effective in increasing urinary electrolyte concentration of all the ions i.e. Na^+, K^+ and Cl^-. The control of plasma sodium is important in the regulation of blood volume and pressure; the control of plasma potassium is required to maintain proper function of cardiac and skeletal muscles. The regulation of Na^+/ K^+ balance is also intimately related to renal control of acid-base balance. The K^+ loss that occurs with many diuretics may lead to hypokalemia. For this reason, generally potassium-sparing diuretics are recommended. Over all, in the diuretic activity screening, the activity of the *Avuri kudineer* of started at 1h of the study at both 500 and 1000 mg/kg body weight dose levels. The maximum diuretic effects of the samples were observed after 1h and 2h of the study and the diuretic activity was observed to be increase in a dose dependent manner. The diuretic activity of furosemide

was started at 1h of the study and the maximum effect was observed at 2h of the experiment. The diuretic activity of the *Avuri kudineer* was comparable to that of furosemide.

This study was performed on Wistar rats. Mean urine volumes were significantly elevated in *Avuri kudineer* treated rats throughout the experimental period. Moreover, diuretic and natriuretic effects were also observed, suggesting an action on the renal function. The *Avuri kudineer* seems to have no toxic effect at the higher dose. Administration of *Avuri kudineer* to rats increased urine output. Sodium, potassium and chloride concentrations increased and further studies are necessary to clarify the diuretic effect.

4.2.4.1. Table 1. Effect Of Avuri kudineer On Urinary Parameters

Group	**Urine volume (ml)/3rats (4h)**	**Urine Electrolytes**		
		Sodium (mMol/ l)	**Potassium (mMol/l)**	**Chloride (mMol/l)**
Normal Control	3.89±0.38	118.25±5.22	100.05±2.36	14.34±1.20
AKL 500mg/kg	4.23±0.64**	115.36±4.96	110.10±3.15*	16.82±1.35
AKL 1000mg/kg	5.51±0.68**	133.14±4.85**	115.26±3.52**	15.16±1.45
Furosemide (20 mg/kg)	7.22±0.78**	106.20±2.61**	98.33±2.88**	18.12±1.56*

Values are expressed as mean±standard error of mean (S.E.M) (N=6). Effects are statistically significant, *P<0.05**;**P <0.01 compared to normal control

RESULTS AND DISCUSSION

4.24.2. NEPHROPROTECTIVE ACTIVITY OF AVURI KUDINEER:

The acute toxicity of *Avuri kudineer* was not occurred at 2000mg/kg (as per the OECD - 425) on mice but toxic symptoms like aggressiveness, tremors, mild diarrhoea, dyspnoea and abdominal writhing were observed after 48 hours of oral drug treatment at the dose level of 5000 mg/kg and total duration of study was 14 days. Hence, one-tenth and one twentieth dose was selected as therapeutic dose from maximum tolerable dose from toxicity study. Cisplatin is a common, highly toxic chemotherapeutic agent. Cisplatin is a widely used and effective chemotherapeutic agent that binds to and alkylates DNA and triggers transcription inhibition, cell cycle arrest, and apoptosis. In addition, Cisplatin generates reactive oxygen species, which are known as one of the pathogenic intermediates following chemotherapy.

Cisplatin is dose-limited by a high incidence of toxicities, including progressive and irreversible nephrotoxicity. *Avuri kudineer* with Cisplatin treated rats had normal BUN after the i.p. model of Cisplatin administration, whereas the Cisplatin with 2% CMC treated rats had abnormally high BUN. Also, data indicate that the *Avuri kudineer* prior to Cisplatin animals had normal creatinine levels, whereas the creatinine levels in the Cisplatin with 2% CMC-treated rats were abnormally elevated. ($P<0.01$). In present study, the rats treated with single dose of cisplatin shown marked reduction of body weight as compared to normal group also caused a mark reduction of glomerular filtration rate, which is accompanied by increase in serum creatinine level indicating induction of acute renal failure. The Avuri kudineer showed remarkable elevation in body weight with a significant ($P<0.01$) increase in urine volume output.

Creatinine is mostly derived from endogenous sources by tissue creatinine breakdown. Thus serum urea and uric acid concentration is often considered a more reliable renal function predictor than serum creatinine. However, the urine creatinine, urea and uric acid decreased significantly ($P<0.01$) as compared with the control group. The serum creatinine and urea were found to be significantly ($P<0.01$) low when compared with the control group.

The effect Avuri kudineer on cisplatin nephrotoxicity was evaluated mainly with the support of change of urine volume. After injected the single dose of cisplatin (10mg/kg) result increased urea and creatinine level as compare to control group and it was recovered significantly (P<0.01) in *Avuri kudineer* treatment but less Significant (P<0.05) on creatinine recovery in 500mg/kg treated group. Kidney homogenate analysis of AKL 1000mg/kg group for oxalate, calcium and Phosphate was 1.60, 3.33 and 3.08mg/g respectively. Similarly, the serum BUN was resulted in 38.22mg/dl. The change of renal function observed in the rat correlate well with the nephrotoxicity effect with man. The increased urea and creatinine level suggests the reduction of glomerular filtration rate. But protective treatment of Avuri kudineer with cisplatin significantly reduced the level of urea and creatinine that indicates increase glomerular filtration rate at all the higher dose treated in AKL. In our study, it was conformed that a single dose cisplatin significantly induced serum creatinine in wistar rats four days after administration. Result had shown that significant reduction of serum creatinine level with protective treatment of 1000mg/kg but less significantly 500mg/kg dose of *Avuri kudineer* leaf extract.

4.2.4.2.1. Table.1. Measurement of Body weight changes after Avuri kudineer treatment

Drug treatment	Periodical Weight changes after Avuri kudineer treatment				
	Day1	**Day4**	**Day7**	**Day10**	**Day14**
Normal (Saline)	220.12±2.45	224.2±3.50	230.15±3.13	233.16±2.50	235.11±3.10
Control (Cisplatin alone)	214.14±2.19	212.81±4.91	216.10±3.21	210.10±3.87	206.45±3.41
AKL 500mg/kg+ Cisplatin	212.13±2.46	208.38±2.66	214.52±3.40	218.60±3.12	233.78±3.78
AKL 1000mg/kg + Cisplatin	217.20±3.14	216.40±4.03	231.16±4.12	228.18±3.60	229.13±3.00

Values are the mean ± S.E.M. of six rats/treatment. All the animal body weight was significant from day 10 **p<0.01, Vs Control from day 1 comparatively.

4.2.4.2.2. Table 2: Effect of treatment with Avuri kudineer on Serum urea, Uric acid and Creatinine levels.

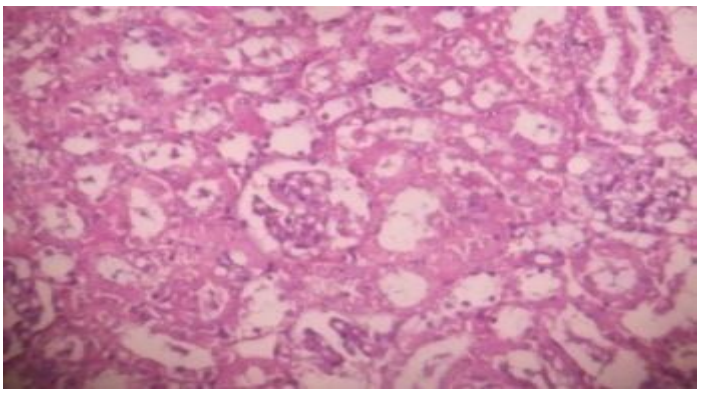
S.No.	Groups	Urea (mM/l)	Uric acid (µM/l)	Creatinine (µM/l)
1.	Normal (2% CMC	8.12± 0.20	128.11 ± 5.33	52.38 ± 2.16
2.	Control (Cisplatin alone)	12.61 ± 0.81	98.72 ± 4.15	82.76 ± 2.24
3.	AKL 500mg/kg+ Cisplatin	10.88 ± 0.71*	112.15 ± 3.48**	77.61 ± 2.18*
4.	AKL 1000mg/kg+ Cisplatin	9.04 ± 0.56**	120.06±5.21**	61.01 ± 3.24**

Values are the mean ± S.E.M. of six rats/treatment. Significance *p <0.05,

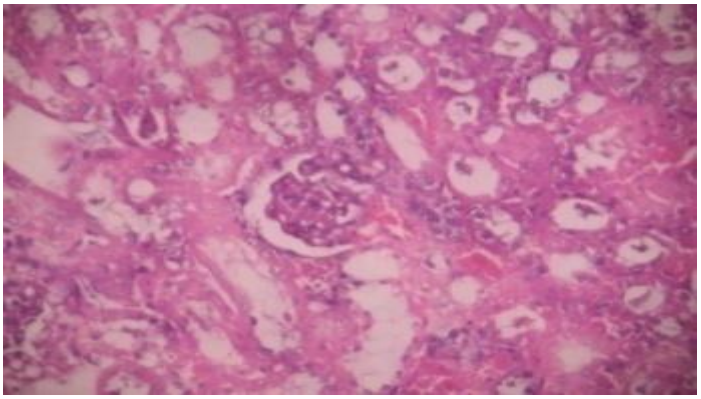
**p<0.01 Vs Control.

4.2.4.2.1. HISTOPATHOLOGICAL FEATURES

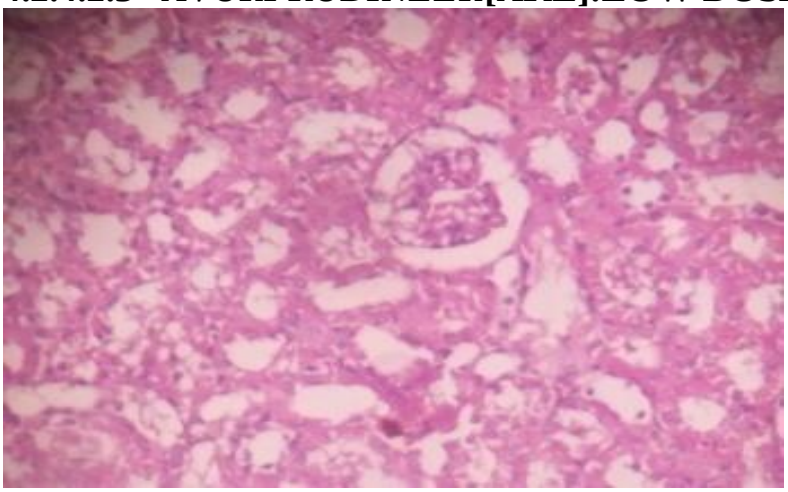
NORMAL



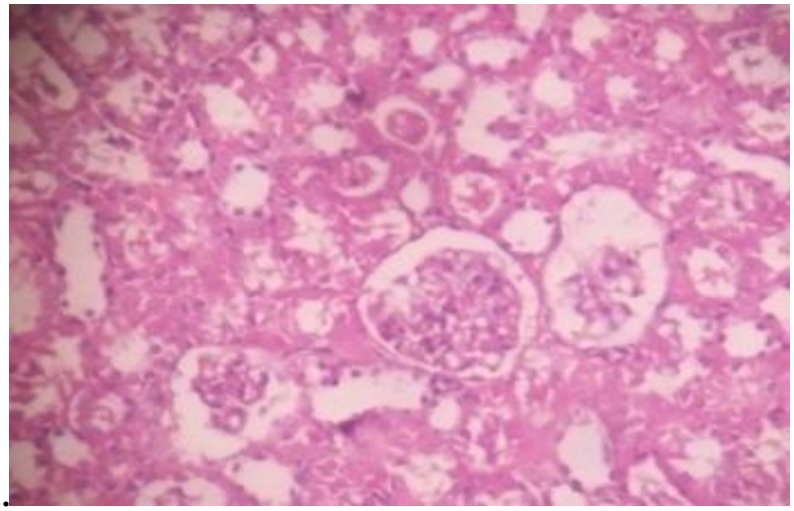
4.2.4.2.2 CISPLATIN



4.2.4.2.3 AVURI KUDINEER[AKL]:LOW DOSE:



4.2.4.2.4 AVURI KUDINEER[AKL]:LOW DOSE:



The histological features found from the tissue sections of different groups and the photomicrographs of tissue sections of kidney are presented. The histopathology of tissue sections suggest that the control group had encountered

vast histological damages as evidenced by the glomerular and tubular congestion with abnormal Bowman's capsule, blood vessel congestion, epithelial cell desquamation, and presence of tubular cast. Inflammatory cells were also seen in kidney section from the Cisplatin-treated group. In Cisplatin group, mononuclear cells infiltrated mainly in the sub-capsular region and interstitial edema was also noticed.

Hyaline changes, vacuolization and necrosis in the proximal tubular epithelial cells were also seen. Concurrent treatment with the *Avuri kudineer* was found to reduce such changes in kidney histology induced by Cisplatin

The histological features of the *Avuri kudineer* 500mg/kg treated group showed minimal cellular damage in contrast to the control group. The *Avuri kudineer* 1000group showed almost normal glomerular and tubular arrangements with minimal blood vessel congestion, epithelial cell desquamation, and presence of tubular cast with very few inflammatory cells.

The present study aimed to evaluate the protective effect of *Avuri kudineer* against cisplatin-induced nephropathy in rats. Cisplatin-administered rats (control group) had encountered acute kidney dysfunction as evidenced by elevation in serum urea and creatinine, decreased urine output and body weight with multiple histological damages. Treatment with the *Avuri kudineer* at the dose level of 500 and 1000mg/kg b.w., for 14 days significantly lowered the serum level of creatinine, urea and uric acid with a significant weight gain, and increased urine output when compared with the control group.

The histological damages in the *Avuri kudineer* treated group were minimal in contrast to the toxic rats. The statistical significance of the nephroprotective activity of *Avuri kudineer* treated group were compared against control were found almost equal as both groups gained significance ($P<0.01$) against the control group in most of the parameters including serum urea and creatinine.

Out of two doses of *Avuri kudineer* higher doses showed striking nephrocurative activity and showed significant nephroprotective activity. These biochemical results were supported by hisptopathological data.

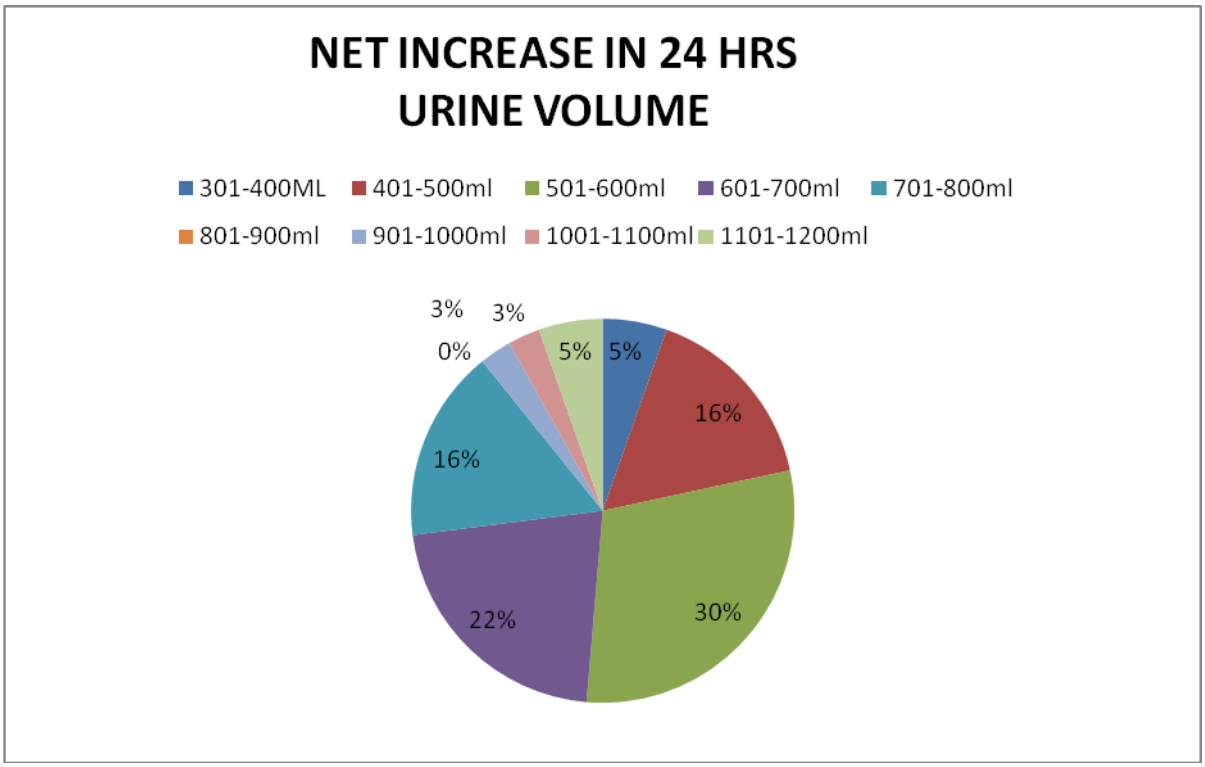
The results of our study suggest that the *Avuri kudineer* possesses nephroprotective potential on the dose dependant manner and substantiate the therapeutic utility in renal injury.

Extensive further research is needed to elucidate the exact mechanism of nephroprotective action of the *Avuri kudineer*.

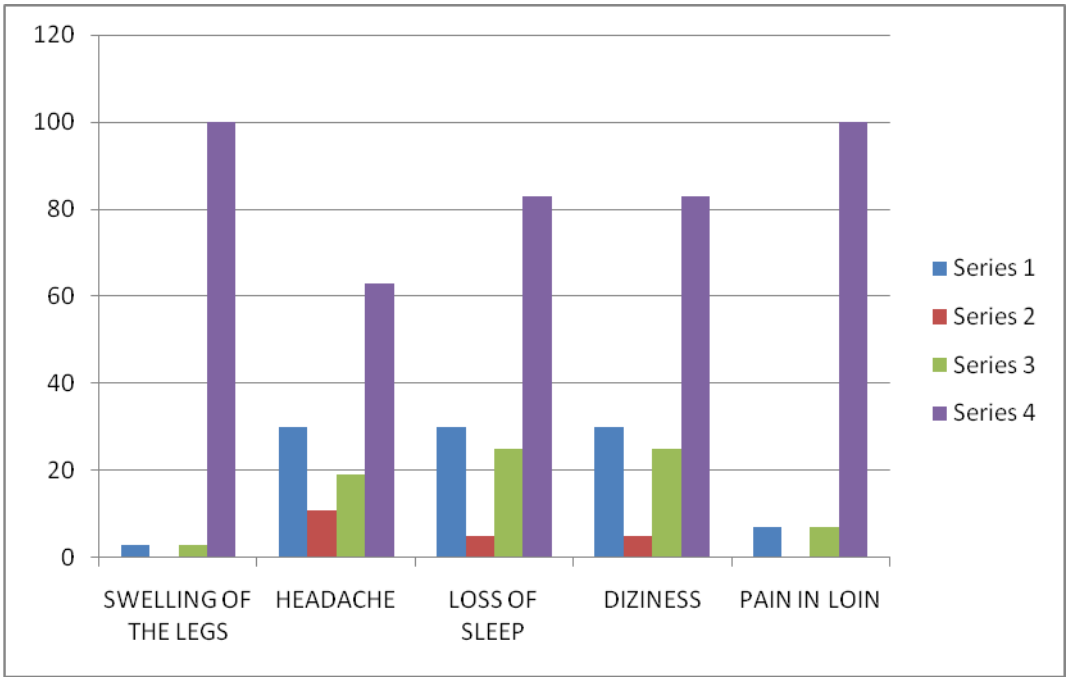
According to the pathological result it can be inferred that *Avuri kudineer* had protective effect against degenerative injury caused by Cisplatin

4.3. RESULTS AND DISCUSSION OF CLINICAL STUDY:

4.3.1. NET INCREASE IN URINE VOLUME



4.3.2 COMPARISON OF CLINICAL FEATURES:

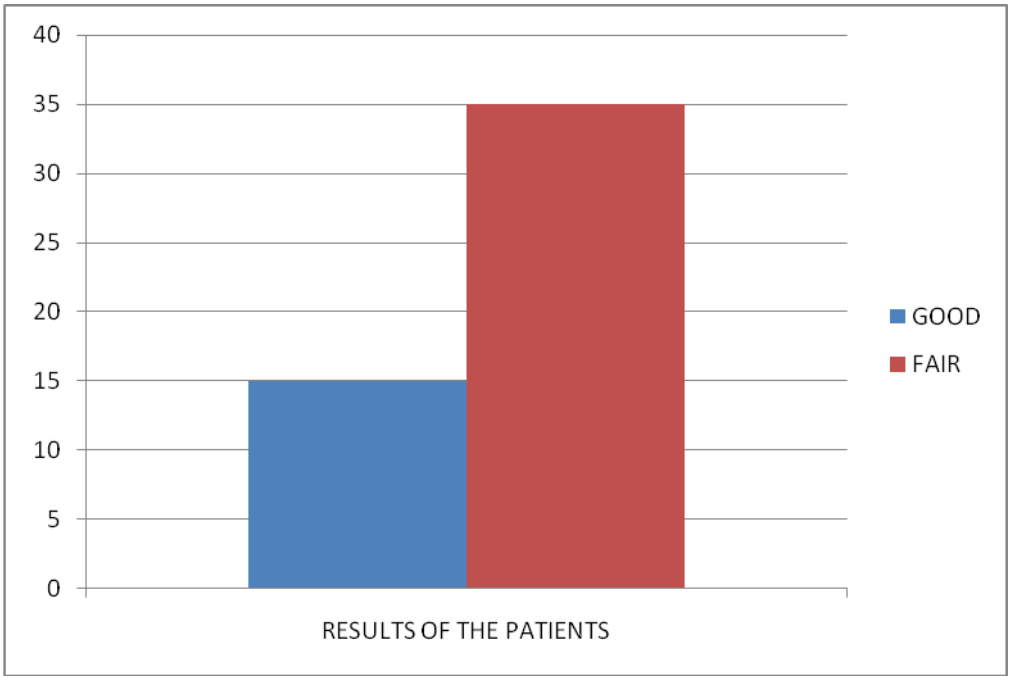


INFERENCE:
Among 40 patients,

- 3 out of 3 patients were relieved from swelling of the legs.
- 11 out of 30 patients were relieved from headache
- 25 out of 30 patients were relieved from loss of sleep
- 25 out of 30 patients were relieved from dizziness.
- 7 out of 7 patients were relieved from pain in the loins.

4.3.4. GRADATION RESULT

SL. NO	LEVEL OF IMPROVEMENT	NO.OF PATIENTS	PERCENTAGE (%)
1	Good	15	37.5
2	Fair	25	62.5
TOTAL		40	100



Clinical study:

40 patients of both sexes were selected.

Among the 40 patients, 16 patients were treated as out- patients in the Post graduate department of Gunapadam, Govt.Siddha medical college hospital and Govt. Arignar Anna hospital, Arumbakkam, Chennai- 106. 24 patients were treated as in - patients.

The patients were observed regularly.

The trial drug *Avuri kudineer* was given to the patients at the dose of 30 ml twice a day. On administration of *Avuri kudineer* 30 ml twice for 3-7 weeks showed significant Diuretic activity.

Out of 40 patients 11 pts excreted an increase of 301-400ml 0f urine per day,8 pts excreted an increase 401 to 500ml0f urine per day, 6 pts excreted an increase 700-800ml 0f urine per day, 6 pts excreted an increase 401-500ml 0f urine per day 2pts excreted an increaseof 301- 400ml,other 2pts 1 excreted an increase 101-2000ml 0f urine per day 1pt excreted an increase 1000ml 0f urine per day.

Among 30 SHT patients, 19 out of 30 patients were relieved from headache , out of 3 oedema patients,3 were relieved from swelling of the legs, out of 30 SHT patients 25 were relieved from dizziness, out of 30 SHT patients 25 were relieved from loss of sleep, out of 7 urolithiatic patients 7 were relieved from pain in the loins

The results revealed that the drug possess 62.5% good relief, 37.5% fair relief.

STATISTICAL ANALYSIS

DESCRIPTIVE STATISTICAL FOR IMPROVEMENT OF URINE OUTPUT IN PATIENTS

PAIRED "t" TEST RESULT:

"p" value & statistical significance:

Treatment	Signs & symptoms	Mean	S.D	S.E.M
Before treatment	40	1359.78	444	92.88
After treatment	40	2021.96	578.68	120.60

From the table we calculated the descriptive statistic like Mean, S.D & S.E.M of Mean for the improvement score before and after treatment.

"t" Table:

t-Table	S.D	"t" Value	"p" Value
Pre vs Post	22	15.57	0.0001

The two-tailed P value is less than 0.0001.By conventional criteria; this difference is considered to be extremely statistically significant.

Hence this study was found to be extremely statistically significant

CONCLUSION

The evaluation of the efficacy of the single drug of *'Avuri kudineer'* for diuretic and nephroprotective activity in the managements of oedema, urolithiasis and hypertension gave significant results.

The presence of terpenoids and cardiac glycosides and the inorganic constituents enhance the activity of the diuretic activity.

Pharmacological animal studied strengthens the study and acts as potent diuretic comparable to that of standard drug and spared the potassium loss in urine.Also protects the kidney from cisplatin induced damage which revealed the diuretic and anti-oxidant nature of *'Avuri kudineer'*.

Clinically, the drug relieved the symptoms of SHT, Urolithiasis, oedema and showed net increase in 24 hrs urine output.

No adverse reactions were produced during the period of the clinical study.

In total, avuri act as diuretic agent and can be applicable to the conditions which needs diuretic demands.

In addition it can also be given to the cancerous patients under the treatment of cisplatin since it showed chemopreventive effect against it and can be studied in future studies.

SUMMARY

The evaluation of the efficacy of the single drug of *'Avuri kudineer'* for diuretic and nephroprotective activity in the managements of oedema, urolithiasis and hypertension gave significant results.

The presence of terpenoids and cardiac glycosides and the inorganic constituents enhance the activity of the diuretic activity.The presence of

carbohydrates increases the solubility of the cardiac glycosides content.Hence this *kudineer* content enhances the diuretic activity.

Pharmacological animal studied strengthens the study and acts as potent diuretic comparable to that of standard drug and spared the potassium loss in urine.Also protects the kidney from cisplatin induced damage which revealed the diuretic and anti-oxidant nature of *'Avuri kudineer'*.

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ANNEXURE – VI

CONSENT FORM

I certify that I have disclosed all the details about the study in the terms readily understood by the patient.

DATE: **SIGNATURE**

NAME

CONSENT BY THE PATIENT

I have been informed to my satisfaction by the attending physician the purpose of the clinical trial and the nature of the drug treatment and follow up including the lab investigations to be performed to monitor and safeguard my body functions.

I am aware of my right to opt out of the trial at any time during the course of the trial without having to give reasons for doing so.

I ,exercising my free power of choice , hereby give my consent to be included as a subject in the clinical trial of AVURI KUDINEER for the TREATMENT UNDER DIURETIC CONDITIONS

DATE: **SIGNATURE**

NAME

Aringnar Anna Govt.Hospital of Indian Medicine and Homeopathy,Chennai-106.

Govt.Siddha Medical College , Chennai-106.				
Name of the study.	Diuretic and Nephroprotective activity of Avuri kudineer. Dose :30 ml tds . Duration:48 days. Diagnosis:			
OP NO:	Name:	Age:	Sex:	Religion:

Country: Marital status:	Personal Habits:	Past history: □DM □SHT □BA□TB□Allery □Epilepsy □Drug intake: □Surgery□Trauma Others;	Address:
Vitals:	PR	RR	BP	T˚

S.No	SYMPTOMS	Before treatment	After treatment[in weeks]						
			I	II	III	IV	V	VI	VII
1.	Changes in Urination								
2.	Fatigue								
3.	Nausea and Vomiting								
4.	Shortness of Breath								
5.	Dizziness								
6.	Flank Pain								
7.	Leg pain								
8.	Rt hypochondriac pain								
9.	Constipation								
Signature of the M.O.									

Inspection	Before	After treatment[in weeks]

		treatment	I	II	III	IV	V	VI	VII
1.	Swelling of legs								
2.	Pallor								
3.	Icterus								
4.	Clubbing								
5.	Abdominal distension								
6.	Skin rashes								

Palpation		Before treatment	After treatment[in weeks]						
			I	II	III	IV	V	VI	VII
1.	Tenderness								
2.	Palpable mass								
3.	Pitting of the edema								
4.	Abdominal rigidity								

Percussion		Before treatment	After treatment[in weeks]						
			I	II	III	IV	V	VI	VII
1.	Dullness of the abdomen								
2.	Dullness of the chest								

Auscultation		Before treatment	After treatment[in weeks]						
			I	II	III	IV	V	VI	VII
1.	Heart sounds								
2.	Respiratory sounds								
3.	Bowel sounds								

Signature of the M.O.								

Laboratory investigations:BLOOD:		
	Before treatment	After treatment
TC		
DC		
ESR		
HB		
Serum bilirubin		
SGOT		
SGPT		
Blood Urea		
Serum Creatinine		
Albumin /globulin ratio		
Blood sugar		

Laboratory investigations:URINE		
	Before treatment	After treatment
Albumin		
Sugar		
Deposits		

	Before treatment	After treatment
X-Ray		
USG		
OTHERS		

Neha; ehly;-SIDDHA SYSTEM OF DIAGNOSIS:

vz; tif Njh;T:8 Criterias	rpfpr;irf;F Kd;	rpfpr;irf;F gpd;
1.ehb		
2.ghprk;		
3.eh		
4.epwk;		
5.nkhop		
6.tpop		
7.kyk;		
!8.%j;jpuk;		
ePh;Fwp: epwk; kzk; Eiu nea;Fwp:		

SIGNATURE OF THE H.O.D SIGNATURE OF THE M.O.

I.P CASE SHEET PROFORMA

POST GRADUATE DEPARTMENT, GUNAPADAM(BRANCH-11)
GOVT.SIDDHA MEDICAL COLLEGE& HOSPITAL, CHENNAI-106.

IP NO	:	OCCUPATION	:
BED NO	:	INCOME	:
NAME	:	NATIONALITY	:
AGE	:	RELIGION	:
SEX	:	D.O.A	:
ADDRESS	:	D.O.D	:
		DIAGNOSIS	:
		SIGN OF MO/AMO	:

COMPLAINTS AND DURATION :

HISTORY OF PRESENT ILLNESS:

HISTORY OF PAST ILLNESS :

PERSONAL HISTORY& HABITS :

FAMILY HISTORY :

GENERAL EXAMINATION:

1.Consiousness :

2.Nourishment :

3.Decubitus :

4.Anaemia :

5.Jaundice :

6.Cyanosis :

7.Clubbing :

8.Lymphadenopathy :

9.Oedema :

10.Jugular venous pulsations :

11.Pulse rate :

12.Temperature :

13.Respiratory rate :

14.Heart rate :

15.Blood pressure :

SIDDHA ASPECTS:

Iymporigal / Pulangal

1.Mei (Sensation)

2.Vaai (Taste)

3.Kann (Vision)

4.Mooku (Smell)

5.Sevi (Hearing)

Kanmenthiriyam / Kanmavidayam

1.Kai (Koduthal)

2.Kaal(Nadathal)

3.Vaai(Pesal)

4.Eruvai (Kazhithal)

5.Karuvai(Aananthithal)

Pira urupukalin nilai;

1.Irudhayam :

2.Puppusam :

3.Eraippai :

4.Kalleral :

5.Manneeral :

6.Kudal :

7.Siruneeragam :

8.Siruneerpai :

9.Moolai :

10.Karuppai :

Uyir thathukkal:

Vatham:

1.Pranan

2.Abanan

3.Viyanan

4.Udhanan

5.Samanan

6.Naagan

7.Koorman

8.Kirukaran

9.Devadathan

10.Dhananjayan

Pitham:

1.Analagam

2.Ranjagam

3.Saadhagam

4.Aalosagam

5.Prasagam

Kabham:

1.Avalambagam

2.Kledagam

3.Podhagam

4.Tharpagam

5.Santhigam

Udal Thathukkal:

1.Saaram

2.Senneer

3.Oon

4.Kozhuppu

5.Enbu

6.Moolai

7.Sukkilam / Suronitham

Envagai Thervu:

1.Naa

2.Niram

3.Mozhi

4.Vizhi

5.Sparisam

6.Malam a) Niram

b) Nurai

c) Erugal

d) Elagal

7.Moothiram

(i)Neerkuri a) Niram (ii)Neikuri

b) Edai

c) Manam

d) Nurai

e) Enjal 8.Naadi

PHYSICAL EXAMINATION:

Inspection:

1.Swelling of the legs:

2.Abdomen distension:

3.Skin rashes:

Palpation:

1. Tenderness

2. Palpable mass

3. Pitting of the edema

4. Abdominal rigidity

Percussion:

1. Dullness of the abdomen

2. Dullness of the chest

Auscultation:

1. Heart sounds

2. Respiratory sounds
3. Bowel sounds

Laboratory Investigation:

1.Blood: TC

DC

ESR 1/2hr

1hr

Hb

Sugar(Fasting / PP / R)

Urea

Creatinine

Cholesterol

RA Factor

CRP Protein

2.Urine: Albumin

Sugar

Deposits

3.Motion: Ova

Cyst

24 hrs urine collection:

CASE SUMMARY

FINAL DIAGNOSIS

MEDICINE

Avuri kudineer 30 ml bd

MEDICAL ADVICE

S.NO	DATE	SIGNS AND SYMPTOMS	MEDICINE	SIGNATURE OF M.O

DISCHARGE SUMMARY:

DATE OF ADMISSION	CONDITIONS AT DISCHARGE	DATE OF DISCHARGE	MEDICAL ADVICE TO BE FOLLOWED	SIGNATURE OF M.O

1 INTRODUCTION

Siddha system of medicines cures all types of debilitating and chronic diseases because of its own power of medicines. Rheumatoid arthritis [RA] is one of the chronic, inflammatory auto-immune diseases characterized by inflammatory swelling of the joints, fibrosis, ankylosis, deformity of joints. It also results in the inflammation and necrosis of several organ systems namely cardiac, pulmonary, gastrointestinal, renal, vascular, hematologic, ocular, cutaneous, neurologic systems. Worldwide, the annual incidence of rheumatoid arthritis is approximately 3 cases per 10,000 populations, and the prevalence rate is approximately 1%, increasing with age and peaking at age 35-50 years.

Modern sciences deliberately worked on RA to explore etiology, pathology, clinical features, diagnosing methods and relevant drug treatments. The drugs for RA aimed at decreasing the production of WBC at bone marrow site and inhibiting the production of mediators of inflammation. But the toxic/adverse effects of such types of drugs causes iatrogenic additional diseases involving liver, renal, bone marrow, ocular toxicity and become vulnerable to infections.

Hence there is a lacuna of research for this disease which inhibit binding of auto-antigen and antibody complex, improves and maintain normal RBC count, inhibits the mediators of inflammation, fibrosis and rejuvenates the eroded tissues. Hence WHO aimed at complementary and alternative system of medicine [CAM] for effective treatment of RA like diseases.

Siddha is included in CAM but it is the system of complete knowledge of universe which stands on its own power of knowledge since several thousand years ago.The word *Siddha* derived from the word '*siddhi*' which means an object to be attained as told by our ancestors. But *siddha* derived from the word '*siddham'* which means the concentration of complete knowledge acquired by *siddhars* who were the persons of highly cultured intellectual, spiritual faculties combined with supernatural powers.

With respect to the medical science, *Siddhars* presented complete knowledge of mankind namely normal construction of human body, physiology, reasons for the diseases, pathogenesis, diagnosing methods, treatments based on 96 fundamental philosophies of truth with includes 5 basic elements of nature. *Siddhars* viewed the physiology and biochemistry of the body in the way of 96 philosophies and manufactured medicines in accord to that with use of plants, metals, minerals and other biological matters. In that way they afforded 32 types of

internal and 32 types of external medicinal preparations and each containing several medicines.

Chunnam is one of the internal type of medicine of higher category, utilized not only in medical treatment but also in a*lchemistry* [target of synthesis of precious metals].*Chunnam* is a amorphous powder, basic in nature and composed of nano sized particles. Metals such as *Stannum* and *Hydrargyrum* are the principle raw materials of *Velvanga chunnam* which is eventually made into amorphous powder of nano size. It is given to *megam, vatham, pitham, megam, moolam* types of diseases as per *Siddha* categorization of diseases. *Vatham* is of 80 subtypes. If Vatham is deranged along with other physiologic entity namely *pitham* and causes painful swellings of joints, restricted movements, myalgia, etc. Hence *velvanga chunnam* is used to treat RA.

Today modern drug development laid hopes on nano medicines for effective drug delivery and actions using various metal salts and colloids for inflammatory [e.g RA], infective [e.g HIV]and neoplasmic[e.g CA] conditions. But finally such medicines exert toxic effects shows some improvement and cannot administer for long duration. But *Chunnam, Parpam, Chenduram, Kattu* are nanomedicines which are formulated manufactured, branded and operated at different doses by *siddhars* and their followers several thousand years ago for various purposes.

Metals are usually applied for making constructions, utensils, and vehicles, electrical appliances to larger extent and for medicines to a very minimal extent. But *Siddhars* showed excellency in applying metal and its compounds to produce potent medicines at minimal doses with more efficacy.It is not a easy thing and requires excellent and complete knowledge in chemistry. Some of the technical terms uniquely used in *siddha* chemistry are '*Sathru- Mithru', 'Uppu sarakku-Puli sarakku', 'Natha sarakku-Vinthu sarakku', 'Maranam', 'Muppu', 'Agaram-Ugaram-Magaram', 'Dasadeetshai',*etc. Hence *Siddhars* are the godfather of the alchemy in making precious metals from metal and mineral based chemical products which have dual purposes in medicine and alchemistry.

Chunnam is also utilized in the field of rejuvenation and immortality because a chunnam which finishes the process of making precious metal is considered as guru medicine and can act at genome of the cell and modify the DNA for anti-ageing/immortal programme for long live to achieve higher goal of divinity.

The goal of *Siddhars* is to achieve eternal enjoyment of Divinity. To achieve such a goal, there is need of synchronization of mind and body towards positive healthy attitude. Hence it is essential to get rid of the hindrances coming out of mind and body. The key answers told by our *siddhars* in the way of *Rasavatham, Vaithiyam Gnanam, Ashtanga Yogam.*

Rasavatham- This is the art of synthesis of precious metals from metals and minerals which offer the double delight of invention of drug of immortality and attainment of precious metal for public utility.

Vaithiyam-It deals with the treatment of body and mind using herbs, metals, minerals, animals in the 64 types of formulas of medicines based on *arusuvai*[6 basic chemicals/biochemicals/tastes], *Gunam*[executing characters/sites of execution], *Pirivu* [metabolism of the ingested materials for their actions,also pharmacodynamic potential], *Veeriyam* [net vital metabolic influences], *Prabhavam*, [Specific other external uses]. These are the pharmacodynamic and pharmacokinetic principles of *Siddha* which again works along with 96 fundamental philosophies of the human body.

Ashtanga Yogam- Cultural maturation of the man in mind and body using *Iyama, Niyamathy* principles for getting out of bad qualities.

Gnanam- Complete knowledge of the matters of the world gaining through gurukulam and self analysis for the applications of living and welfare of the society.

Varmam, Panchapatchi, Jothidam, Vasiyogam, Nadisasthiram, Attamasiddhis, Ashtanga Yogam, Gnanam, Rasavatham, Muppu, Vaithiyam are the entities of crown of siddha system. The compact of complete knowledge of all fields andshowing excellency in applying them can be only by siddhars.It should be proud to be in this field and should be blessed to shrine in this field. The research of this field will explore matters to some extent using *siddha* doctrines and tools 'Alavaigal','*Ullathu Pogathu Illathu Varathu' , 'Andathil Ulathae Pindam, Pindathil Ullathae Andam',.* Hence this study deals with the exploration of this *Siddha* drug and for its efficacy on the rheumatoid arthritis.

2. **AIM AND OBJECTIVES**

The Aim of the Study is to prove the efficacy of the *Velvanga Chunnam* in the treatment of *Valzhi azhal keelvayu [Utthara vatha suronitham*] [Rheumatoid arthritis].

Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disorder that may affect many tissues and organs, but principally attacks synovial joints. There is a high risk of disability and mortality in people with RA.

Hence there is a need for more successful treatment without any adverse effects.

Siddha system of medicine affords treatment for all kinds of diseases and disorders without any adverse effects which has been documented from ancient times.

Velvanga chunnam is one of the drug taken from the classical siddha siddha texts which comes under Drugs and cosmetics act in the list of siddha texts.

In Siddha Literature the *Velvanga Chunnam* is mentioned for *Valzhi azhal keelvayu[Utthara vatha suronitham*][Rheumatoid arthritis],but it is not now used in general practice.

The objectives are

The drug Velvanga Chunnam was studied in the following aspects.

1. Literature reviews
2. Identification and authentification
3. Chemical analysis.
4. Toxicological
5. Pharmacological activity
    a. Analgesic activity
    b. Anti-arthritic activity
6. Clinical study
7. Statistical analysis of the results.

3.1 REVIEW OF LITERATURES

nts;tq;fk; :VELVANGAM [TIN]

rpj;j kUj;Jt Nehf;F : GUNAPADAM ASPECT:

1.ruf;F tif. :

‘cw;Wg;ghh; jq;fk;nts;sp nrk;G ehfk;
cUf;fpUk;G ntz;fyk; gpj;jis juhTk;
ej;jpg;ghh; fhhPak; nts;sP ae;jhd;
eykhfg; gjpndhd;wha;g; gphpe;j ijah,”
--Nghfh; fhurhuj;Jiw Fzghlk; jhJth;f;fk; g.vz;. 2

- nts;tq;fk;- Xh; ,aw;if cNyhfk; MFk; .
- FU/tpahod; Mjpf;fk; ngw;w cNyhfk; MFk;.
- ,‡J Xh; cUf;fpd nghUs; kw;Wk; %y nghUs; MFk;.

NtW ngah;fs;:

‘nts;sPag; Ngh;jidNa tpsk;gf;Nf
ts;spahk; tq;fkhq; FbykhF “
‘nts;sPa kzy; Ngiu tpsk;gf; NfS
kpUj;JTk; gJikahk; Ntijr; rj;JU”
-NghfKdpth; epfz;L 1200 gf;fk;vz;73.

‘tq;fq;Fbyk; kfj;jhd ntz;zhfk;
rpq;fk; gwpf;fpr; rPawr; Nrtfd;
gq;fk; etNyhfk; gLj;JQ; #udhk;
nghq;fkhk; nts;sPak; Gfo;e;jpLk; ehkNk”
-rl;lKdp epfz;L gf;fk; vz;64 nghUs;:

- ntz;zhfk; -MjpNrld; gpwg;G,
- Fbyk--tpz;> khia>tl;lk;>tisT,ril> Nkhrk;> gpiztk;)
- jts tq;fk;, RNtj tq;fk;> ghz;B--ntz;ik)>
- **khurk**;--Mz; jd;ik kpFe;jJ> rpq;fk; >
- rPawr; Nrtfd; (nra ,urj;jpd; Nrtfd;) .

gpwg;G /Njhw;wk;:

‘Nguhd NrlDl clypy; jhDk;
fhuhd fhw;wpdhNy epyj;jpy; tPo
-Nghfh;7000. 3Mk fhz;lk;; 271

nghUs;: MjpNrld; clypd; kpf ntg;gj;jhy; vOe;j tpah;it fhw;wpdhy; epyj;jpy; tpOe;J ,Wfp nts;sPak; Njhd;wpw;W.mf Gw fhuzj;jpdhy; vOe;j moy;> fg Fw;wk; rhhe;;j khh;G Neha;fis Nghf;f ty;yJ.

tifAk; mjd; ,ay;Gk;:

‘,ak;gNtF unkd;Wk;kp rpuf nkd;Wk;

,uz;Ltif Ngjkhf ,aq;F fhZk**”**

-Nghfh;7000. 3Mk fhz;lk;; ; gf;fk; 273

tif**:** ,uz;L tiffs;.

1.Fufk;- cj;jkk;. jSf;fhd ntz;ikahd nrz;gfg;G+ epwk;. fdkhAk;> Fsph;rpahAk;> nea;g;G> tpiutpy; nghl;ldNt rj;jkpd;wp cUfp epw;Fk;.

2.kprpufk;-kj;jpkk;. gr;irAk; ntSg;ghAk; ,Uf;Fk;. kUe;Jf;F gad;glhJ.

5.rj;JU-kpj;JU:

‘#jKld; fhpehfk; nfThp %d;Wk;

NgjKld; cgurq;fs; fhu rhuk;”

- nfhq;fzth; 3000> 2 Mk; fhz;lk; gf;fk; 176

‘jhndd;w tq;fj;jpd; kpj;JUitf;NfS

jSf;fhdf; fhhPaQ; #je;jq;fk;

----NghfKdpth; epfz;L 1200 gf;fk; 146-147

kpj;JU: #jk;> fUtq;fk;> nfThp> jq;fk;.

rj;JU: Nkw;fz;l cNyhfky;yhj midj;J tif cNyhfq;fs;>; cgurq;fs;> gh\hzq;fs;.

NkYk; **‘**tq;fj;ij fz;lhw;#jk;

-nfhq;fzth; thjfhtpak; 3000> 2 Mk; fhz;lk; gf;fk; 270

tq;fj;ij fz;l khj;jpuj;jpy; #jkhdJ tha; ifg;nghj;jp Nrhh;e;J NghFk;. mjhtJ rpq;fj;jplk; mfg;gl;l ahidia Nghd;W #jkhdJ tq;fj;jplk;; rpf;fp jtpf;Fk;.

6.gQ;r G+j $W:

G+j $W : ntsp vd;W $wg;gl;L cs;sJ.

-rpj;jh;fs; mUspa ,urthj fsQ;rpak; gf;fk; 299.

7.ehj-tpe;J $W:

ehj ruf;Fk;> tpe;J ruf;Fk; MFk;.

-Ch;trp ,uthj rpl;fh gf;fk; 275

-Nfhuf;fh; ekdhrj;jpwTf;Nfhy; gf;fk; 97

-itj;jpa rj;jfuhjp gf;fk; 14.

8.Rj;jp Kiwfs;:

‘ghNueP Gifr; ruf;Fk; cUf;fpdKk;
gf;Ftkh naht;nthd;Wk; ghf khf
NeNufhz; Jz;L Jz;lha;r; Rj;jp nra;J
Neh;ikAld; jhndLj;J itj;Jf;nfhs; “

--ahNfhA nra;ghfk; ghly; 2 cUf;fpd nghUs;fis jf;f ghfkhf Jz;LJz;lhf Rj;jp nra;J itf;f Ntz;Lk;. tq;fj;jpw;F vz;zw;w Rj;jp Kiwfs; cz;L.

- cUf;fp rha;f;Fk; Kiw
- Cwy; Kiw
- Cwy; Kiw; + cUf;fp rha;f;Fk; Kiw

I.cUf;fp rha;f;Fk; Kiw:

- fPolf;fz;ltw;Ws; cUf;fp rha;f;f Rj;jp MFk;.
- 3 Kiw nts;shl;L ePh;>kQ;rs; nghb>gpuz;dl Nth; fw;fk; fye;j fyitapy;;;.
- 3 Kiw nehr;rprhW >kQ;rs; nghbapy; rha;f;f Rj;jp MFk; .
- 7 Kiw ey;nyz;nzapy; rha;f;f Rj;jp MFk;
- 7 Kiw ,Yg;ig vz;nzapy; rha;f;f Rj;jp MFk;
- 7 Kiw Nfh%j;jpuj;jpy; rha;f;f Rj;jp MFk;

II. Cwy; Kiw:

- nehr;rp rhW kQ;rs; nghbapy; rha;f;f Rj;jp MFk; .
- INtyp r%yr;rhwpy; 12 ehs; #upa Glk; + 20 ehs; G+kp Glk; itf;f Rj;jpahFk;.

III. Cwy; Kiw + cUf;fp rha;f;Fk; Kiw*:

- Rj;j ryj;jpy; 12 rhkk; tpfrpjkjhf Cwy; + vUf;fk;ghypy; cUf;fprhaj;jy;. ,dp Rj;jp Ntwpy;iy.

-jpUts;St ehadhh; gQ;ruj;jpdk; 500.gf;fk; 198.

9.Ritahjp Fzq;fs;.

‘NfSNkjhd; frg;Gkhd ntg;g khfp -Nghfh;7000. 3Mk fhz;lk;; ; gf;fk; 273

‘jhfq; fug;ghd; ryNkfk; gpj;jfg

Nkf nkhspkq;fy; ntg;Ggyk; - khfpue;jp
Js;spake; jhu RthrKke; jhf;fpdpAk;
nts;sPak; Nghf;Fk; tpjp”

--gjhh;j;jFztpsf;fk; jhJ th;f;fkgf;fk;179

nghUs;:

- Rit: ifg;G >kJuk;. tPhpak;: ntg;gk; gphpT: fhh;g;G
- nra;if: fpUkp ehrpdp> jhjntg;gfw;wp> Jth;g;gp> tPf;fKUf;fp.
- kUj;Jtf;Fzk;: thjgpj;j tpfw;gg; gpzpfs;> Nfhio> fgg;gpzpfs;> Nkfg;gpzpfs;. tapw;W G+r;rp Neha;fs;> Nghf;Fk;. cliy gykhf;Fk;.
- NkYk; jhfk;> fug;ghd;> gpj;j fg gpzpfs;> ntg;G> khfpue;jp> ke;jhu Rthrk;> ke;jhfpdp Nghd;w Neha;fis Nghf;Fk;.
- ,J rpwg;ghf [dd ry cWg;Gfisg; gw;wpa Neha;fspYk; Fujp Gg;Grk; rk;ge;jg;gl;l gpzpfspYk; toq;fg;gLfpd;wJ .fl;bfSf;Fk; gad;gLfpwJ

10.kUe;J tiffspy; nts;tq;fk;. :

- nts;tq;fk; vd;fpd;w ,e;j ,aw;if cNyhfj;ij cah; kUe;jhf;Fk; tpj;ijia mwpe;J itj;jpUg;gth;fs; rpj;jh;fNs,.
- nts;tq;fj;ijf; nfhz;L gw;gk;> nre;J}uk;> Rz;zk;>nraePh;> rj;J Nghd;w kUe;Jfis nra;Js;sdh;

I.nts;tq;f gw;;gq;fs;:

1.nts;tq;f gw;gk;: Njuu; Kiwg;gb nra;j nts;tq;f gw;gk; rptDf;F xg;ghdJ MFk;. jPUk; Neha;fs;: fPy;fis gw;wpa fg Neha;fs;. --Fzghlk; g.vz;207.

II.nts;tq;f nre;J}uk;:

1.Nrj;Jk njhe;j tpahjp Nghf;Fk;> vYk;GUf;fp Neha;> rpNuhtyp $l;lgpzp NghFk;.

- Fzghlk; g.vz;211

III.nts;tq;f Rz;zq;fs;:

1.nts;tq;f Rz;zk;:

Nkf #iy Nghf;Fk;> fPy;thA >nts;is Nghf;Fk;. -- Fzghlk; g.vz;211

2. nts;tq;f Rz;zk;:

‘njhopw;fhz tq;fj;jpy; fk;gpAg;Gr;
Rd;dj;ijj; J}tpNa AUf;Fk;NghJ

------ Glk;NghL tq;fkJ Rd;dkhFk;.”

ruf;Ffs;: tq;fk;+fk;gpAg;G+#jk;+tha;ePh; (tha;ePh;=GifePh;=jpuhtfk;=ntbAg;G jpuhtfk;).

V.nts;tq;f nraePh:;

‘ jpukhf tq;fj;jpd; [aePh;jd;id

----edthfg; gdpglNt [aePuhFk; --A+fpKdp thjfhtpak; g.vz;.160

VI.nts;tq;f rj;J:

‘gpiof;fNt tq;fkJ Nrh;jhd; xd;W

-----Neh;ikAld; rj;jJTk; kzpaha; NghFk;”

--NghfKdpth; rj;j fhz;lk;g.vz;80

VII.nts;tq;f FU:

‘— G+zNt Nts;tq;fe;jd;id thq;fp

----- jz;ikAs;s tq;fkJ ntl;ilfhNz” - mf];jpah; nrskpa rhfuk;> g.vz;257

NrUk; kUe;Jfs;:

1. jq;f cuk;> nts;sp cuk;.
2. jphptq;f Rz;zk;.
3. etNyhf Rz;zk

--- Fzg;ghlk; jhJ tFg;G g.v.213.

11. kUe;jy;yhJ kw;w gad;ghLfs;:

- nts;sPa ghj;jpuk;-,urk; nra;tjw;F ed;W MFk;.
- nrk;G ghj;jpuj;jpy; cl;Gwk; G+Rtjw;F gad;gLk;.

12.,urthjj;jpy; nts;tq;fk;.:

- vy;yh Nyhfj;ijAk; Ngjpf;Fk;.
- Nfhop Kl;il nts;sPaj;jpd; ePiu thq;Fk;

13.eQ;R FwpFzk;:

fUtq;fj;jpd; FwpFzNk ,jw;Fk; cz;lhff;$Lk;.

- gy; <W fWf;Fk;
- tapW cg;Gk;
- <is
- tapW typf;Fk;
- ghhprthA
- nrhwp cz;lhFk;
- kyk; rpf;Fk;
- fhkhiy

eQ;R KwpT:

1.fWg;G Gy;yhQ;rp ,iy rhW2.fUq;Nfhop khkprk; 3.fhl;LGspauid Nth;fw;fk;.

II. ,urk; *Rasam*[Mercury]:

ruf;Ftif:

‘ghbNdd; gpwf;;FKg; gj;jp uz;L
ghq;fhd jhJTilg; ngaiuf; NfS
J}bNdd; #jgh lhzj; NjhL**”**
----(Nghfh; 7000 ---Fzg;ghlk; g.v 14)

,‡J ,aw;if ghlhzj;Js; xd;W.
Gjdpd; Mjpf;fk; ngw;;wJ.

NtW ngah;fs;:

‘fhuNk #jk;Gz;ak;--(jrhq;f epfz;L)

‘,dpik rptrf;jp Vw;wpa th;zj;Njhd;
jdpik rptrf;jp ---(rl;lKdp epfz;L)

fhuk;> #jk;> Gz;ak;> **<rd**;>kfpgd;> tPhpak;> fw;gk;> rj;J> **ePh;> khUjk;> fdy;> G+jk;> kfhkuk;>** guhguk;> Js;sp> **rpjwpf; fhZNthd**;> %yk;> Rf;fpyk;> rpe;J}uk;> **fhtd**;> gha;e;jpL J}kk;> Mjp> **J}kk**;> ke;juk;> th;zj;Njhd;> **ruf;fpw; fye;jpL rPtd;> #j;jpud;>tpe;J** Nghd;w gyg; ngah;fs; ,urjpw;F cz;L.
,‡J rjhrptdhhpd; tpe;J vd;W Ntjk; $WfpwJ. -(fUT+uhh; gyjpul;L g.vz;99)
nghUs;;:
<rd; : ,jd; kfj;Jtj;ijf; czh;j;Jtjhk;.
ePh;> khUjk;> fdy;> G+jk;> kfhkuk; : ,jd; gQ;r G+j rhuhk;rj;ij czh;j;Jtjhk;.
rpjwpf; fhZNthd;> J}kk; : ,ay;ig czh;j;Jtjhk;.
ruf;fpw; fye;jpL rPtd;> #j;jpud; : tpid jpwid czh;j;Jtjhk;.
tpe;J : ehj tpe;J $w;iw czh;j;Jtjhk;.
fhuk; : fhu-rhu>cg;G-Gsp $w;iw czh;j;Jtjhk;.
fhtd; : caph;+ cly; jhJf;fis fhg;ghw;Wk;.
tQ;rfk;>kdNtfp>ghtd; : Rj;jp+ kUe;J gjk; nfby; jPtpid GhpAk;.

gpwg;G /Njhw;wk;:
vhpkiyf; Fok;gpy; ,Ue;J Mtpahfpf; Fsph;e;jJk; fpilf;Fk; nghUs;fspy; xd;whFk;. (rpj;jh;fs; mUspa ,urkzp kfj;Jtk; g.v 14). nghpJk; ,ypq;fkhfNt fpilf;Fk;. mhpjhf ,urkhfNt fpilf;Fk;.,ypq;fj;jpypUe;J vLf;fg;gLk; ,urNk cl;nfhs;tjw;F J}a;ikAk; rpwe;jJk; MFk;.

tifAk; mjd; NgjKk;:

‘MwpNa #jk‡ije;Jtpj khFk;
---CwpNa urnkd;Wk; ,uNre;jpu nkd;Wk;”
(-Nghfh; 7000 2 Mk; fhz;lk;-Fzghlk; jhJ tFg;G g.v.228)

,urk; 5 tiffs; MFk;;.

- ,urk; -- nre;epwk; nfhz;lJ J}a;ik MdJ.filapw; fpilf;Fk; J}a;ikahd ,urj;ij Fwpf;Fk;.
- ,uNre;jpud; -- fUik epwk; nfhz;LJ.
- #jk; -- kQ;rs; epwk; nfhz;lJ.Rj;jp mtrpak;.
- kprufk; -- gy epwk; nfhz;lJ.Rj;jp mtrpak;.
- ghujk; -- ntz;zpwk; nfhz;lJ.Rj;jp mtrpak;.

epw;f>J}a;ikahd ,urk; #hpa xspia ntspGwj;Jk;>rpwpJ ePy xspia cl;Gwj;Jk;.

rj;JU-kpj;JU: (**-**itj;jpa rj;jfuhjp g.v 10.)

rj;JU		kpj;JU		
1.rpq;fp	8.fhe;jk;	1.mg;gpufk;	8.mQ;rdk;	15.Jj;jk;
2.nfshp	9.#ld;	2.ehfk;	9.jhsfk;	16.fhuk;
3.nts;is	10.G+uk;	3.fhhPak;	10.njhl;b	17.jPKUfy;
4.Fjpiug;gy;	11.nghd;dk;gh;	4.**tq;fk**;		11.nts;sp 18.gtog;Gw;W
5.rj;jprhuk;	12.fy; rTL	5.rpiy	12.nrk;G	
6.ntbAg;G	13.epkpis	6.nfe;jp	13.JUR	
7.,Uk;G	14.**G+ePW**	7.**tPuk**;	14.rhuk;	

gQ;r G+j $W:

Mfha G+j $whFk;.vdpDk; 6 Rit ,Ug;gjhy; ,J gQ;r G+jj;ijAk; jd;Ds; mlf;fpajhFk;.,jid ,jd; ngah; tiffspYk; mwpayhk;

ehj-tpe;J $W + cg;G-Gsp $W:

#jk;-tpe;J $whFk;. #jk;-cg;G $whFk;.--- itj;jpa rj;jfuhjp g.v14)

Rj;jp Kiwfs;:

- ,urj;jpy; 8 Njhlk; /7 rl;il vd;fpw gy cNyhf>cgur>gh\hz njhe;jq;fs; cs;sd.
- Rj;jp nra;ahJ gad;gLj;jpdhy; Nkw;fz;l njhe;jq;fs; kUe;J nra;Kiwfspy; rhptu kbahky; kUepjpd; jd;ikf;Fk; clw;Fk; nfLjpia tpistpf;Fk;.

Ritahjp Fzq;fs;:

Rit : 6 Rit. rpwg;ghf ,dpg;G. ,JNt ,jd; rpwg;G.
tPhpak; : ntl;gk;+jl;gk;.
gphpT : NrUk; Jiz kUe;ij nghUj;J mjd; gphpT ngWk;.
nra;if: cly;Njw;wp> cly; cukhf;fp> kyNghf;fp> gpj;jePh;> mfw;wp> tPf;fKUf;fp> ckpo;ePh; ngUf;fp> rpWePh;ngUf;fp> Nkfehrpdp.
kfpik : rPj+ntg;g Neha;fSf;F toq;fyhk;> Kj;njhopiy cilaJ> <rDf;F xg;ghdJ.
ml;lkhrpj;jp jUk;. ‘etepjp“MFk;.
nghJ Fzk;:

‘tpopNeha; fpue;jp Fd;kk; nka;r;#iy Gz;Fl;
lopfhypy; **tpe;J**tpdhy; mj;ij –topaha;
GhpA tpjp ahJ GhpapNdh nay;yhk;
,hpAtpjp ahJ kpy;iy**”** -Fzg;ghlk; jhJ tFg;G g.v239)

nghUs;:
tpopNeha;> fpue;jp> Fd;kk;> nka;r;#iy> Gz;> Fl;lk;> thjFw;wj;jhy; tUk; Neha;fs;
tpe;J- ,urj;jhy; nra;a Ntz;ba kUe;ij nra;J je;jhy; Neha;fs; jPUk;.

kUe;J tiffspy; ,urk;;:
,urj;ij nfhz;L gw;gk;> nre;J}uk;> fUg;G> gjq;fk;> nkOF> ijyk;> Gif> fspk;G> fl;L> FU> Fspif Nghd;wit nra;agLfpd;wd.—Fzg;ghlk; jhJ tFg;G g.v.265)

III.tPuk; Veeram [Mercury(II) Chloride:

ruf;F tif:; tPuk;

,‡J ,aw;if ghlhznkdpDk;>jw;NghJ filfspy; tpw;Fk; nraw;if gh\hzkhd rt;tPuNk kUj;Jtj;jpy; gad;gl;L tUfpwJ.

NtW ngah;fs;:

ruf;F Rz;zk;> gwq;fp gh\hzk;> nfhr;rp tPuk;> kPdhl;rpike;jd;> G+tpe;J> rhuj;jpd; rj;JU> gwpkpj;JU>Nrtfd;.

ruf;F Rz;zk;: Rz;zj;jpw;F Mjp.

rj;JU-kpj;JU:

rj;JU: mak;> ehfk;>nghd;. kpj;JU: #jk;.

gQ;r G+j $W:

tPuk;: mg;G G+jk;. (----gr;ir ntl;L gjpdhW---Fz ghlk; g.v.16.)

tPuk;: NjA G+jk;. (----ee;jPrh; fiyQhdk;> Nghfh; fhurhu Jiw. ---Fz ghlk; g.v.17)

ehj-tpe;J $W:

ehfj;jpw;F tPuk; Gsp.

Gspahiuf;F tPuk; cg;G.

Ritahjp Fzq;fs;:
Rit: fhh;g;G.
tPhpak;: ntl;gk;.
nra;if: cly;Njw;wp> fpUkpehrpdp> mOfyfw;wp> Gz;Zz;lhf;fp.
nghJ Fzk;:

‘Fd;knkhL Fl;lk; nfhbatdp yj;jpul;L
Jd;khq; fprg;ngUf;FQ; #iyNeha; - td;ikAW
Fhkpag;Gz; zhjpaNeha; fzlhw;rt;;
tPundDQ; rhkpeh kj;ijAr; rhp**”** (-Fzg;ghlk; jhJ tFg;G g.v291)

nghUs;: Fd;kk;> Fl;lk;>nfgba thj Neha;fs;> Nflile;j Cd;ngUf;F Neha;> #iy> fhkpag;Gz;fs;kw;Wk; gw;gy Gz; Neha;fs; NghFk;.

IV.mz;lNthL: ***Andaodu*****[Hen’s egg shell]**

ruf;Ftif:

‘fz;Lnfhs; Sgurj;jpd; tifiar; nrhy;Ntd;
----NfhNkj fk;Gl;g uhf Kl;il”
--(Nghfh; fhurhuj;Jiw)Fzg;ghlk; jhJth;f;fk; g.v 22)

NtW ngah;fs;:

mz;lj;Njhy;> Kl;il XL.

gpwg;G /Njhw;wk;:

Nfhop> gUe;J> fpsp> fhfk;> kapy;> Kjypa gwitfspd; Kl;il XLfis kUj;Jtj;jpy; gad;gLfpd;wJ.

rpwg;G kpf;fJ-fUq;Nfhop> nrk;gUe;J> mz;lq;fhfk;/fUq;fhfk;--(--mfj;jpah; Kdpth; thjfhtpak;. g.v.125)

gQ;r G+j $W:

‘Gy;yf;Nfs; ez;Lej;ij rq;F Kl;il
Nghw;fpspQ;rp ypitiae;Jk; GdNy MFk;”-
--(Nghfh; fhurhuj;Jiw)Fzg;ghlk; jhJth;f;fk; g.v 23)

Kl;il ---mg;G G+jk; MFk;.

ehj-tpe;J $W:

Kl;ilapd; XL-ehjr ;ruf;fhFk;.----(nfhq;fzth; 3000 ,uz;lhk; fhz;lk; g.v.80)

Rj;jp Kiwfs;:

G+ePW---1gq;F
Rz;zhk;G njspePh;---2 gq;F.

,uz;ilAk; fye;J %d;W gq;fsT xU gq;F Kl;il Xl;bw;F ,l;L xU ehs Cw itj;J mLg;Ngw;wp ePh; xU ghfkhf Rz;Lk; NghJ ,wf;fp Kl;il Xl;Lfspd; rt;it Nghf;fp fOtp ntapypy; cyh;j;jTk;. –(Fz ghlk; g.v 425)

kUe;J tiffspy;; mz;lNthL:

Kl;il Xl;L gw;gk;.:

ePh;Ks;sp rhwhy; gw;gkhFk;.---(Fz ghlk; g.v 739)

NrUk; kUe;Jfs;:tq;f Rz;zk;.-----(Fz ghlk; g.v 211)

,urthjj;jpy;mz;lNthL:

Nfhop Kl;ilahy; ruf;nfy;yhk; Rz;zkhFk;.-(itj;jpa rj;jfuhjp g.v.16)

VI.fw;Rz;z njspePh;:Karchunna *Thelineer*.[Saturated Calcium Hydroxide Solution]

ruf;Ftif.:

,‡J Xh; cgur nghUs; MFk;.

NtW ngah;fs;:

Rf;fhd;fy;> Rz;zhk;Gf;fy;> fw;Rz;zhk;;G.-(rh.rpt.gps;is mfuhjp)

gpwg;G /Njhw;wk;:

,‡J ,aw;ifapy; jhuhskhff; fpilf;fpd;wJ.,jidf; fhs thapypl;L ePw;wp vLj;J> ePh; tpl;Lj; jhspj;Jf; nfhs;s Ntz;Lk**;. - (**Fzg;ghlk; jhJth;f;fk; g.v536 **)**

gQ;r G+j $W:

,‡J Mfha G+j $whFk;. **(**Fzg;ghlk; jhJth;f;fk; g.v23.**)**

nghJ Fzq;fs;:

nra;if: cly;Njw;wp> jhJntg;gfw;wp> Jth;g;gp> er;rhp> tapw;Wg;Gspg;gfw;wp MFk;.

cz;l czT nrhpg;gpf;Fk;> Flypy; gw;wpa nea;rpf;if Nghf;Fk;> ePh;g;Ngjp> ePh;r;rUf;F>tplq;fs;>,uj;jg;ngUf;F> jPr;rl;lGz;> rpuq;F> eikr;ry;> ahidf;fhy;> re;ep> jiy Neha;>Nghd;wit Nghf;Fk;.- **(**Fzg;ghlk; jhJth;f;fk; g.v536 **)**

fw;Rz;zhk;G njspePh;:

1.jhspf;fhj fw;Rz;zhk;G - 1 gb>
2.Rj;jkhd ePh; - 4 gb
xU ghz;lj;jpy; tpl;L ed;whf fyf;fp %d;w ehs; itf;fTk;.%d;W ehSk; rpy kzp Neuq;fSf;F xU jilt %q;fpw; nfhz;L ed;whf fyf;fp tplTk;.ehd;fhk; ehs; njspe;jpUf;Fk; ePiu mirf;fhky; vLj;J fWg;G epw Gl;bapy; milj;J itf;fTk;. ,JNt ‘ Rz;zePh; ” my;yJ ‘ Rz;zhk;GePh; vd;W $wg;ngWfpwJ. mbapy; jq;fpapUf;Fk; Rz;zhk;gpy; fw;fs; Kjypatw;iw ePf;fp fhuq; nflhky; vg;nghOJk; <uk; fhj;J tUk;gb mg;Nghijf;fg;NghJ ePh;tpl;L itj;J tUtNj fw;Rz;zk;. (--gjhh;j;jFz tpsf;fk; jhJ th;f;fk; g.vz;.93).

V. G+ePW :*Pooneeru*[Fuller’s Earth]

ruf;Ftif:

,‡J Xh; ,aw;if fhurhu/cg;G nghUs; MFk;. G+ePW fhur; ruf;F MFk;.

gpwg;G /Njhw;wk;:

‘ ghug;gh Gtpjdpy;tho; epyg;gapiug;
guNyhf kpdprdpifg; gUtk;ghh;j;J” –mfj;jpah; ghpghi\ 300 g.v.192.

- ,‡J cth;kz; G+kpapYk;>rpte;j G+k;apYk; gq;Fdp>rpj;jpiu>itfhrpj; jpq;fspy; nghq;fp ePWk;.
- ,J rptfq;if> fhsh];jphp> Nkh#h; > cj;jpu Nk&h;> Nghd;w ,lq;fspy; ,Ue;J vLf;fg;gLfpd;wJ. G+g;Nghy; Nky; epw;gij thhpf; nfhs;s Ntz;Lk;. ,‡J Mfhr ntspapy; mike;j cg;ghFk;.

gQ;r G+j $W:

,jd; G+j $W Mfhak; MFk;. Fzg;ghlk; jhJth;f;fk;

ehj-tpe;J $W:

G+ePW ehj $iw rhh;e;jJ MFk;. NkYk; G+ePW fhur; ruf;F MFk;.

Rz;zk;.

rpj;j kUj;Jtj;jpw;F rpwg;G Nrh;f;Fk; kUe;J KiwfSs; xd;Nw Rz;zk; MFk;.

- Rz;zk; vd;gJ thj Kiwf;Fk; itj;jpa Kiwf;Fk; cl;gl;l xh; cah; nghUs;.
- Rz;zk; Xh; gpuhzg;nghUs; MFk;.

Rz;zk; ,y;yhtpby; ,urthjk; gypahJ

Rz;zk; vd;why; vd;d?.

ghjurj;ijj; jdpahfthtJ> ghlhzq;fisj; jdpahfthtJ> cNyhfq;fisj; jdpahfthtJ fye;jhtJ fy;tj;jpl;L rpy rhWfshyhtJ nraePh;fshyhtJ> Gif ePh;fshyhtJ miuj;Jul;b cyh;j;jp> %irapypl;Lr; rpiy nra;Jyh;j;jp> fhpneUg;gpypl;L Cjp vLj;J> Mwitj;Jg; G+j;jgpd; vLj;Jf; nfhs;tjhFk;.

Rz;zj;jpd; ngah; tpsf;fk; vd;d?.

- Rz;zk;;: -
- Rd;- ntz;ik -epwj;ijf Fwpf;fpd;wJ.
- Rd;dk;- Rz;zhk;G Nghd;wJ.
- Rz;zk;-GOjp> Rl;l rhe;J.-Ez;zpa nghbiaf; Fwpf;fpd;wJ.
- Rd;dk;-Rop
- RopT-kiwT>rQ;ryk;.-ruf;Ffspd; ,aw;if jd;ikia mopf;fpd;wJ.
- Rd;dpjk;-El;gk;
- Rz;zpj;jy;-ePw;Wjy;-----rhk;gtrptg;gps;is mfuhjp.

Rz;zj;jpd; NtW ngah; vd;d?.

‘Ntug;gh Rz;znkd;w ePw;Wf;nfy;yhk;

ntUtplNt gQ;RNghy; nghUkpg;NghNk”--NghfKdpth; 7000f;F #j;jpuk; 700g.v 102

Rz;zj;ij ePw;wpdk; vd;Wk; Fwpg;gplg;gLfpd;wJ----nfhq;fzth; thjfhtpak;3000 Rz;zj;jpy; NrUk; ruf;Ffs; vd;d?.

- jhJ th;f;f nghUs;fshd cNyhfq;fs;(tq;fk;)> gQ;r#jq;fs;(,urk;)> ghlhzq;fs;(jhsfk;)> fhurhuq;fs;(ntbAg;G) > etkzpfs;(gtok;)> cgurq;fs;(epkpis) kw;Wk; rPtg; nghUs;fs; (mz;lXL).
- jhtug;nghUs;fs; Rz;zk; nra;a Jiz nra;fpwJ.(vUf;fk;ghy;> cj;jhkzp)

Rz;zk; nra;Ak; Kiwfs; vd;d?

- JUj;jp cjtpAld; fhp mLg;gpy; %ir itj;J Cjp vLf;Fk; Kiw.
- twl;b nfhz;L kz; mfypy; Glk; NghLjy;.

- #upa Glk; NghLjy;-rpy Rz;zj;ij cNyhf jfl;bd; Nky; G+rp utpapYyh;j;j Rz;zkhFk;.(jq;f Rz;zk;)

Rz;zk; nra;Ak; Kiwfshy; ruf;Ffs; vt;thW Rz;zkhFnkdpy;> ruf;Ffs; Rod;W nte;J NghFk;. G+g;Nghy; ePwp Rz;zkhFk;.---nfhq;fzth; thjfhtpak;3000 >2 Mk; fhz;lk;.

Rz;zj;jpw;F Mjp ruf;Ffs; vd;d?.

‘mQ;RePh; nrhy;Ntd; milthFk; ntz;fUTk;

-----Nrh;j;JNk Rz;zkpF rPh;ngwNt”

--A+fp thj fhtpak;> -NghfKdpth; 7000f;F #j;jpuk; 700 g.v.102

‘nfhbaRd;dk; gpwe;jnjy;yhk; ntbAg;ghNy

FzrykhQ; nraePNu rhuj;jhNy”--------NghfKdpth; Qhd #j;jpuk;g.v.10

Mjpr; ruf;Ffs;:

- ntbAg;G> G+ePW> rTf;fhu Rz;zk;> tPuk;> #jk;> G+uk;> GDF> FUtz;L> fhh;Kfpy; ghlhzk;> #ld;.
- rTf;fhu Kiw – Rz;zj;jpw;F Mzp NtuhFk;.
- (ntbAg;G) nra;ePh;fs;> jpuhtfq;fs;> cj;jhkzp rhW Nghd;witfshFk;.
- mz;l vUf;fQ; nra;ePh;> rpg;gp nra;ePh;>
- Itif ePh;fs;-(Kl;il ntz;fU> Kiyg;ghy;> Gif ePh;> Rz;ztifahd ePh;fshd Rz;zhk;G ePh;> nra;ePh;> gor;rhW.) Nghd;witfs; MFk;.
- fhurhuq;fs; xd;NwhL xd;W $bdhy; Rz;zq;fs; gypjkhFk;.
- fhuk;--cg;G ruf;fhFk;. cg;G--rptd; MFk;
- rhuk;--Gsp ruf;fhFk;. Gsp---rf;jp MFk;
- fhuKk; rhuKk; $bdhy;jhd; ruf;Ffs; kbAk;. Rz;zq;fs; gypjkhFk;. thjk; if$Lk;. NkYk; fhurhuj;jpdhy;jhd; mz;lgpz;lq;fs; cUthdJ.
- ruf;Ffis mjDila rj;JU ruf;fhy; Nrh;j;jiuj;J Fifapy; itj;J Cjpdhy; Rz;zk; MFk;.---- nfhq;fzth; thjfhtpak;3000 >2 Mk;fhz;lk;

Rz;zj;jpw;Ff; fU vd;d?.

fw;Rz;zk;> fpspQ;ry; Rz;zk;> rq;F > nfe;jfk; > ez;Lf;fy; > ,jid ntz;fU> Rz;z ePh;> gor;rhW> tha; ePh; (jpuhtfk;) Kjypatw;iwf; nfhz;L kj;jpj;jhy; Rz;zf;fU MFk;.---nfhq;fzth; thjfhtpak; 500. g.v. 60

rfyKk; Rz;zkhf;f jpuhtfk;?.

‘ePUj;jpLtha; G+ePW gye;jhd; gj;J

Neuhd rq;FePh; gye;jhd;gj;J” ---mfj;jpah; k`hjpuhtfk; 800 g.v.141.

G+ePW > rq;F ePW> nts;is ,tw;iw jpuhtfj;jpy; nkhy nkhy vd;W fiuj;jpl;L jpuhtfj;jpy; fLq;fhu Nkw;wp fhurhu Kjy; cNyhf <uhf Rz;zkhFk;.

Rz;zk; nra;Ak; fhyk; vJ?.

‘kPd Nk\ kpuz;ilA Nkapjw;

Fhd fhynkd; Nwaiw thh;rpyh;” ----A+fpkhKdp kjpntz;gh g.v.140

gq;Fdp> rpj;jpiu> Rz;zk; nra;a Vw;w fhykhFk;.

Rz;zj;jpd; ,ay;G/jd;ik vd;d?.

- Rz;zkhdJ fhuj;jd;ikAld; ,Uf;Fk;.
- Rz;zkhdJ fhw;wpy; gwf;Fk;. fdk; ,Uf;fhJ.

‘ghUeP Rd;dnky;yhk;
gwe;jpLq; fdKkpy;iy”
----nfhq;fzth; thjfhtpak; 3000 >2 Mk;fhz;lk; g.v326

Rz;zj;jpd; epwk;:

- jts epwk;--rl;ilKdp epfz;L g.v.207.
- ntz;ik epwk;- ----nfhq;fzth; thjfhtpak;3000 >2 Mk;fhz;lk; g.v24
- jq;f epwk;--- gQ;rG+j tfhu FUr; Rz;zj;jpd; epwk;.
- rpy Ntis Rz;zkhdJ fUj;JtUk;.mt;thW fUj;Jthpd; rTf;fhur; Rz;zk; Nrh;j;jiuj;J Cj Rz;zk; ntSg;ghFk;. ---nfhq;fzth; thjfhtpak; 3000> 2Mk; fhz;lk; g.v.337
- nghJthf Rz;zkhdJ> kQ;rspl;lhy; rptf;Fk;.

Rz;zj;jpd; Kjy; jukhtJ vd;d?.

‘Cjpa Rd;d KRe;j Kjw;wuk;

Khjpa G+ePW kUT nuz;lhe;ju

khjpA gur kUT %d;whe;juk;
Nfhjpa nraePh; nfhLehyhk; tpj;ijNa”----rl;ilKdp epfz;L g.v.76

nghUs;:

- neUg;gpypl;L Cjp vLf;fpd;w Rz;zk;----Kjy; juk;.
- G+ePWld; Nrh;j;J nra;Ak; Rz;zk;----------,uz;lhk; juk;.
- cgurj;Jld; Nrh;j;J nra;Ak; Rz;zk;------%d;whk; juk;.
- nraePh; nfhz;L nra;tJ----------ehd;fhk; juk.;

Rz;zj;jpy; rpwe;j Rz;zk; vJ?.

FUr;Rz;zNk rpwe;j Rz;zk; MFk;.

JUR> rTf;fhuk;>,urk;> cg;G> itu tPuk;> G+uk; tq;fk;> epkpis> jq;fk;> Rz;zq;fs; rpwe;j Rz;zq;fs; MFk;.

- JUR----kNzhd;kzpj;jha;f;F Nky; gunthspf;F epfuhFk;.
- rTf;fhur Rz;zk;---rr;rpjhde;j Rz;zkhFk;.
- cg;G Rz;zk;----------kNzhd;kzpj;jha;f;F epfuhFk;.
- ,urr;Rz;zk;----------Kbthd nghUSf;F ,izahFk;.
- itur; Rz;zq;fs;----------jhahh; tPw;wpUf;Fk; tPlhFk;. --nfhq;fzth; thjfhtpak; 3000> 3Mk; fhz;lk;

SCIENTIFIC ASPECTS OF TIN:

GENERAL PROPERTIES:

Name	:	Tin	Period	:	5
Number	:	50	Symbol	:	Sn
Group	:	14	Block	:	p
Element category	:	Post-transition metal			
Electron configuration:		[Kr] $4d^{10}$ $5s^2$ $5p^2$			
Electrons per shell	:	2, 8, 18, 18, 4			

Tin is the 49th most abundant element. Tin shows chemical similarity to both neighboring group 14 elements, germanium and lead and has two possible oxidation states, +2 and the slightly more stable +4

PHYSICAL PROPERTIES;

Phase	:	solid
Density (near r.t.)	:	(white) 7.365 $g \cdot cm^{-3}$
Density (near r.t.)	:	(gray) 5.769 $g \cdot cm^{-3}$
Liquid density at m.p.	:	6.99 $g \cdot cm^{-3}$
Melting point	:	505.08 K, 231.93 °C, 449.47 °F
Boiling point	:	2875 K, 2602 °C, 4716 °F
Heat of fusion	:	(white) 7.03 $kJ \cdot mol^{-1}$
Heat of vaporization	:	(white) 296.1 $kJ \cdot mol^{-1}$
Specific heat capacity	:	(25 °C) (white) 27.112 $J \cdot mol^{-1} \cdot K^{-1}$

- β-tin (the metallic form), which exists at room temperature and hotter, is malleable; while the α-tin (nonmetallic form), formed when tin is cooled below 13.2 °C, is brittle.
- β-tin has a diamond cubic crystal structure, similar to diamond, silicon or germanium. α-tin has no metallic properties at all. This conversion is known as *tin disease* or *tin pest*.

CHEMICAL PROPERTIES:

- Tin resists corrosion from distilled, sea and soft tap water, but can be attacked by strong acids, alkalis, and acid salts.
- Tin can be highly polished and is used as a protective coat for other metals in order to prevent corrosion or other chemical action.

- Tin acts as a catalyst when oxygen is in solution and helps accelerate chemical attack.
- Tin(II) fluoride can be mixed with calcium abrasives
- More effective than sodium fluoride in controlling gingivitis
- Organotin compounds or stannanes are chemical compounds based on tin with hydrocarbon substituents.

APPLICATIONS AND USES:

- Metal or alloy:
- Tin is used by itself, or in combination with other elements for a wide variety of useful alloys. Tin is most commonly alloyed with copper. Pewter is 85–99% tin

SCIENTIFIC ASPECT OF MERCURY:

MERCURY-*HYDRARGYRUM:*

Mercury or hydrargyrum is a chemical element with the symbol Hg .

Latinized Greek: hydrargyrum, from "hydr-" meaning watery or runny and "argyros" meaning silver.

- Name- Mercury
- Symbol- Hg
- Group-12
- Element category- transition metal
- Number -80
- Period-6
- Block-d block element

PHYSICAL PROPERTIES:

Phase	:	liquid
Standard atomic weight	:	200.59g·mol−1
Electron configuration	:	[Xe] $4f^{14}$ $5d^{10}$ $6s^2$
Electrons per shell	:	2, 8, 18, 32, 18, 2
Density (near r.t.)	:	(liquid) 13.534 $g \cdot cm^{-3}$
Melting point	:	234.32 K-38.83 , °C-37.89 , °F
Boiling point	:	629.88 K356.73 , °C674.11 , °F
Critical point	:	1750 K, 172.00 MPa
Heat of fusion	:	2.29 $kJ \cdot mol^{-1}$
Heat of vaporization	:	59.11 $kJ \cdot mol^{-1}$

- Merury is a shining ,silver-white metal liquid at ordinary temperature,divisible into spherical globules,mobile without any odor or taste.

CHEMICAL PROPERTY:

- Mercury has a unique electronic configuration where electrons fill up all the available subshells. As such configuration strongly resists removal of an electron, mercury behaves similarly to noble gas elements, which form weak bonds and thus easily melting solids.

- ❖ The stability of the 6s shell is due to the presence of a filled 4f shell. An f shell poorly screens the nuclear charge that increases the attractive Coulomb interaction of the 6s shell and the nucleus .Mercury dissolves to form amalgams with gold, zinc and many other metals except tantalum, tungsten and platinum.

Research on the treatment of mercury poisoning is limited. Currently available drugs for acute mercurial poisoning include chelators N-acetyl-D, L-penicillamine (NAP), British Anti-Lewisite (BAL), 2,3-dimercapto-1-propanesulfonic acid (DMPS), and dimercaptosuccinic acid (DMSA).

THE PERMISSIBLE LIMITS OF HEAVY METALS IN AYURVEDIC DRUGS

[as per WHO(World Health Organisation) and FDA (Federal DrugAdministration),[Radhika Singh XXXII NATIONAL SYSTEMS CONFERENCE, NSC 2008, December 17-19, 2008]

HeavyMetal	**Maximum PermissibleLimit in drugs.**
Arsenic (As)	10^3 ng/g
Cadmium (Cd)	0.3 μg/g
Lead (Pb)	10 μg/g
Mercury (Hg)	**1 μg/g**
Copper (Cu)	Not specified
Zinc (Zn)	Not specified

SCIENTIFIC ASPECT OF MERCURY(II)CHLORIDE:

MERCURY(II)CHLORIDE-CORROSIVE SUBLIMATE:

Mercury(II) chloride or mercuric chloride is the chemical compound with the formula $HgCl_2$. This white crystalline solid is a laboratory reagent and a molecular compound.

PHYSICAL PROPERTIES:

Molecular formula	:	$HgCl_2$
Molar mass	:	271.52 g/mol
Appearance	:	white solid
Density	:	5.43 g/cm^3
Melting point	:	276 °C, 549 K, 529 °F
Boiling point	:	304 °C, 577 K, 579 °F
Solubility in water	:	7.4 g/100 ml (20 °C)
Solubility	:	soluble in alcohol, ether, acetone, ethyl acetate slightly soluble in benzene, CS_2
Acidity (pK_a)	:	3.2 (0.2M solution)

- Mercuric chloride is not a salt but a linear triatomic molecule, hence its tendency to sublime. In the crystal, each mercury atom is bonded to two close chloride ligands.

Toxicity:

- Mercuric chloride is highly toxic, not only acutely but as a cumulative poison.

SCIENTIFIC ASPECT OF LIME WATER:
PRODUCTION OF LIME WATER:

The saturated calcium hydroxide solution is produced by quenching/slaking calcium oxide in water in a appropriate proportions.

The stepwise procedure:

- The calcium oxide is obtained by heating the limestone in a lime kiln. This is accomplished by heating the material to above 825 °C (1,517 °F) and the process is called calcination or lime-burning.
- This process will liberate molecules of carbon dioxide (CO_2) leaving quicklime.
- The quicklime is not stable and, when cooled, will spontaneously react with CO_2 from the air until, after enough time, it is completely converted back to calcium carbonate.
- The Calcium hydroxide is obtained when calcium oxide is mixed with water.
- Limewater is thus obtained as the supernant of the solution.Lime water is also made by mixing calcium hydroxide with water.
- The mixture needs to be shaken or made circular motion to ensure the solution is saturated with calcium hydroxide. It is then left to settle and the clear saturated solution is siphoned off the sediment.

LIMESTONE→QUICK LIME→SLAKED LIME→SATURATED$Ca(OH)_2$SOLUTION

SCIENTIFIC ASPECT OF THE EGG SHELL:

THE EGG SHELL:

An eggshell is the outer covering of a hard-shelled egg and of some forms of eggs with soft outer coats.

Element / Compound of Egg shell	Percentage
Calcium carbonate	98.2%
Magnesium	0.9%
Phosphorus (phosphate)	0.9%

[Adapted from Romanoff & Romanoff (1949)].

The chicken eggshell is 95-97% calcium carbonate crystals
The average eggshell contains traces of sodium, potassium, zinc, manganese, iron and copper

Scientific Aspects of Aloe vera:

It contains

- Essential and non-essential aminoacids ,
- Anthroquinones,anthrones,
- Enzymes like oxidases,amylase,carboxy peptidases,cellulases,catalases,alkaline phosphatise,peroxidises.,
- Essential fatty acids,
- Minerals like calcium oxlate,chloride,iron,potassium,sodium,sulphur,and few trace elements,
- Salts of organic acids calcium isocitrate,organic acids aloetic acids,citric,malic,salicylic acids.

Scientific aspect of the *Pooneeru*:

This *Pooneeru* is called as Fuller's earth or Dhobi's earth.

- It is alkaline, crystalline,creamy coloured salt ,soluble in water.
- Its pH range is more than 12. It is called Dhobi's earth as it is used by them for washing purposes.
- It is **rich in carbonates** because it produces **milky white solution with saturated solution of calcium hydroxide solution.**

The chemical composition of *Pooneeru* is discussed below.-Internet sources

- In the ICP-AAS Analysis, it contains Si, Ai, Ti, Fe, Mn, Ca, Mg, K, Na, P, Hg, As, Cr, V, Ni, Cu, Co, Cd , Li, Ba , Sr, Pb elements.
- It is a composite of **rich carbonates, sulphates, hydroxides** rendering this substance in basic nature.
- The salt collected at the specified time told by *Siddhars* on the night of *Chithra Pournami* contain chemical properties which are not found in the salt collected at other times / days.
- During full moon day, elements like mercury, iron found to be contained in more percents.

SIDDHA ASPECT OF THE DISEASE :

rpj;j kUj;Jt mbg;gilapy; Nehapd; ,yf;fzk;:

tq;f Rz;zj;ij fPy;thA> Nkf #iy> Nghd;wtw;wpw;F juyhk; vd;W $wg;gl;bUf;fpwJ.

-Fz ghlk; jhJ rPt tFg;G g.v.

It is given for rheumatism, vatham diseases. -The pharmacopeia of siddha research medicine p.no.70

vdNt fPy;thA gw;wpAk; &khb]k; Xj;j FwpFzk; nfhz;l thj Neha;fshd thj RNuhzpjk;> cjpu thj RNuhzpjk;> igj;jpa thj RNuhzpjk; gw;wpAk; ,g;gFjpapy; tpthpf;fg;gl;Ls;sJ.

I.fPy;thA:

Neha; tUk; top:

‘ tspjU fha;fp oq;F
Kspjaph; Nghdkp Ff;F”

--rpj;j kUj;Jtk; (nghJ)g.v.624

- tspf;Fw;wj;ij kpFjpg;gLj;Jk; fha;> fpoq;F> Neha;fs;
- Fsph;r;rp jUk; nghUis kpFjpahf cz;zy;> Fsph;f;fhw;wpy; <Lgly;>
- Nkf Neha;f;F Jizahf tUjy;
- jha;je;ijahpd; topahf tUjy; MFk;.

2.tsp moy; fPy;thA:

,ay;G:

‘thjgpj; jf;fPy; tha;tpd;
tUq;Fwp rhw;wf; Nfsha;
Vjkhh; ke;j Nkg;gk”;

---rpj;j kUj;Jtk; (nghJ)g.v.627

ke;jk;
Vg;gk;
tapW ,iur;ry;
clw;fz; Fj;jy;
tPf;fk;
vhpr;ry;
cwf;fkpd;ik
Ruk; Kjypait Njhd;Wk;

III. thj Neha;:

thj Neha;f; fd;k tuyhW / Neha; tUk; top:

‘E}nyd;w thjk;te;j tifjhNdJ

Ez;ikaha;f; fd;kj;jpd; tifiaf;NfS

fhypNy Njhd;wpaJ fLg;gNjJ

iffhypy; Klf;fpaJ tPf;fNkJ

NfhypNy gLf;fpd;w tpUl;rkhd

Foe;ijkue; jidnthl;ly; Nky;Njhy; rPty;

ehypNy rPtnre;J fhy;Kwpj;jy;

ey;ynfhk;G jioKwpj;jy; eypj;jy;fhNz”

--mfj;jpah; fd;k fhz;lk;.g.v.23.

- tpUl;rkhd kuj;ij ntl;ly;
- mtw;wpd; Nky; Njhy; rPty;
- caphpdq;fspd; iffhy; Kwpj;jy;
- ey;y nfhk;G jio Kwpj;jy; Kjypatw;why; thj Neha;j; Njhd;Wk;.

fd;k epth;j;jp:

‘ eypahNy te;jfd;ke; jPuntd;why;

ed;kuq;fs Njhg;Geilrhiy itj;jy;

njspthd fpzWntl;ly; Fsq;fs;ntl;ly;

nja;tjyq; Nfhapy;fl;lj; jPUk;ghU”

--mfj;jpah; fd;k fhz;lk;.g.v.23.

- ed;ik jUk; kuq;fis Njhg;G NghyTk; eilghijfspYk; itjj;jy;
- njspikahd ePh; jUk; fpzW ntl;ly;> Fsq;fs; ntl;ly;
- Nfhapy;fs; fl;ly;
- ,t;thW nra;jhy; thjq;fs; mlq;fp tpLk;.
- fd;k epth;j;jp nra;J gpd;G itj;jpak; nra;a thj Neha jPUk;.

1.thj RNuhzpjk;:

,ay;G:

‘ mwpe;jpl;l tq;fnkyh nkypT khfp
  mirthd jt;tplq;fs; tPf;f khfp
ewpe;jpl;l eilnfhlh jhdp Uj;jy;”

---rpj;j kUj;Jtk; (nghJ)g.v.607

- cly nkypT cz;lhFk;
- mirf;ff; $ba G+l;Lfspy; tPf;fk; cz;lhFk;
- elf;f KbahjthW gLf;ifapw; fplf;fr; nra;Ak;
- Neha; Kjpu Kjpu tPf;fk; cz;lhFk;
- cly; mirTj; Njhd;Wk;
- czT Ntz;lhik
- kpFe;j J}f;fj;ij tUtpf;Fk;
- thapy; ePUWk;
- vd;Dk; Fwpfis cz;lhf;Fk;
- ,‡J moy; Fw;wj;NjhL kpFe;J $ba thAthy; cz;lhtjhFk;.

2.cjpu thj RNuhzpjk;:

,ay;G:

‘ itfpjkha;f; fizf;fhY Koq;fhy; jhD
Kw;flQ; re;JGw tbAk; tPq;fpr;
nra;fpjkhQ; rpWtpuy;fs; kpfT nehe;J
rpe;ijL khwpNa rypg;Gz; lhFk;”

--- rpj;j kUj;Jtk; (nghJ)g.v.608

- ,e;Neha; fizf;fhy;> Koq;fhy;> re;J> Gwtb> G+l;L ,itfspy; tPq;fp rpW tpuy;fspy; kpfTk; Nehiag; gpwg;gpf;Fk;.
- mjNdhL rpe;ij fyf;fk;>
- rypg;G>
- gpj;J>
- cly; ghukhFk;
- cly; ntg;G Njhd;Wk;
- czT Ntz;lhik vd;Dk; Fwpfis cz;lhf;Fk;
- ,‡J moy; Fw;wj;NjhL kpFe;J $ba thAthy; cz;lhtjhFk;.

3.igj;jpa thj RNuhzpjk;.

,ay;G:

‘czh;r;rpaha;r; RNuhzpje;jhd; kpfnt Jk;gp

Cf;fkha;j; Njfnkq;F kpfNt nehe;J

Kzh;r;rpaha; Koq;fhy;fs; Koq;if nahf;f

Kidahd rpWtpuy; fd;dk; new;wp ”-- rpj;j kUj;Jtk; (nghJ) g.v.609

- FUjp kpf ntJk;gp
- clypd;fz; kpFe;j Jd;gk; cz;lhFk;
- Koq;fhy;>Koq;if>rpW tpuy;fs;>fd;dk;>new;wp>
- cly; KOikAk; re;Jf;fspYk; kpFe;j Jd;gk; cz;lhfp Filr;rYk; Njhd;Wk;
- Ruk; Njhd;Wk;
- clyhdJ ntSg;ghFk;
- ,jpy; moYk; tspAk; kpFe;j Fw;wKWk;.

NkNy $wpa tiffs; FwpFzKk; &khl;b]j;jnahj;j Ra vjph;g;G Nehapd; FwpFzj;ij Xj;jpUg;gpDk; ,e;j Ie;J Neha; tifapYk; tspAk;>moYk; ghjpf;fg;glbUf;fpd;wikahy; tsp moy; fPy;thA vd;w ngahpl;Nl Nehahspfsplj;J ,t;tha;tpy; rpfpr;ir mspf;fg;gLfpwJ.

kUj;Jtk;:

Nflile;j tspf;Fw;wj;ijj; jd;dpiyg;gLj;jf; fopr;ry; kUe;Jfis toq;f Ntz;Lk;.

Ngjpahf;Fk; kUe;Jfs;:

II.	vz;nza; tiffs;	1.nts;is vz;nza;-$^{1}/_{2}$ - **1** mTd;]; 2.thj ehr ijyk;- $^{1}/_{2}$ - **1** mTd;]; 3.nkUFs;sp ijyk;- $^{1}/_{2}$ - **1** mTd;];
III.	khj;jpiu tiffs;	1.Nkfehjf;Fspif-1
IV.;	Fok;G tiffs;.	1.mf];jpah; Fok;G.-1 Fd;wp msT.

--rpj;j kUj;Jthq;fr;RUf;Fk; g.v.657.

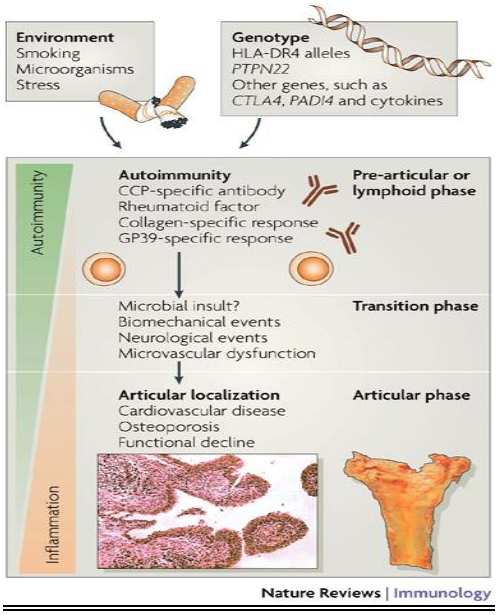
SCIENTIFIC ASPECT OF THE DISEASE:

RHEUMATOID ARTHRITIS:

DEFINITION:

Rheumatoid arthritis is a chronic, systemic inflammatory, auto immune disorder that may affect many tissues and organs, but principally attacks flexible (synovial) joints.
The word '*rheuma*' derived from greek meaning '*that which flows as a river or stream*',and '*-oid*' meaning '*resembling'.*
Rheumatoid arthritis produces an inflammatory response of the capsule around the joints (synovium) secondary to swelling (hyperplasia) of synovial cells, excess synovial fluid, and the development of fibrous tissue (pannus) in the synovium, leading to the destruction of articular cartilage and ankylosis of the joints.

AETIOLOGY:



1. Genetic Predisposition for auto immunity
2. Environmental trigger factors for auto immunity

1.Genetic Predisposition:

- Family studies and studies in mono- and di-zygotic twins support the concept that genetic factors are important for susceptibility to Rheumatoid arthritis.
- While the rheumatoid arthritis concordance rate in monozygotic twins was up to 12-15%, di-zygotic twins displayed a concordance rate of 4%, which equals a

four-fold increased susceptibility of the latter to develop RA when compared with normal population.

- A genetic link with HLA-DR4(human leukocyte surface antigen)and related allotypes of MHC Class II and the T cell-associated protein PTPN22 indicating T- cells play an important role in RA pathogenesis.

2.Environment trigger factors:

- Lifelong infectious load due to certain bacteria and viruses
- Smoking
- Hormonal imbalance during menopause
- Diets like eating too much acid-forming foods
- Artificial food items

PATHOGENESIS:

The articular manifestations of RA can be divided into two categories:

1.Reversible signs related to aseptic inflammatory synovitis
2.Irreversible structural damage caused by synovitis, resulting in cartilaginous and bony deformities.

Useful for deciding Disease staging, Prognosis and treatment.

The Cross –Reactivity between Auto-Antigens [Citrullinated arginine residues of modified Vimentin,Filaggrin like proteins] in joint matrix and WBC especially T-cell leads to pathogenesis of rheumatoid arthritis.

1.Synovitis and Pannus formation:

- The synovial membrane normally contains a relatively thin intimal lining layer with only one or a few cell layers.
- After disease onset the normal hypocellular synovial membrane becomes hyperplastic, comprising a superficial lining layer of synovial fibroblast and macrophages.
- The lining layer overlies an interstitial zone with marked cellular infiltrates containing fibroblast, macrophages, dendritic cells, mast cells, T cells[CD4 subset and CD8 subset] and B cells.

- The interaction between activated lymphocytes and monocytes,leading to production of pro-inflammatory cytokines, immunoglobulins and rheumatoid factors [RF] is central to this immunological reaction.
- Since many mediators are involved in pathogenesis interleukin-1 (IL-1) and tumour necrosis factor (TNF) are suspected to stimulate synoviocytes and osteoclasts, events that lead to the irreversible destruction of bone and cartilage.
- These cytokines are also involved in the expression of cell-adhesion molecules necessary for cell migration and inflammation on endothelial cells, which promote local accumulation of leukocytes.
- Synoviotes are also known to produce matrix –metalloproteinases (MMPs).
- In RA, the proportion of proteinases to their inhibitors is unbalanced.
- The combined activity of these mediators appears to be the cause of synovial fluid, synovial proliferation as well as cartilage and bone damage.
- Rheumatoid factor (RF) and other auto-antibodies accumulate in the synovial tissue and fluid, where they maintain inflammation by activating complement in the adjacent bradytrope cartilage and tissue.
- In addition to cellular basis of synovial inflammation, newly formed blood vessels also infiltrate the synovial membrane.
- This neo- angiogenesis is known to be driven by the production of different growth factors which support synovial hyperplasia.
- All these events lead to the development of a non-suppurative proliferating synovitis, also known as ‘ Synovialitis Pannus ’.
- The pannus extends over and sometimes through adjacent articular cartilage, observed radiologically as joint space narrowing and bone erosion.
- Pannus growth can be compared with the progression of a benign tumour (tumour –like progression).

2.Mechanism of cartilage loss in rheumatoid arthritis:

- Cartilage degradation is regulated through different mechanism. Chondrocytes switch from an anabolic matrix-synthesizinig state to a catabolic state which is characterized by the formation of matrix-degrading enzymes (MMPs) that cleave cartilage components such as Proteoglycan and collagen fibres.

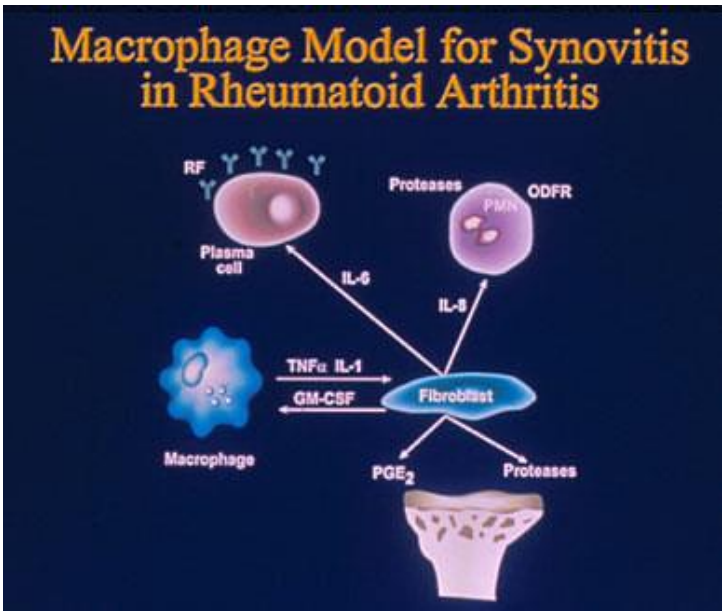
- The chondrocytes themselves synthesize or respond to local cytokines released by the synovial membrane such as IL-1beta and TNF .

This synergestic effect seems more potent than that of TNF. In addition synovial fibroblast ,neutrophils and mast cells situated in the synovial membrane further release matrix-degrading enzymes, in turn contributing to cartilage degradation.

3.Mechanism of focal bone loss in RA:

- Osteoclastogenesis is influenced by both IL-1 and TNF, as both factors up-regulate RANKL expression in bone-lining and marrow stromal cells. TNF and RANKL act in synergy to enhance osteoclast differention, whereas IL-1 even delays osteoclast apoptosis.

- In addition, IL-1 and TNF induce apoptosis of osteoblasts, further contributing to bone loss in RA.



CLINICAL MANIFESTATION OF RHEUMATOID ARTHRITIS:

- Clinical features of RA vary not only from one patient to another but also in an individual patient during the disease course.

- In approximately 2/3 of the patients ,prodromal symptoms, which may persist for weeks and defy diagnosis, are fatigue,generalised weakness and non-specific musculoskeletal symtoms prior to the appearance of clinically obvious synovitis.
- RA is an insidious process that characteristically presents with symmetrical involvement of joints.
- First, the appearance of symtoms is usually in the hands and feet and their adjacent structures, but onset may also occur in large joints such as the knee and hip.
- Persistant synovial arthoncus (joint swelling) with hyperthermia,morning stiffness, limitation of motion,feebleness and precocious juxtaarticular myoatrophy,accompanied by more or less severe pain,are cardinal symptoms.
- The other symtoms are low grade fever, loss of appetite,fatigue.

The 1987 revised criteria for the classification of rheumatoid arthritis,set by the American College of Rheumatology(ACR)
Guideliness for classification :
Four of seven criteria are required to classify a patient as having RA.Criteria 1-4 must be present for at least 6 weeks,criteria 2-5 must be observed by a physician.
1.Morning stiffness: Stiffness in and around the joint lasting 1 hour before maximal improvement.
2.Arthritis of 3 or more joint areas: At least three joints areas,observed by a physician simultaneously have soft tissue swelling or joint effusion,not just bony overgrowth. The 14 possible joint areas involved are right or left proximal interphalangeal,metacarpophalangeal,wrist,elbow,knee,ankle and metatarsophalangeal joints.
3.Arthritis of hand joints: Arthritis of wrist,metacarpophalangeal joints or proximal interphalangeal joints.
4.Symmetric arthritis: Simultaneous bilateral involvement of the same joint areas.
5.Rheumatoid nodules: Subcutaneous nodules over bony prominences,extensor surfaces or juxta-articular regions observed by the physician.
6.Serum rheumatoid factor[RF]: Demonstration of abnormal amounts of serum RF by any method for which the result has been positive in less than 5% of normal control

subjects.
7.Radiographic changes: Typical changes of RA on posterior-anterior hand and wrist radiographs must include erosions or unequivocal bony decalcification localized in, or most marked adjacent to the involved joints.

SPECIFIC DEFORMITY:

a) Swan neck deformity:

With hyper extension of the PIP joints with fixed flexion of the distal interphalangeal joints.

b) Button hole deformity: (Boutonniere deformity)

Which includes fixed flexion of the proximal interphalangeal joints.

c) Z deformity: of the thumb (Radial deviation at the wrist with ulnar deviation of the digits often with palmer subluxation of the PIP joints.

d) Hypertension of the first interphalangeal joints and flexion of the first metacarpo phalangeal joint with consequent loss of thumb mobility and pinch.

EPIDEMIOLGY OF RA:

Incidence	:	Western countries 1-3%
Prevalence	:	0.5-1% of population
Female:Male	:	3:1
Age	:	30-50

INVESTIGATION OF RHEUMATOID ARTHRITIS:

Blood:

- TRBC
- TWBC
- Platelets
- ESR
- CRP

C reactive protein is produced in the liver and is normally found in serum in minute amounts (less than 0.6 mg/dl). In conditions characterized by inflammation with tissue destruction, the CRP level may increase. Although CRP has many effects in the immune system, its specific primary role is still unclear.

- Rheumatoid factor

Rheumatoid factor is an immunoglobulin M (IgM) antibody directed against normal human immunoglobulin it is usually measured by agglutination tests (IgG). (Agglutination of IgG coated latex particles) and reported as either negative or positive with titres up to 1:320.

- LFTs
- Antinuclear antibodies
- Anti-CCP.

Anti-citrullinated protein antibodies (ACPA) or anti-cyclic citrullinated protein antibodies (anti-CCP) are autoantibodies (antibodies directed against one or more of an individual's own proteins) that are frequently detected in the blood of rheumatoid arthritis patients.

Radiology

Early

- Soft tissue swelling
- Juxta-articular osteoporosis
- Joint space narrowing (cartilage loss)
- Erosions (marginal)

Late

- Bone and joint destruction
- Subluxation

RA-MEDICATIONS:

- NSAIDS- Non-steroidal anti-inflammatory drugs
- DMARDS-Disease modifying anti-rheumaic drugs
- STEROIDS
- NEW FEATURE TREATMENTS

NSAIDs

- COX-2 Inhibitors
- Meloxicam

DMARDs

- Auranofin
- Azathioprine
- Ciclosporin
- Cyclophosphamide

- Hydroxychloroquine
- Leflunomide
- Methotrexate

New Treatments

- Anti-cytokine therapy
- Soluble TNFα receptor - Etanercept (Enbrel)
- Anti- TNFα antibodies - Infliximab (Remicade)
- Anti- TNFα antibodies - Adalimumab

Adverse effects

- Infection
- Malignant disease
- Injection site/Infusion
- Immune/Autoimmune
- Demyelinating Diseases.
- Heart failure

POOR PROGNOSIS:

- Older onset
- Female
- Greater number of joints
- Uncontrolled polyarthritis
- Structural damage/deformity
- Functional disability
- Extra-articular features
- Psychosocial problems
- Rheumatoid factor
- (HLA-DR4/DR1 'shared epitope')

RA IN REMMISION:

- Morning stiffness <15 minutes
- No joint pain

- No fatigue
- No joint tenderness/pain on
- motion
- No soft tissue swelling
- ESR <30mm/hr (female),<20mm/hr (male)

4.MATERIALS AND METHODS:

This Medicine is taken from the Classical Siddha Text, SIDDHA FORMULARY OF INDIA, Government of India, Public health and welfare department, Page no.12,13.and also referred in The Pharmacopoeia of Siddha Research Medicines Page.no70.

4.1.THE PREPARATION OF VELVANGA CHUNNAM:

This starts with identification, purification and then preparation of the chunnam.

IDENTIFICATION AND AUTHENTIFICATION OF THE RAW MATERIALS OF THE VELVANGA CHUNNAM.

The raw materials namely *Velvangam,Lingam,Veeram,*are bought at Country goods market, Parrys corner, Chennai., Egg's shop, Chennai, *Utthiramerur* for *Pooneeru* collection, Particularly on *Panguni Utthiram,Paurmami*, "Super Moon" Day. And it was authentified at Government Siddha Medical College,Chennai by our Professors of Post Graduate Department of Gunapaadam.

PURIFICATION OF THE RAW MATERIALS OF THE VELVANGA CHUNNAM.

The Starting materials of the *Velvanga chunnam* are *Velvangam* [Tin],*Rasam* [Mercury], *Veeram* [corrosive sublimate], *Anda Odu* [hen's egg shell], *Pooneeru [Fuller's Earth],Kumari juice, Karchunna thelineer.*

The required ingredients should undergo the

- *Suthi muraigal*
- *Marunthu sei muraigal*
- *Marunthai sothithu parthal* as per classical *siddha* literature.

SUTHI MURIGAL*:*

What is Suthi muraigal?

The Pre–conditioning process of drug preparation which eliminate unwanted toxic materials, enhance potentiality and prepare the raw material suitable for preparation of medicine.

Suthi muraigal of Velvangam:

The *velvangam* is weighed and taken in a ladle and heated over the stove at appropriate flame until it melts thoroughly and then poured into a small pot containning *nalennaii.* The *velvangam* is taken out and washed and this repeated for three times. Then The *velvangam* is taken in a ladle and heated over the stove at appropriate flame until it melts thoroughly and then poured into a small pot containning *komuthiram.* The

velvangam is taken out and washed and this repeated for three times. Then the purified *velvangam* is then washed and wiped with cloth, dried and kept in a container.

Suthi muraigal of *Rasam:*

This process contains *Valai rasam* process and then purifying techniques.

The process of *Valai rasam:*

This includes putting powders of '*lingam'* in a pot with '*sitthiramolla vaer pattai'* and then closed with another pot [which is coated and dried with juice of *maeni saaru]* and sealed with *ulundu* seals, stayed dried and kept over the pot and then heated for 2-3 hrs at moderate flame. A wet cloth is placed over the upper pot and stayed wet with water. Then the pot is taken carefully and kept cool. The sealed is removed carefully, opened and the *rasam* is removed from the inner surface of the upper pot with brush and washed with water. Then it is grinded with brick powder and turmeric powder one after other for three hours. It is then washed with water and poured into pot containing '*kuppaimaeni'* juice and heated in a slow flame till $^{2}/_{3}$ of the juice is reduced.The *rasam* is then washed with lime juice and finally with water and stored in a glass container.

Suthi muraigal of *Veeram:*

The *veeram* is weighed and sealed in a cloth. It is then hanged [with help of bamboo stick] into a pot containing tender coconut water and camphor dissolved in it. The level of the hanging *veeram* should be above the level of the liquid. The pot is then kept over the stove and heated in a slow flame. This process is called *Thulaenthiramaga Erithal*. The *veeram* is then removed and dried and kept in a container.

Suthi muraigal of *Anda odu:*

The [*naattu muttai odu*] *anda odu* is collected and put in a pot containing *karchunna thelineer* and *pooneeru* mixture in 4:1 ratio respectively. It is then heated in a stove with low flame. With some liquid the anda odu is removed and inner skin is removed and washed thoroughly with water. It is then dried and powdered and kept in a container.

Suthi muraigal of *Pooneeru:*

The pooneeru mann is then mixed with distilled water in the ratio of 1:4 and mixed well and stayed for 3 days.It is then mixed well intermittently. After 3 days the supernant is then taken and heated in a container and until the salt is obtained. It is then repeated for 10 times and then kept in a container.

Preparation of *Karchunna thelineer*:

The *sunnappukkal* is put in water in the ratio of 1:4.It is then stirred well and kept for 3 days. It is then mixed well intermittently. After 3 days the supernant is then taken and stored in a container.

METHOD OF PREPARATION OF VELVANGA CHUNNAM:

1.PURIFIED *VELVANGAM*[tin] -4parts.

2.PURIFIED *RASAM*[mercury] -4parts.

3.PURIFIED *VEERAM*[corrosive sublimate] -1part.
4.PURIFIED *ANDA ODU*[hen's egg shell] -4parts.
5.*POONERU* -*Panavedai.*
6.*KUMARI SAARU* -For grinding needs.
7.*KARCHUNNA THELINEER* -For grinding needs.

The Velvangam is heated at a crucible and and mixed with rasam and the process is called thonthithal.The resultant material is then mixed with powdered veeram and anda odu, pooneru.It is then grinded with karchunna thelineer and make into small villai[disc like] and then let to dry.

The villai is kept in a crucible and and the crucible is closed and made air tight with seals of mud cloth, dried and heated with charcoals with air blowing setup .After heating the mosai is removed and kept cooled. The seal is removed and the chunnam is searched for any metallic particles and then tiny metallic particles are removed. Then the process is repeated once. The chunnam is obtained and showed red color with turmeric paste.

PICTORIAL REPRESENTATION OF PURIFIED RAW MATERIALS,*ANDAERUKAN JEYANEER*, FINAL PRODUCT, *SIDDHA* VERIFICATION OF *VELVANGA CHUNNAM*

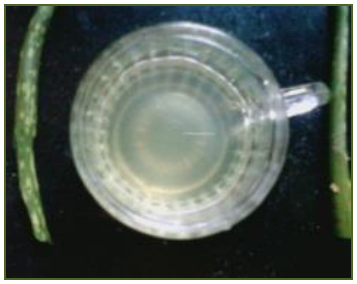
PURIFIED *VELVANGAM*

PURIFIED *RASAM*

PURIFIED *VEERAM*

PURIFIED *ANDAODU*

PURIFIED *POONEERU*



Juice of Aloe vera *KUMARI* JUICE

KARCHUNNA THELINEER

VELVANGA CHUNNAM

MANJAL + VELVANGA CHUNNAM → SIVAPPU NIRAMAGA MARIYATHU

[Turmeric powder + *Velvanga Chunnam* → *Reddish Discoloration of the Mixture*]

4.2.STANDARDISATION OF THE VELVANGA CHUNNAM:

ANALYSIS OF THE VELVANGA CHUNNAM.

SIDDHA/GUNAPADAM ASPECT:

rpj;j Kiwg;gb Nrhjpj;J ghh;j;jy;:

t.vz;	Rz;zj;jpd; ,ay;G	nts;tq;f Rz;zk;
1.	Cjpa gpd; %iria jpwe;J ghh;f;f G+j;J ,Uf;Fk;	G+j;J ,Ue;jJ.
2.	nghJthf ntz;ik epwNkhL ,Uf;Fk;/ntSj;jpUf;Fk;	ntz;ik epwNkhLk; ntSj;Jk; ,Uf;fpwJ.
3.	Rd;dpjk;-El;gk;	El;gkhf ,Uf;fpwJ.
4.	kQ;rspl;lhy; rptf;Fk;	kQ;rspl;lTld; rpte;jJ.

S.NO	CHARACTERS [Through kaandal/kaatchi alavai]	NATURE OF CHARACTERS OF *VELVANGA CHUNNEL-RESULTS.*
1.	The State of Matter	Solid
2.	Consistency	Very Fine Powdery in nature
3.	Nature of powder	Amorphous in nature [to the maximum extent]
4.	i.Colour –physically ii.Colour -On reaction with water and turmeric powder	Dull white White coloured samples are also obtained. Turns yellow colour of the mixture to red in colour.
5.	Solubility	Not soluble in water but reacts with water.
1.	Weight	Low, since the initial weight of starting materials is reduced
III.	Taste	Not predictable Dryness of mucosa and tongue is felt.

4.2.1.PHYSICO-CHEMICAL ANALYSIS:PROCEDURES:

Total ash

Two grams of grounded air-dried material was accurately weighed in a previously ignited and tared silica crucible. The drug was gradually ignited by raising the temperature to 450°C until it was white. The sample was cooled in a desiccator and weighed. The percentage of total ash was calculated with reference to air-dried drug.

Acid Insoluble ash

The ash was boiled with 25 ml of 2 M hydrochloric acid for 5 minutes, the insoluble matter was collected on an ash less filter paper, washed with hot water, ignited, cooled in a desiccator, and weighed. The percentage of acid insoluble ash was calculated with reference to the air-dried drug.

Water Soluble ash

The ash was boiled with 25 ml of water for 5 minutes, the insoluble matter on ash less filter paper collected, washed with hot water, ignited, cooled in a desiccator, and weighed. The weight of the insoluble matter from the weight of the total ash was subtracted; the difference represents the water soluble ash. The percentage of water insoluble ash was calculated with reference to the air-dried drug.

Moisture content:

The shade-dried drug was grounded in a mixer grinder. The powder passed through #40 and retained on #120. Accurately weighed 10 g of # 40/120 drug powder was kept in a tared evaporating dish. This was dried at 105°C for 5 hours in tray drier and weighed. The drying was continued and weighing was done at one-hour interval until difference between two successive weighings corresponds to not more than 0.25 percent.

Drying was continued until a constant weight was reached with two successive weighings after drying for 30 minutes and cooling for 30 minutes in a desiccator was showing not more than 0.01 g difference.

Potential of Hydrogen (**pH):**

The pH scale is logarithmic and runs from 0.0 to 14.0 with 7.0 being neutral. Readings less than 7.0 indicate acidic solutions, while higher readings indicate alkaline or base solutions.

4.2.2. INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROMETRY (ICP-OES)

Inductively coupled plasma atomic emission spectroscopy (ICP-AES), also referred to as inductively coupled plasma optical emission spectrometry (ICP-OES), is an analytical technique used for the detection of trace metals.

It is a type of emission spectroscopy that uses the inductively coupled plasma to produce excited atoms and ions that emit electromagnetic radiation at wavelengths characteristic of a particular element.

The intensity of this emission is indicative of the concentration of the element within the sample.

4.2.3. FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR)

INSTRUMENT DETAILS**:**

Model	**: Spectrum one: FT-IR Spectrometer**
Scan Range	**: MIR 450-4000 cm-1**
Resolution	**: 1.0 cm-1**
Sample required	**: 50 mg, solid or liquid.**

Fourier Transform Infrared Spectroscopy (FTIR) is an analytical technique used to identify mainly organic materials. FTIR analysis results in absorption spectra which provide information about the chemical bonds and molecular structure of a material. The FTIR spectrum is equivalent to the "fingerprint" of the material and can be compared with cataloged FTIR spectra to identify the material.

FOURIER TRANSFORMS INFRARED SPECTROSCOPY ANALYTICAL CAPABILITIES:

- Identifies chemical bond functional groups by the absorption of infrared radiation which excites vibrational modes in the bond
- Especially capable of identifying the chemical bonds of organic materials
- Detects and Identifies organic contaminants
- Identifies water, phosphates, sulphates, nitrates, nitrites, and ammonium ions

- Detection limits vary greatly, but are sometimes $<10^{13}$ bonds/cm^3 or sometimes sub monolayer
- Useful with solids, liquids, or gases

4.2.4. ENERGY-DISPERSIVE X-RAY SPECTROSCOPY[EDAX]

Energy-dispersive X-ray spectroscopy (EDS or EDX or EDAX) is an analytical technique used for the elemental analysis or chemical characterization of a sample.
It relies on the investigation of an interaction of a some source of X-ray excitation and a sample. Its characterization capabilities are due in large part to the fundamental principle that each element has a unique atomic structure allowing X-rays that are characteristic of an element's atomic structure to be identified uniquely from one another.

4.2.5. SCANNING ELECTRON MICROSCOPE (SEM)

Resolution : 1.2 nm gold particle separation on a carbon substrate
Magnification : From a min of 12x to greater than 1, 00,000 X

The Scanning Electron Microscope (SEM) is a microscope that was electrons rather than light to form an image. There are many advantages to using the SEM instead of a light microscope.
The SEM has a large depth of field, which allows a large amount of the sample to be in focus at one time.
The SEM also produces images of high resolution, which means that closely spaced features can be examined at a high magnification. Preparation of the samples is relatively easy since most SEM one require the sample to be conductive.
The combination of higher magnification, larger depth of focus, greater resolution, and easy of sample observation marks the SEM one of the most heavily used instruments in research areas today.

4.2.6. CHEMICAL ANALYSIS OF TRIAL MEDICINES

Preparation of Sodium Carbonate extract:
2 gm of the sample is mixed in 20 ml of distilled water.The solution is soaked for24 hours, the filtrate is taken.

I.TEST FOR ACID RADICALS:

Test for Sulphate:2 ml of the above prepared extract is taken in a test tube. To this add 2ml of 4% Ammonium oxalate solution.2ml of extract is added with 2ml of dilute hydrochloric acid until the effervescence ceases off. Then 2ml barium chloride solution is added.

Test for Chloride:2ml of extract is added with dilute nitric acid till the effervescence ceases. Then 2ml of silver nitrate solution is added.

Test for Phosphate:2ml of the extract is treated with 2 ml of Ammonium molybdate solution and 2ml of concentrated nitric acid.

Test for Carbonate:2ml of the extract is treated with 2ml of magnesium sulphate solution.

Test for Sulphide:1 gm of the substance is treated with 2ml of concentrated Hydrochloric acid

Test for Nitrate:1gm of the substance is heated with copper turnings and concentrated sulphuric acid and viewed the test tube vertically down.

Test for Fluoride and oxalate:2ml of the extract is added with 2ml of dilute acetic acid and 2ml of calcium chloride solution and heated.5 drops of clear solution is added with 2ml of dilute sulphuric acid and slightly warmed to this, 1 ml of dilute potassium permanganate solution is added.

Test for Nitrite:3 drops of the extract is placed on a filter paper. On that, 2 drops a Acetic Acid and 2 drops of Benzidine solution is placed.

Test for Borate:2 pinches of the substance is made into paste by using Sulphuric acid and Alcohol (95%) and introduced into the blue flame.

II.TEST FOR BASIC RADICALS:

Test for lead:2 ml of the extract is added with 2 ml of Potassium iodide solution

Test for Copper: One pinch of substance is made into paste with concentrated Hydrochloric acid in a watch glass and introduced into the non luminous part of the flame.2ml of the extract is added with excess of Ammonia solution

Test for Aluminium: To the 2 ml of extract. Sodium Hydroxide solution is added in drops to excess.

Test for Iron:To the 2 ml of extract, 2 ml of Ammonium Thiocyanate solution is added. To the 2 ml of extract, 2 ml of Ammonium Thiocyanate solution and 2 ml of concentrated Nitric Acid is added.

Test for Zinc:To the 2 ml of extract Sodium Hydroxide solution is added in drops to excess.

Test for Calcium:2 ml of the extract is added with 2 ml of 4% Ammonium Oxalate solution.

Test for Magnesium:2ml of extract, Sodium Hydroxide solution is added in drops to excess.

Test for Ammonium:2 ml of extract few ml of Nessler's Reagent and excess of Sodium Hydroxide solution are added.

Test for Potassium:A pinch of substance is treated with 2 ml of Sodium Nitrite solution and then treated with 2 ml of Cobal Nitrate in 30% glacial Acetic acid

Test for Sodium:2 pinches of the substance is made into paste by using Hydrochloric acid and introduced into the blue flame.

Test for Mercury:2 ml of the extract is treated with 2 ml of Sodium Hydroxide solution.

Test for Arsenic:2 ml of extract is treated with 2 ml of silver Nitrate solution.

4.2.7.THE PROCEDURE OF PHYOCHEMICAL ANALYSIS		
Sl. No	**EXPERIMENT**	**OBSERVATION**
I.	**Test for Tannins:** A plant sample dried powder 0.5 gm is boiled in 20 ml of water and filtered.The filterate 2 ml is taken and 3-5 drops of $Fecl_2$ (0.1%) is slowly added to it.	Forms a brownish-green or bluish- black colour.
II.	**Test for Phlobatannins:** An aqueous 2 ml of plant sample is boiled in a hot water bath with 1 ml of aqueous Hcl	A red precipitate is deposited
III.	**Test for Saponin:** A powdered 2 gm of plant sample is boiled with 20 ml of distilled water,then filtered,the filterate is added with fresh 5 ml of distilled water and shaken vigorously.	A permenant or persistant froth is not formed.The froth is not turned in to emulsion by adding three drops of olive oil.
IV.	**Test for Flavonoids:** An aqueous filterate of plant sample is mixed with 5 ml of dilute Ammonium solution and few drops of concentrated H_2SO_4 is slowly added through the sides of the test tube.	Yellow colour formed and disappears on standing.When 1% Alluminium solution is added in this mixture re-formation of yellow colour.
V.	**Test for steroids:** An ethonolic extract of plant sample 2ml is mixed with 2 ml H_2SO_4 and 0.5 gm Acetic anhydride.	The solution turns in to blue to green colour
VI.	**Test for Cardiac glycosides:** In 5 ml of plant Ethanolic extract, 2 ml of Glacial acetic acid, a drop of $Fecl_2$ and 1 ml of H_2SO_4 (slowly on the sides of the test tube) is added.	A brown ring indicates deoxy sugar of cardenolides/violet ring appears below brown ring/ in acetic acid layer a green ring is formed
VII.	**Test for Terpenoids:** In 5 ml of Ethanolic plant extract, 2 ml of chloroform and 3 ml of concentrated H_2SO_4 (slowly) is added.	A reddish brown interface layer is formed
VIII.	**Test for Carbohydrates:** An aqueous plant extract is boiled in a water bath with Benedict's solution.	A green or brick red or red precipitate shows the presence of reducing sugar
IX.	**Test for Alkaloids:** Alkaloids are identified by precipitate method **Mayer's reagent:** An aqueous plant extract of 2 ml is mixed with 2 ml of mayer's reagent **Wagner's reagent:** An aqueous plant extract of 2 ml is mixed with 2 ml of wagner's reagent **Dragendroff's reagent:** An aqueous plant extract of 2 ml is mixed with 2 ml of Dragendroff's reagent.	 Forms whitish or yellowish cream colour precipitate Forms a brown or dark reddish precipitate Forms reddish brown precipitate

X.	**Test for Glycosides:** An aqueous plant extract of 2 ml is added with 1 ml of concentrated Hcl and boiled in a water bath for about 2 hours. The filtrate is separated and 3 ml of chloroform is added, then 10% of 1ml Ammonium solution is added.	Forms pink colour
XI.	**Test for Protein:** An aqueous extract /alcoholic extract of 2 ml is added with few drops of Biuret reagent and kept in hot water bath for 10 minutes.	Formation of light blue or Pale violet colour is absent
XII.	**Test for Phytosterols:** An ethanolic or a methonolic plant extract 2 ml is mixed with 2 ml of Acetic anhydride stirred well and heated for 2 minutes in hot water bath then allowed to cool.1 or 2 drops of H_2SO_4 is added with the mixture slowly through the sides of the wall .	Forms greenish blue layer on the upper surface
XIII.	**Test for Phenolic compounds:** About 2 ml of aqueous plant extract is mixed with 2 ml of $Fecl_3$ solution.	Formation of deep bluish green colour is absent
XVI.	**Test for Volatile oil:** An ethanolic plant extract of 2 ml is mixed with one or two drops of tincture in warm water bath in a screwed cap test tube.	Red colour is not appeared
XV.	**Test for Fixed oil:** One ml of ethanolic extract of plant sample is mixed with 1 ml of 1% copper sulphate solution and 5 drops of 10% sodium Hydroxide solution	Formation of a clear blue solution is absent

4.3.TOXICOLOGICAL EVALUATION:

4.3.1.ACUTE TOXICITY STUDY ON *VELVANGA CHUNNAM:*

The acute toxicity study on *Velvanga chunnam* was done under the OECD Guidelines 425 The sub-acute toxicity study on *Velvanga chunnam* was done under the OECD Guideline 407.

PROCEDURE

I.Stock solution preparation

The powdered form of *Velvanga Chunnam* was filtered through cheesecloth and was mixed uniformly in 2% CMC solution to achieve 100mg/ml as main stock solution and used in this study. All drugs were administrated orally half an hour before the onset of pain stimulus in different models of nociception in albino mice. Diclofenac sodium (5mg/kg) in distilled water, Test drug Velvanga Chunnam (500mg/kg) in 2 % CMC.

Animals:

Swiss mice (25—35 g), were housed at 22±2°C under a 12-h light/12 h dark cycle and with access to food and water *ad libitum*, were acclimatized to the laboratory for at least 1 h prior to testing. The animals were acclimatized for one week under laboratory conditions. For each experiment, one group of animals was used. The experiments reported on here were carried out in accordance with the current ethical and care guidelines for the care of laboratory animals and the investigation of experimental pain in conscious animals.

The experiments were approved by the local Ethics Committee of Vels University (XIII/VELS/COL/12/CPCSEA/IAEC/23.O9.11). The number of animals (6for group of treatment) and intensities of noxious stimuli used were the minimum necessary to demonstrate consistent effects of the drug treatments.

Acute toxicity study:

Acute oral toxicity study for the Velvanga Chunnam was carried out as per OECD Guidelines 425. Animals are observed individually after dosing at least once during the first 30 minutes, periodically during the first 24 hours, with special attention given during the first 4 hours, and daily thereafter, for a total of 14 days, except where they need to be removed from the study and humanely killed for animal welfare reasons or are found dead. All observations are systematically recorded and Observations include changes in skin and fur, eyes and mucous membranes, and also respiratory, circulatory, autonomic and central nervous systems, and somatomotor activity and behavior pattern. Attention was directed to observations of tremors, convulsions, salivation, diarrhea, lethargy, sleep and coma.

4.3.2.SUB-ACUTE ORAL TOXICITY STUDY OF *VELVANGA CHUNNAM* IN RATS

Animals

Either sex albino rats of average body weight of 194g were kept separately in individual polypropylene cages with stainless steel hopper in air-conditioned room (24 °C) of the animal house under uniform animal husbandary conditions. The animals were fed basal diet (Sai meera foods. Bangalore) and water *ad libitum.* The animals were

acclimatized to temperature and lighting (12 h light/dark) conditions of the animal house. The animals were housed 3 per cage and body weights were recorded on the day of arrival, day of randomization, prior to Velvanga chunnam treatment, on days 7, 14, 21, and 28 post dosing, and on days 7 and 14 of the recovery period.

Sub-acute toxicological studies:

A 28-day study with a 14-day recovery period was conducted. The study design met the criteria outlined in OECD Guideline 407 ("Repeated Dose 28-Day Oral Toxicity Study in Rodents") and was conducted as a limit test. Groups of 4-5-week-old Wistar rats were given by gavage 0 (vehicle control) or 250, 500 and 1000mg/kg b.w/day of Velvanga chunnam in 2% Carboxy methyl cellulose for 28 days.

The rats were observed twice daily for any adverse clinical signs or mortality during the treatment and recovery periods. Feed consumption (g/day) was recorded weekly throughout the entire study and water intake (g/day) was recorded daily during different weeks of the treatment period and of the recovery period. Prior to termination, fasting blood samples were taken from the retro orbital vein for hematological and clinical chemistry evaluations.

Observations made in this study

Clinical signs

All the rats were observed at least twice daily with the purpose of recording any symptoms of ill health or behavioral changes. These observations were also performed on week-ends. The observations included but were not limited to changes in skin and fur, in the eyes and mucous membranes, in the respiratory, circulatory, central nervous and autonomous systems, somatomotor activity and behavior.

Body weight

The bodyweight of each rat was recorded one week before the start of treatment, daily during the course of the same and on the day of sacrifice. The rats selected for the recovery period were weighed twice a week and on the day of sacrifice. The mean weights for the different groups and sexes were calculated from the individual weights.

Food intake

Prior to the beginning of treatment, and afterwards once a week, the food intake of each cage was recorded and the mean weekly intake per rat was calculated.

Water intake

Water intake was checked by visual observation during the Study. In addition, the water consumption in each cage was measured daily for a period of 5 days, during the 3rd week of treatment and, subsequently, during the 2nd week of the recovery period.

Ophthalmoscopy

Before treatment started, the eyes of all animals were examined. These examinations included the cornea, the conjunctiva, the sclera and the iris. The observations were made with the aid of an indirect ophthalmoscope. Before the end of the treatment and before the end of the recovery period, additional examinations of the eyes of the animals from the Control and high dose groups were made.

Laboratory Studies

During the 4th week of treatment, samples of blood were withdrawn from the retro orbital sinus of rats from each group, under light ether anesthesia after fasting for 16 hours. The blood samples were taken from each animal approximately between 7:30 and 10:00 hours in order to reduce biological variation caused by circadian rhythms. In addition, samples of the urine produced during 16 hours by rats were taken. To this end the rats were deprived of food for this period of time.

Haematology

The following determinations were performed:

Haemoglobin g/100 mL, Haematocrit %, Mean corpuscular volume (MCV) fL, Mean corpuscular haemoglobin (MCH) pg, Mean corpuscular haemoglobin concentration (MCHC) g/100 mL, Reticulocyte count %, Total leukocyte count $10^3/\mu L$, Differential leukocyte count$10^3/\mu L$ includes Neutrophils, Lymphocytes, Eosinophils, Basophils, Monocytes, and Platelet count $10^3/\mu L$.

Biochemistry

The following blood chemistry determinations were carried out:

Glucose mg/100 mL, Urea mg/100 mL, Creatinine mg/100mL, Total bilirubin mg/100mL, Aspartate aminotransferase (AST/GOT) U/L, Alanine aminotransferase (ALT/GPT) U/L, Alkaline phosphatase U/L, Total cholesterol mg/100mL, Sodium mmol/L, Potassium mmol/L, Chloride mmol/L, Calcium mg/100mL, Total protein g/100mL and Albumin g/100mL.

Analysis of urine

The following determinations were made:

Colour, Volume, Macroscopic observation, Specific gravity, pH, Proteins, Glucose, Bilirubin, Ketones, Urobilinogen, Haemoglobin

The results are presented using the following scale:

0 = negative, + = small quantity of the parameter analyzed, ++ = moderate quantity of the parameter analyzed, +++ = large quantity of the parameter analyzed. The urinary sediment was examined for the detection of Pus cells, RBCs, Epithelial cells, Crystals, Casts and Others.

Terminal Studies

On completion of the 4 weeks of treatment, two rats from each group were sacrificed by ether inhalation. The remaining rats were sacrificed at the end of the recovery period. A full autopsy was performed on all animals, which included examination of the external surface of the body, all orifices, cranial, thoracic and abdominal cavities and their contents. As the number of animals exceeded the number that could be sacrificed in one day, the autopsies were carried out at the end of the treatment period. However, each rat continued to receive the test substance until the day prior to its sacrifice.

After the blood collection, internal organs such as heart, lung, liver, kidney, spleen, stomach and brain, uterus and testis were removed from all rats for detection of gross lesions. After routine processing, the paraffin sections of each tissue were cut at 5μm thickness and stained with haematoxylin and eosin for a microscopic examination.

Organ weights

After the macroscopic examination the following organs were weighed after separating the superficial fat like Brain, Heart, Spleen, Kidneys, Testes, Liver, Lungs, Uterus, Pancreas, Spleen, Stomach, Testes and Uterus. Organ weights were recorded.

Statistical analysis:

The results are presented as means ± S.E.M. Statistical significance was determined by one-way analysis of variance (ANOVA) and Dunnet 't' test for significant difference. *P* values less than 0.05 were considered significant.

PHARMACOLOGICAL STUDY ON *VELVANGA CHUNNAM:*

4.5.1.ANALGESIC EFFECT OF *VELVANGA CHUNNAM* IN MICE

The purpose of the study was to evaluate the analgesic effect of the *Velvanga Chunnam* using acetic acid induced writhing model of pain in mice.

PROCEDURE:

Stock solution preparation:

The powdered form of *Velvanga Chunnam* was filtered through cheesecloth and was mixed uniformly in 2% CMC solution to achieve 100mg/ml as main stock solution and used in this study. All drugs were administrated orally half an hour before the onset of pain stimulus in different models of nociception in albino mice. Diclofenac sodium (5mg/kg) in distilled water, Test drug *Velvanga Chunnam* (500mg/kg) in 2 % CMC.

Animals:

Swiss mice (25—35 g), were housed at 22±2°C under a 12-h light/12 h dark cycle and with access to food and water *ad libitum*, were acclimatized to the laboratory for at least 1 h prior to testing. The animals were acclimatized for one week under laboratory conditions. For each experiment, one group of animals was used. The experiments reported on here were carried out in accordance with the current ethical and care guidelines for the care of laboratory animals and the investigation of experimental pain in conscious animals.

The experiments were approved by the local Ethics Committee of Vels University (XIII/VELS/COL/12/CPCSEA/IAEC/23.O9.11). The number of animals (6for group of treatment) and intensities of noxious stimuli used were the minimum necessary to demonstrate consistent effects of the drug treatments.

Study of analgesic activity.

The *Velvanga Chunnam* was evaluated for its analgesic activity on Swiss albino mice according to acetic acid induced writhing method. The mice were randomly divided into different groups depending on the number of samples and doses to be applied and consisted of 6 mice in each group. All the animals were individually weighed and the dose of the test samples and control material adjusted accordingly. The animals were

kept in the laboratory atmosphere for at least one week for acclimatization prior to any experiment. The test samples were prepared as suspension in saline water with 2% CMC as suspending agent.

Diclofenac sodium (45mg/kg body weight) was used as positive control in this experiment. Glacial acetic acid was administered intra-peritoneally to the experimental animals to create pain sensation. As a result, the animals squirm their body at regular intervals out of pain. This squirm or contraction of the body is termed as writhing. Any substance that has got analgesic activity is supposed to reduce the number of writhing of animals within a given time and with respect to the control groups. At zero hour, test samples (at doses of 500mg/kg body weight), and negative control were administered orally by means of a long needle with a ball-shaped end. After forty minutes, glacial acetic acid (0.7% at a dose of 0.1 ml/10 g body weight) was administered intra-peritoneally to each of the animals of all the groups.

The forty minutes interval was given to ensure the proper absorption of the administered samples. Five minutes after the administration of acetic acid, the number of writhing were counted for fifteen minutes for each mouse. The animals did not always accomplish full writhing, because the animals started to give writhing sometimes but they did not complete it. This incomplete writhing was considered as half writhing. Accordingly, half of the writhing was taken to convert all writhing to full writhing or real writhing.

4.5.2. ANTI-ARTRITIC EFFECT OF *VELVANGA CHUNNAM* IN RATS:

At present day substantial risks were involved with the long-term use of NSAIDs for RA.Hence there is an increasing demand for the development of newer agents with better pharmacological profile.Therefore, the present study was carried out to evaluate the antiarthritic potential of the *Velvanga Chunnam* using Freud's adjuvant- induced arthritis model in rats.

PROCEDURE:

Drugs, Chemicals and stock solution

The powdered form of *Velvanga Chunnam* was mixed uniformly in ghee to achieve 100mg/ml as main stock solution and used in this study. Freund's Complete Adjuvant Injection (Difco Lab. USA), Mineral oil (SBD Chemicals), Saline (Wokhardt

Laboratories Ltd. Bombay- 400124, Ghee and Ibuprofen was purchased from local market at Chennai. All other reagents and chemicals used in this study were of analytical grade.

Preparation of Animals

The animals were randomly selected, marked to permit individual identification, and kept in their cages for 5 days prior to closing to allow for acclimation of the laboratory condition. Ninety-day-old Wistar male rats and six weeks old mice of either sex, bred, and raised in the Animal Facility of the Department of Pharmacology, Vel's college of pharmacy were used in this study. They were maintained under constant automatically control 12 h/12 h light/dark cycle (lights on from 07.00 a.m. to 07.00 p.m.). Dry pellet diet and tap water were provided *ad libitum* in standard propylene cages. Cage cleaning consisted of daily change of sawdust bedding. At the end of the study, animals were sacrificed with an overdose of chloral hydrate. All experiments were conducted in a quiet room at constant temperature of 23 ± 1^{0}C.

Administration of doses

The test substances are administered in a single dose by gavage using an intra-gastric tube. Animals were found prior to dosing, following period fasting, the animals were weighed and test substance was administered. After dosing, food was withheld for a further 3-4 hrs in rats. All solutions were daily prepared in distilled water and stirred until the residues were completely dissolved and distributed. The volume injected was 1 ml/kg of body weight. Control animals received the same volume of ghee alone. Due to the painful condition imposed on the animals, the number of subjects used was restricted to the minimum that allowed reliable statistical analysis of the results. All procedures were submitted to and approved by the Ethics Committee and followed the recommendations of the Research and Ethics Committee (CPCSEA/IAEC Approval No:XIII/VELS/COL/12/CPCSEA/IAEC/23.9.11).

Screening of anti-arthritic activity in FCA – induced arthritis in rats

The animals were weighed, numbered and marked and both hind paws. The initial paw volume of each rat was noted by plethysmometer. On Day 0, all animals were subjected to behavioral test and assessment of body weight and right paw's measurements, followed by the injection of Freund's adjuvant in the right paw. One hundred percent of the animals developed arthritis. Everyday animals were carefully and thoroughly inspected, by examining the affected paw and the animal's general status.

Evaluation of the anti- arthritic effects of *Velvanga Chunnam* was performed by monitoring the edema in the right paw. In control animals, sub-plantar injection of Freund's adjuvant produced a local edema after a few hours with a progressive increase reaching its maximum in the eighth day after inoculation.

On the 10^{th} day after adjuvant administration, animals were randomly distributed into three groups: Group-I control, treated with distilled water (1ml/kg) and group-II treated with (500mg/kg of *Velvanga Chunnam*) and group –III animals were treated with Indomethacin (10mg/kg) and then again all those animals were subjected to behavioral test and assessment of body weight and paw's edema measurements. The test solution was administered daily and testing application was done on Days 10, 16, 23, and 30 after injection of Freund's adjuvant.

Freund's Complete Adjuvant [F.C.A. 0.1ml] injected into the subplantar region of right hind paw induced arthritis and measure the paw volume by plethysmometer during treatment period ending on day 30. All the animals received either *Velvanga Chunnam* or Ibuprofen or vehicle (Ghee) orally depending upon their respective grouping for 30 consecutive days from the day of FCA injection. On 30^{th} day blood was withdrawn from retro orbital plexus of all the groups and various haematological, biochemical parameters were estimated and after euthenesia the footpad was isolated and subjected for the histopathological investigations.

Statistical Analysis

Paw oedema volume and other contents were expressed as Mean ± S.E. and were analyzed for statistical differences by One Way ANOVA followed by dunnet 't' test when significant groups were indicated. Values of $P < 0.05$ were considered significant compared to control group in Freund's Complete-Adjuvant induced

CLINICAL TRIAL

OBJECTIVES

- To evaluate the Anti-Arthritic activity of Velvanga Chunnam.
- To explore the efficacy of Velvanga Chunam in patients with Rheumatoid Arthritis.

DESIGN OF THE STUDY

Randomized controlled trial

STUDY CENTRE

Arignar Anna Government Hospital of Indian Medicine and Homeopathy, Arumbakkam, Chennai – 106.

STUDY PARTICIPANTS

Both men and women and members of all races and ethnic groups are eligible for this trial. Treatment will be administered on an *inpatient/outpatient* basis. The patients will be selected from the In-patient and Out-patient department of Arignar Anna Government Hospital of Indian Medicine and Homeopathy, Chennai – 106.

NUMBER OF SUBJECTS

Number of participants will be 40- 50.

At the beginning of the study, 50 patients will be treated with a low dose of the drug. If this dose does not cause bad side effects, it will slowly be made higher as new patients take part in the study. A total of 100 patients are the most that would be able to enter the study.

REGISTRATION PROCESS

To register a patient, the following documents should be completed by the investigator.

- Copy of required laboratory tests
- Signed patient consent form
- *Other appropriate forms (e.g., Eligibility Screening Worksheet, Registration Form).*

The investigator will then verify eligibility and will assign a patient study number, drug dose and register the patient on the study.

CRITERIA FOR INCLUSION:

Patients with rheumatoid arthritis are eligible for entry to the trial if the following criteria are satisfied.

The criteria of inclusion are:

1.Morning stiffness

2.Arthritis of 3 or more joint areas:

3.Arthritis of hand joints:

4.Symmetric arthritis:

5.Raised ESR

6.Serum rheumatoid factor[RF]:positive or negative.

Co operative patients

The previous drug regimen if any have been with held for 24 hours before the clinical trial.

CRITERIA FOR EXCLUSION

- Osteo arthritis
- AIDS
- Malignancy
- Pregnant and lactating women

- TB
- Renal diseases
- Cardio vascular disorder
- Age below 10 years
- Syphilis

WITHDRAWAL CRITERIA

Patients was removed from study when any of the criteria listed below applies. The reason for study removal and the date the patient was removed must be documented in the Case Report Form.

In the absence of treatment delays due to adverse events, treatment may continue for 2 cycles or until one of the following criteria applies:

- Disease progression,
- Deterioration of vital signs with cardiac, respiratory, hepatic, renal and CNS changes.
- Intercurrent illness that prevents further administration of treatment,
- Unacceptable adverse event(s),
- Patient decides to withdraw from the study, or
- General or specific changes in the patient's condition render the patient unacceptable for further treatment in the judgment of the investigator.

ROUTINE EXAMINATION AND ASSESSMENT

The full details of history and physical examination of the patients was to be recorded as per the proforma (form I and I A). The clinical assessment was done initially at the end of 4 days, 7 days, 14 days and 21 days during treatment and at the end of the 21 days follow up (form II) to be done. The laboratory investigation and the physiological parameters was recorded initially at the end of the treatment and at the end of follow up as per the proforma (form III)

TRIAL DRUG

VELVANGA CHUNNAM.

DOSAGE

35-65mg B.D with Ghee.

Dose was fixed after finding the LD50.

DURATION OF TRIAL

Study Period: 48 days with 3 months follow up.

Total duration: 3 months

TREATMENT PLAN

DOSAGE

The trial drug Velvanga Chunnam was given in the dose of 35-65mg B.D with Ghee depending upon the severity of the case.

DIET RESTRICTION AND MEDICAL ADVISE

- The patients was instructed to follow easily digestible foods.
- They was advised to take ,badam nuts,tender coconut, and vegetables like radish, juice of plantain stem.Avoid bitter gourd,agathi greens,brinjal,non-vegs.
- The patient was advise to cold damp climate.
- The patient was advised to take rest. But prolonged immobilization should be avoided.

- ❖ The clinical improvement was observed and recorded daily in the proforma of case sheet.

TRIAL CONDUCT

This study was conducted in compliance with the protocol approved by the Institutional Review Board, and according to Good Clinical Practice standards. No deviation from the protocol was implemented without the prior review and approval of the IRB except where it may be necessary to eliminate an immediate hazard to a research subject. In such case, the deviation will be reported to the IRB.

CLASSIFICATION OF RESULTS

1. **Good Response**
   a. Relief of Symptoms above 75%
   b. Laboratory parameter findings towards normalcy.
2. **Fair Response**
   a. 50% to 75% relief in symptoms.
   b. Significant improvement in laboratory parameter.
3. **Poor Respon**
   25% to 49% relief in symptoms and minimal improvement in laboratory parameters.
4. **No Response**
   No relief in symptoms and no significant improvement in laboratory parameters.

FOLLOW UP

Assessment will take for every three days before treatment and after treatment. During this period clinical assessment (form II) and laboratory investigation (form III) will be carried out.

STATISTICAL ANALYSIS

The data will be tabulated and analyzed by students 'T' test.

ETHICAL REVIEW

This protocol and any amendments will be submitted to the Tamil University Institutional Ethical Committee (IEC) for formal approval to conduct the study. The decision of the IEC concerning the conduct of the study will be made in writing to the investigator.

All subjects for this study will be provided a consent form describing this study and providing sufficient information for subjects to make an informed decision about their participation in this study. This consent form will be submitted with the protocol for review and approval by the IEC. The formal consent of a subject, using the IEC-approved consent form, will be obtained before that subject is submitted to any study procedure. This consent form must be signed by the subject or legally acceptable surrogate, and the investigator-designated research professional obtaining the consent.

COMPLETION OF FORMS

All the forms (consent, form I and form II) can be completed in duplicate and the originals was sent to the Officer-in-charge, CBM unit, Institute of research in medical statistics, Mayor Ramanathan Road, Chetpet, Chennai – 31 by registered post. Form completed during a month will be dispatched to CBM unit during the first week of the following month.

TRIAL MONITORING AND DATA ANALYSIS The progress of the trial was monitored by field visit by the CBMU/IRMS, Chennai staff and the ICMR HQ (New Delhi) staff data analysis was undertaken at the CBMU/IRMS, Chennai.

4.3.1. CLINICAL STUDY ON *VELVANGA CHUNNAM* IN OP DEPT FOR RHEUMATOID ARTHRITIS

Sl.No.	O.P. No.	Name	Age/ Sex	Symptoms	Duration	Results
1.	3537	YAMUNA	51/F	Pain & swelling in both ,Elbow jts,knee, ankle joints, pip joint, morning stiffness ⊕	48 DAYS	FAIR
2.	7238	MANJULA	39/F	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	30DAYS	GOOD
3.	649	BASKARAN	44/M	Pain & swelling in both knee, ankle joints, wrist,pip joint, morning stiffness ⊕	48 DAYS	FAIR
4.	5281	SAROJINI	36/F	Pain & swelling in hip, both knee, ankle joints, pip joint, morning stiffness ⊕	30 DAYS	GOOD
5.	8065	KALAISELVI	34/F	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	30 DAYS	GOOD
6.	8135	BHUVANESWARI	50/F	Pain & swelling in both knee, ankle joints,wrist, pip joint, morning stiffness ⊕	48 DAYS	FAIR
7.	8173	ANANDHAN	52/M	Pain & swelling in both knee, ankle joints,wrist, pip joint, morning stiffness ⊕	30 DAYS	GOOD
8.	9402	LAKSHMI	55/F	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	48 DAYS	FAIR
9.	9491	RAJA	55/M	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	28 DAYS	GOOD
10.	8950	JEGALAKSHMI	30/F	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	48 DAYS	FAIR

Sl.No.	O.P. No.	Name	Age/ Sex	[[4.3.1.2] TABLE] Symptoms	Duration	Results
11.	4602	SEKAR	55/F	Pain & swelling in both ,Elbow jts,knee, ankle joints, pip joint, morning stiffness, restricted movements ⊕	28DAYS	FAIR
12.	4618	PARIMALA	57/F	Pain & swelling in both knee, ankle joints, elbow,pip joint, restricted movements morning stiffness ⊕	30 DAYS	GOOD
13.	4944	KANGAMMAL	47/F	Pain & swelling in both knee, ankle joints, wrist,pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
14.	7448	MEENATCHI	33/F	Pain & swelling in hip, both knee, ankle joints, pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
15.	8184	NOORJAHAN	45/F	Pain & swelling in both knee, ankle joints, elbow,pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
16.	689	VIJARAGHAVAN	45/M	Pain & swelling in both knee, ankle joints,wrist, pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
17.	565	KARPAGAM	38/F	Pain & swelling in both knee, ankle joints,wrist,elbow, pip joint, morning stiffness ⊕	48 DAYS	GOOD
18.	3540	SANTHANA BABU	42/M	Pain & swelling in both knee, ankle joints, pip joint, restricted movements morning stiffness ⊕	30DAYS	GOOD
19.	3444	INDHIRA	41/F	Pain & swelling in both knee, ankle joints,elbow, pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
20.	6931	MALA	45/F	Pain & swelling in both knee, ankle joints, pip joint, restricted movements morning stiffness ⊕	48 DAYS	GOOD

4.3.1. CLINICAL STUDY ON *VELVANGA CHUNNAM* FOR RHEUMATOID ARTHRITIS

Sl.No.	O.P. No.	Name	Age/ Sex	Symptoms	Duration	Results
21.	3443	VENKATESAN	55/M	Pain & swelling in both ,Elbow jts,knee, ankle joints, pip joint, morning stiffness, restricted movements ⊕	48 DAYS	FAIR
22.	7168	KASTHURI	55/M	Pain & swelling in both knee, ankle joints, elbow,pip joint, restricted movements morning stiffness ⊕	30DAYS	GOOD
23.	7325	NIRMALA	50/F	Pain & swelling in both knee, ankle joints, wrist,pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
24.	5817	MANI	54/M	Pain & swelling in hip, both knee, ankle joints, pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
25.	6434	NANCY	16/F	Pain & swelling in both knee, ankle joints, elbow,pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
26.	5418	KUSALGURI	64/F	Pain & swelling in both knee, ankle joints,wrist, elbow,pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
27.	7472	REVATHY	42/F	Pain & swelling in both knee, ankle joints,wrist,elbow, pip joint, morning stiffness ⊕	48 DAYS	FAIR
28.	7260	MALLIGA	42/F	Pain & swelling in both knee, ankle joints, pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
29.	6372	AMARAVATHY	43/F	Pain & swelling in both knee, ankle joints,elbow, pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR
30.	2742	BATCHA	26/M	Pain & swelling in both knee, ankle joints, pip joint, restricted movements morning stiffness ⊕	48 DAYS	FAIR

4.3.4.CLINAL STUDY ON *VELVANGA CHUNNAM* FOR RHEUMATOID ARTHRITIS

Sl.No.	O.P. No.	Name	Age/ Sex	DATE OF FIRST VISIT	Symptoms	DATE OF LAST VISIT	Results
31.	4694	JANAKI DEVI	60/F	12.8.2011	Pain & swelling in both ,Elbow jts,knee, ankle joints, pip joint, morning stiffness ⊕	28.9.2011	FAIR
32.	5674	ARPUTHAM	35/M	12.8.2011	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	3O.9.2011	FAIR
33.	624	VEENA	40/F	26.8.2011	Pain & swelling in both knee, ankle joints, wrist,pip joint, morning stiffness ⊕	5.10.2011	FAIR
34.	2349	VEDHAVALLI	40/F	2.9.2011	Pain & swelling in hip, both knee, ankle joints, pip joint, morning stiffness ⊕	3.9.2011	FAIR
35.	4830	SRINIVASAN	45/M	9.9.2011	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	6.9.2011	FAIR
36.	8896	SAGHADEVAN	23/M	1.8.2011	Pain & swelling in both knee, ankle joints,wrist, pip joint, morning stiffness ⊕	18.9.2011	GOOD
37.	8236	KULLAMMAL	60/F	16.8.2011	Pain & swelling in both knee, ankle joints,wrist, pip joint, morning stiffness ⊕	2.9.2011	GOOD
38.	3476	AEGAVALLI	55/F	10.8.2011	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	5.9.2011	FAIR
39.	8143	VIJAYALAKSHMI	45/F	16.8.2011	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	9.9.2011	GOOD
40.	262	MURUGAN	27/M	5.9.2011	Pain & swelling in both knee, ankle joints, pip joint, morning stiffness ⊕	10.10.2011	GOOD

4.3.5.HAEMATOLOGICAL PARAMETERS OF PATIENTS OF RHEUMATOID ARTHRITIS

Sl. No.	O.P. No.	Name	Age/ Sex	[[4.3.7 TABLE] HAEMATOLOGICAL REPORT														URINE ANALYSIS					STOOL EXAMINATION	
				BEFORE TREATMENT				AFTER TREATMENT				ESR (mm)				Hb(Gm)		BT			AT		BT	AT
Sl. No.	O.P. No.	Name	Age/ Sex	BEFORE TREATMENT				AFTER TREATMENT				ESR (mm)				Hb(Gm)		BT			AT			
				TC CU/mm	DC			TC CU/mm	DC			BT		AT		BT	AT							
					P	L	E		P	L	E	½ hr	1 hr	½ hr	1hr			Alb	Sug	Dep	Alb	Sug	Dep	
1.	3537	YAMUNA	51/F	9570	66	31	3	8500	52	44	4	-	70	20	45	9.8	10.1	NIL	NIL	NIL	NIL	NIL	opc	
2.	7238	MANJULA	39/F	4200	65	31	4	7800	62	33	5	-	41	10	20	10.9	11.7	NIL	NIL	NIL	NIL	NIL	NIL	
3.	649	BASKARAN	44/M	8200	75	20	5	6300	51	44	5	25	70	18	40	9.7	10.2	NIL	NIL	NIL	NIL	NIL	NIL	
4.	5281	SAROJINI	36/F	6400	68	26	6	8800	59	37	4	12	30	7	15	9.4	10.2	NIL	NIL	NIL	NIL	NIL	NIL	
5.	8065	KALAISELVI	34/F	9700	58	35	7	9200	58	38	4	29	75	14	35	9.0	11.5	NIL	NIL	OEC	NIL	NIL	NIL	
6.	8135	BHUVANESWARI	50/F	10,200	60	34	6	9800	60	36	4	22	54	9	20	12.0	12.1	NIL	NIL	OPC	NIL	NIL	Opc	
7.	8173	ANANDHAN	52/M	9300	66	32	2	9100	61	36	3	12	28	5	12	11.0	11.5	NIL	NIL	OPC	NIL	NIL	NIL	
8.	9402	LAKSHMI	55/F	9100	55	39	6	8800	58	56	6	20	50	9	20	9.0	10.2	NIL	NIL	NIL	NIL	NIL	NIL	
9.	9491	RAJA	55/M	9800	57	39	4	9900	62	33	5	19	45	8	20	12	12.2	NIL	NIL	NIL	NIL	NIL	NIL	
10.	8950	JEGALAKSHMI	30/F	9800	56	31	4	9700	67	29	4	25	52	7	19	9.8	10.1	NIL	NIL	NIL	NIL	NIL	NIL	
11.	4602	SEKAR	55/F	9400	57	38	5	9200	60	35	5	25	57	7	21	13	13.8	NIL	NIL	NIL	NIL	NIL	NIL	
12.	4618	PARIMALA	57/F	7800	54	41	5	7600	52	40	8	25	56	8	23	8.8	9.9	NIL	NIL	NIL	NIL	NIL	NIL	
13.	4944	KANGAMMAL	47/F	9800	59	27	6	9500	59	36	5	30	60	8	26	9.8	10.2	NIL	NIL	NIL	NIL	NIL	NIL	
14.	7448	MEENATCHI	33/F	8500	67	30	3	9200	60	36	4	25	52	6	18	10.2	11.3	NIL	NIL	OPC	NIL	NIL	NIL	
15.	8184	NOORJAHAN	45/F	8900	63	31	6	9000	54	32	4	26	52	7	19	9.6	10.3	NIL	NIL	NIL	NIL	NIL	NIL	
16.	689	VIJARAGHAVAN	45/M	9600	66	29	5	9800	65	31	4	29	48	7	17	10.2	11.2	NIL	NIL	NIL	NIL	NIL	NIL	
17.	565	KARPAGAM	38/F	9200	60	35	5	9800	60	35	5	35	56	8	22	9.6	10.1	NIL	NIL	NIL	NIL	NIL	NIL	
18.	3540	SANTHANA BABU	42/M	10,200	69	36	3	8700	56	38	6	28	58	7	20	10.8	11.2	NIL	NIL	NIL	NIL	NIL	NIL	
19.	3444	INDHIRA	41/F	8,600	66	30	4	9100	65	30	5	25	50	7	18	10.4	11.6	NIL	NIL	NIL	NIL	NIL	NIL	
20.	6931	MALA	45/F	7100	65	32	3	9300	62	35	3	15	35	5	13	12	12.4	NIL	NIL	NIL	NIL	NIL	NIL	

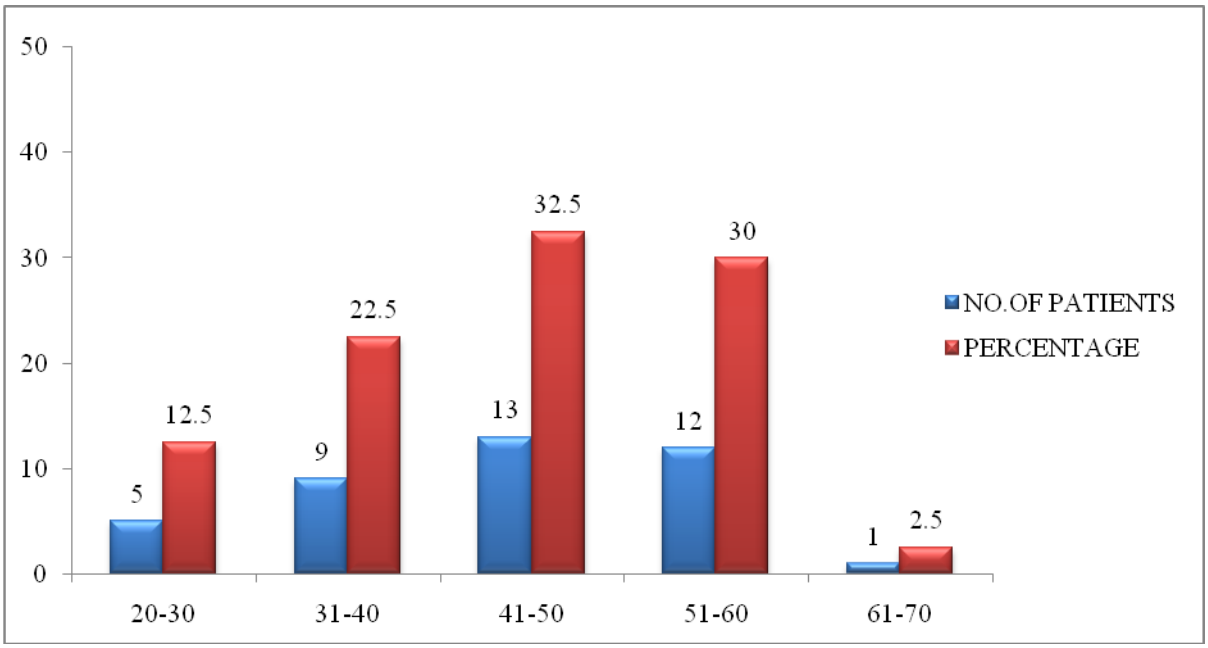
				TC CU/mm	DC			TC CU/mm	DC			BT		AT		BT	AT	Alb	Sug	Dep	Alb	Sug	Dep	Ova	Cyst	Ova	Cyst
					P	L	E		P	L	E	1/2hr	1 hr	½ hr	1hr													
21.	3443	VENKATESAN	55/M	9800	60	36	3	9500	60	35	5	30	60	11	25	11	11.4	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
22.	7168	KASTHURI	55/M	9600	58	34	8	9200	52	43	5	38	86	16	50	11	12	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
23.	7325	NIRMALA	50/F	8100	54	41	5	9400	65	30	5	15	40	7	18	9.8	11	NIL	NIL	OPC	NIL	NIL	NIL	NIL	NIL	NIL	NIL
24.	5817	MANI	54/M	9800	65	32	3	9200	65	30	5	20	45	9	19	14	14.6	NIL	NIL	FPC	NIL	NIL	FPC	NIL	NIL	NIL	NIL
25.	6434	NANCY	16/F	9000	60	36	4	9100	62	33	5	20	45	7	16	10.2	11.4	NIL	++	OPC	NIL	NIL	NIL	NIL	NIL	NIL	NIL
26.	5418	KUSALGURI	64/F	10200	60	34	6	9800	60	33	7	35	80	21	41	10	11	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
27.	7472	REVATHY	42/F	9200	55	39	6	9800	60	35	5	20	45	7	16	12	12.3	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
28.	7260	MALLIGA	42/F	8000	49	47	4	8100	52	45	3	15	40	6	15	10	12	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
29.	6372	AMARAVATHY	43/F	8700	55	38	7	9100	58	38	4	27	58	9	20	10.4	11	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
30.	2742	BATCHA	26/M	8400	58	36	6	8400	58	38	4	24	51	14	21	9.8	10.2	NIL	NIL	1-2PC	NIL	NIL	NIL	NIL	NIL	NIL	NIL
31.	4694	JANAKI DEVI	60/F	10000	62	34	4	10100	58	35	7	22	49	12	20	9.8	11	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
32.	5674	ARPUTHAM	35/M	9700	57	38	5	9600	58	37	5	23	53	11	21	1O.1	12	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
33.	624	VEENA	40/F	9600	59	36	5	9600	58	40	2	19	47	7	15	9.8	11	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
34.	2349	VEDHAVALLI	40/F	9000	47	48	5	9100	50	45	5	19	41	12	20	8.8	10	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
35.	4830	SRINIVASAN	45/M	9400	55	39	6	9500	58	36	6	20	40	10	18	9.2	10.2	NIL	NIL	OPC	NIL	NIL	NIL	NIL	NIL	NIL	NIL
	IP.NO																										
36.	8896	SAGHADEVAN	23/M	9000	55	42	3	9800	57	40	3	18	45	7	12	10	12	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
37.	8236	KULLAMMAL	60/F	9000	55	39	6	9100	54	40	6	20	46	6	12	9	10	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
38.	3476	AEGAVALLI	55/F	9400	55	41	4	9500	55	42	3	19	45	7	15	11	12	NIL	NIL	FEC	NIL	NIL	NIL	NIL	NIL	NIL	NIL
39.	8143	VIJAYALAKSHMI	45/F	8000	58	37	5	8100	59	37	4	20	40	5	12	10	11	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
40.	262	MURUGAN	27/M	8800	59	38	3	8900	59	39	2	69	110	30	65	9.8	11.6	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

CLINICAL ASSESSMENT

4.3.8. AGE WISE DISTRIBUTION

SL. NO	AGE IN YEARS	NO. OF PATIENTS	PERCENTAGE (%)
1	20-30	5	12.5
2	31-40	9	22.5
3	41-50	13	32.5
4	51-60	11	30
5	61-70	1	2.5
TOTAL		40	100

4.3.8. AGE WISE DISTRIBUTION



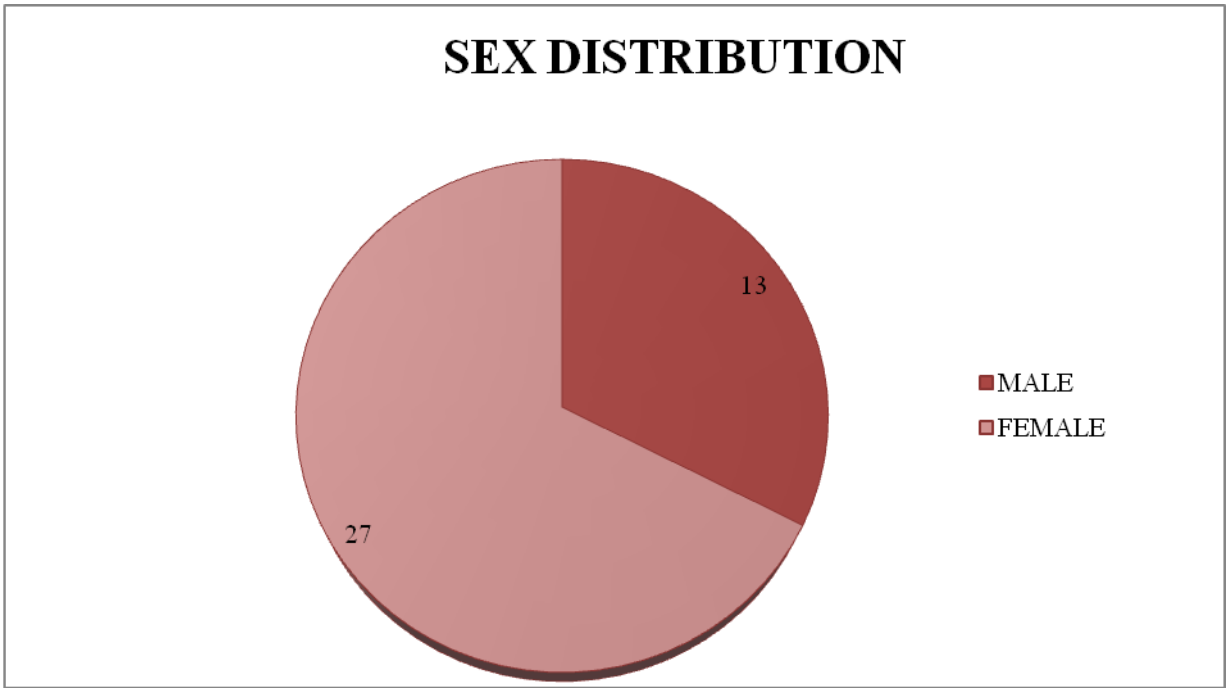
INFERENCE:

Among 40 patients,

- 5patients belongs to the age group of 20-30 years
- 9 patients belongs to the age group of 31-40 years
- 13 patients belongs to the age group of 41-50 years
- 12 patients belongs to the age group of 51-60 years
- 1 patients belongs to the age group of 51-60 years

4.3.9. SEX DISTRIBUTION

SL. NO	SEX	NO. OF PATIENTS	PERCENTAGE
1	Male	13	32.5
2	Female	27	67.5
TOTAL		40	100



INFERENCE:

Among 40 patients,

- 13 patients were male
- 27patients were female

4.2.RESULTS AND DISCUSSION OF ANALYSIS OF *VELVANGA CHUNNAM*:

4.2.1.1.PHYSICO-CHEMICAL ANALYSIS:

S.No	Parameters	Results
1.	Ash(%w/w)	9.16
2.	Acid insoluble ash (%w/w)	19.21
3.	Water soluble ash(%w/w)	6.74
4.	Moisture content	4.6%w/w
5.	pH of *Velvanga chunnam*	10-11.

4.2.1.2. RESULTS OF ICP-OES :

S.NO	ELEMENT	CONCENTRATION
1.	Ca	220.265mg/L
2.	Na	55.967mg/L
3.	K	22.369mg/L
4.	S	15.126mg/L
5.	P	7.89mg/L
6.	Sn	5.985mg/L
7.	Hg	3.01 mg/L
8.	Fe	1.86mg/L
9.	As	BDL
10.	Cd	BDL
11.	Pb	BDL

4.2.1.3. RESULTS OF FT-IR:

The absorbance frequency around 3331 cm^{-1} is corresponding to either for O–H [hydroxide group] of alcohols/phenols or for N–H stretch of amines.

The absorbance frequency bands,functional groups,symbols and percentage of MRCM[Code given at IIT for *VELVANGA* CHUNNAM] are listed below:

Frequency bands	Functional groups	Symbols	Percentage
3331 cm^{-1}	- alcohols, phenols	O–H /–N–H groups	96%
2214 cm^{-1}	- alkynes	–C≡C– groups	70%
1557cm^{-1}	-nitro groups	N=O groups	88%
1416 cm^{-1}	- aromatic	–C–C groups	90%
1124 cm^{-1}	-aliphatic amines	–C–N groups	28%
1019 cm^{-1}	-aliphatic amines	–C–N groups	52%
654 cm^{-1}	-alkynes	–C≡C–H groups	43%
928cm^{-1}	-carboxylic groups	O–H	25%

1051cm^{-1}	-aliphatic amines	–C–N groups	32%

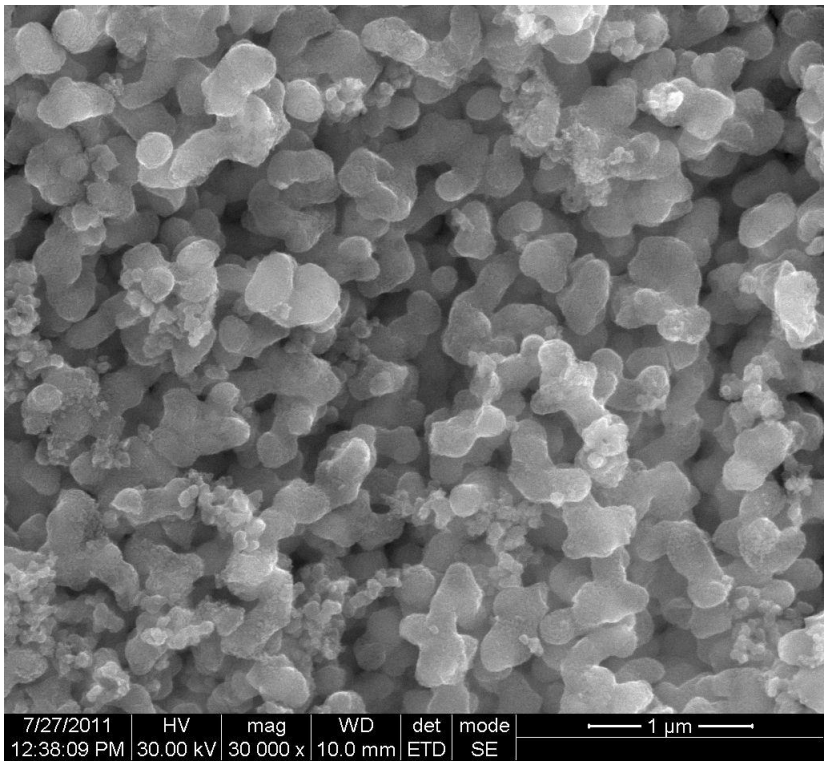
4.2.1.4. RESULTS OF EDAX:

S.NO	ELEMENT	ATOMIC %
1.	C*K*	45.92
2.	O*K*	39.91
3.	S*K*	00.07
4.	Cl*K*	01.02
5.	Sn*L*	03.41
6.	Ca*K*	09.62
7.	Hg*L*	00.05

4.2.1.5. RESULTS OF SEM:

SEM-Micro graph particle size range in μ	500 nm-0.5μ

THE SEM PICTURE OF *VELVANGA CHUNNAM*[MRCM-The code given in IIT]



4.2.1.6. CHEMICAL ANALYSIS OF VELVANGA CHUNNAM

S.NO	ACID RADICALS	RESULT [+] / [–]
1.	SULPHATE	+
2.	CHLORIDE	+

3.	PHOSPHATE	+
4.	CARBONATE	+
	BASIC RADICALS	
5.	CALCIUM	+

4.2.1.7 PHYTOCHEMICAL ANALYSIS OF *VELVANGA CHUNNAM*

S.No:	PHYTOCHEMICALS	PRESENCE [+] /ABSENCE [–]
1.	PROTEIN	+

DISCUSSION OF ANALYSIS:

In chemical and elemental analysis done with sophisticated analytical instruments namely ICP-AES, it showed the presence of the following elements namely Ca, Na, K, S, P, Sn, Hg, Fe in the descending manner in quantitative and qualitative basis.

In EDAX, it is showed the presence of C, O, Ca ,Sn ,Cl ,S ,Hg in qualitative and quantitative on surface area basis.

In FTIR,it showed the functional groups related to 96% of Amide, Hydroxide groups, 90%of C–C Compound groups,88% of Nitro Compounds,70% of Alkynes groups,52% of Aliphatic Amine groups 43% of Alkynes groups,25% of –O-H bend, Carboxylic groups,32% of Aliphatic Amine groups.

In the Phytochemical analysis, the presence of protein is documented.

In the Physico-Chemical analysis it is indicated that the nature of the drug is amorphous quality due to high acid insoluble ash value and the moisture content is low. It is partially soluble in water.

In preliminary bio-chemical analysis, it showed the presence of Acid radical namely Carbonate, Phosphate, Chloride, Sulphate, and the Basic radical namely Calcium which are present in sufficient amount to express it and they play a vital role in the buffer systems of the body, cellular integrity.

It is appeared to contain nano-sized particles of oxidised elements of the starting materials of the preparation of the *Velvanga Chunnam* in 500 nanometers to 0.5 microns indicating the actions of the drugs at cellular and sub-cellular levls.

It is also to be noted that for the presence of Basic Nature of the substances, there should be Carbonate, Hydroxide or Hydronium, amides groups to execute the basic reaction in chemistry.

The *Velvanga Chunnam* possess all the entities of basic substances to striking the conclusion of the alkalinity of the drug and the way of its constitutional exhibition.

The calcium, sodium, potassium, carbonate like other radicals plays vital role in cell membrane stability,integrity,osmotic regulation and or the normal polarity of the cells by contolling sub –cellular enzymes and proteins and their mechanisms.

Since it acts as electron pair donars it acts as potent anti-oxidant mechanisms at cellular levels .The functional groups might play role in proteins remodelling of joint matrix also in addition presence of sulphur is essential in proteoglycan matrix and Oxygen for reversal of tissue ischaemia and Carbon moiety for methylation reactions.

4.2.2 RESULTS AND DISCUSSION OF TOXICOLOGICAL STUDIES:

4.2.2.1. ACUTE TOXICITY:

The acute toxicity study, results revealed that the animals treated with 5000gm/kg dose produced remarkable changes in the general behavier pattern in the animals like slow response to external stimuli, reduction of mobility and sluggishness etc. after oral administration of Velvanga chunnam initiation of adverse symptoms were noted from the groups treated with 2000mg/kg. But no mortality was observed in any of the treated groups of animals. Therefore the Velvanga chunnam can be classified under the category of class IV drug with mild toxicity.

4.2.2.2. SUB-ACUTE TOXICITY:

From the maximum tolerable dose 5000mg/kg 1/5, 1/10 and 1/20th dose were selected for further sub acute toxic study. In sub acute toxicity study 28 days duration was followed. The signs and symptoms of toxicity were noted. The animals treated with Velvanga chunnam 1000mg/kg showed moderate loss of body weight after two week but later it become normal. In other dose level groups have no statistically significant body weight changes during four weeks of drug treatment. Food and water intake is progressively modified after treatment with Velvanga chunnam in all the groups. There was no major change in the haematological parameters except the DLC. The DLC count is drastically modified in the dose dependent manner particularly with lymphocyte and eosinophils. After the experimental period the biochemical results indicates that there were no significant changes in Total protein, Hb, Globulin, GGT, Chloride, HDL and VLDL. But statistically noticeable changes were observed in the levels of total bilurubin, ALP and Triglycerides. From the urine routine analysis the drug treatment indicates changes in the pH of urine, bilurubin and Ketones. Similarly, the vital organs weight variation confirms and alterations in biochemical parameters match with the other changes in overall parameters.

HISTOPATHOLOGY

Velvanga Chunnam 250mg/kg treated group

BRAIN: shows brain with edema, microglial proliferation

KIDNEY: shows renal tissue with focal tubular damage, interstitial inflammatory collection. Glomeruli shows epithelial proliferation

LIVER: shows hepatocytes with focal mild fatty change

SPLEEN: shows congestion with lymphoid hyperplasia.

STOMACH: shows near normal mucosal gland with mild exudates.

LUNG: shows congested alveolar wall with mild thickening and mild emphysematous changes

PANCREAS: shows pancreas with acini and normal islets.

TESTIS: shows normal tubules with spermatogenesis.

HEART: shows congestion and mild inflammatory infiltration in between cardiac muscle bundles.

Velvanga Chunnam 500mg/kg treated group

STOMACH: shows stomach with superficial erosion and congestion.

HEART: shows hypertrophic cardiac muscle bundles.

SPLEEN: shows lymphoid hyperplasia.

BRAIN: shows brain with vesicular nuclei and micro cystic changes.

LIVER: shows almost normal hepatocytes and occasional binucleate cells.

KIDNEY: shows renal tissue with tubular epithelial damage. RBC with in the tubules.

PANCREAS: shows atrophic islet cells.

LUNG: shows congestion, narrowed alveolar space and thickened alveolar wall.

OVARY: shows ovarian follicles and corpus leuteum

Velvanga Chunnam 1000mg/kg treated group

HEART: shows hyperplasic and hypertrophic cardiac muscles.

LIVER: shows reactive hyperplasic hepatocytes, Fatty degeneration, focal areas of necrosis and congested blood vessels of the liver were observed

BRAIN: shows brain with edema, separation of nerve fibers and degenerative changes in astrocytes.

LUNG: shows occasional distend alveoli and congested alveolar wall.

STOMACH: shows hyperplasic mucosal glands, congestion, with desquamated epithelia cells and superficial erosion.

SPLEEN: shows spleen with lymphoid hyperplasia.

KIDNEY: shows renal tissue with tubular damage, Glomerulonelphritis and tubular cast were observed.

PANCREAS: shows degreased islets (atrophic and small islets)

TESTIS: shows normal tubules with spermatogenesis.

Hence this study presents strong evidence of the toxic effect of the Velvanga chunnam at the dose level of 1000mg/kg orally. So it can be concluded that the administration of Velvanga chunnam above the dose level of 500mg/kg is not advisable and safe and it may be suggested that the dose reduction during prolonged use of this drug must be strictly followed.

4.2.2.1: Dose finding experiment and its behavioral Signs of Toxicity

S.No	Dose mg/kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	**500**	+	+	-	+	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-
2	**1000**	+	+	-	+	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-
3	**2000**	+	+	-	+	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-
4	**5000**	+	+	-	+	+	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-

1.Alertness 2. Aggressiveness 3. Pile erection 4. Grooming 5. Gripping 6. Touch Response 7. Decreased Motor Activity 8. Tremors 9. Convulsions 10. Muscle Spasm 11. Catatonia 12. Muscle relaxant 13. Hypnosis 14. Analgesia 15.Lacrimation 16. Exophthalmos 17. Diarrhoea 18. Writhing 19. Respiration 20. Mortality.

4.2.2.RESULTS OF SUB-ACUTE TOXICITY:

4.2.2.1 Table1.Body wt (g) of albino rats exposed to Velvanga chunnam for 4 weeks.

Dose (mg/kg/day)	Days				
	1	**7**	**14**	**21**	**28**
Control	148±4.2	150±4.8	153±4.6	156±4.4	158±5.1
250	136±4.6	140±5.0	144±5.0	147±5.2	150±6.2
500	140±5.0	143±5.2	146±4.2	149±5.2	152±6.5
1000	142±4.0	146±4.5	140±4.0	138±5.0	145±5.7

Values are mean of 6 animals ± SEM (Dunnett's test). *P<0.05 from day 14; N=

4.2.2.2 Table 2. Food (g/day) intake of albino rats exposed to Velvanga chunnam for 4 weeks.

Dose (mg/kg/day)	Days (gms/rats)				
	1	7	14	21	28
Control	40.24±2.18	42.16±2.11	40.02±2.10	42.18±2.16	40.14±2.66
250	41.15±2.50	40.10±2.42	38.15±2.15	32.20±2.18**	36.19±2.46*
500	38.20±2.36	34.12±2.15	34.12±2.24	40.00±3.10	40.20±2.18
1000	40.29±2.32	40.02±2.10	35.17±2.22*	40.56±2.19	35.88±2.39*

Values are mean of 6 animals ± SEM (Dunnett's test). *P<0.05;**P<0.01; N=6.

4.2.2.3 Table 3.Water (ml/day) intake of albino rats exposed to Velvanga chunnam for 28days

Dose (mg/kg/day)	Days (ml/Group)				
	1	7	14	21	28
Control	42.10±2.10	42.18±2.55	40.15±2.15	41.46±2.66	42.22±2.62
250	40.55±2.24	42.79±2.18	42.00±2.18	43.34±2.38	45.00±3.53
500	37.46±3.18	44.62±2.24*	48.64±2.12**	49.18±2.53**	40.82±3.64
1000	32.15±2.16	40.11±2.99**	46.12±2.44**	48.15±2.48**	52.±2.33**

Values are mean of 6 animals ± SEM (Dunnett's test). *P<0.05; **P<0.01. N=6.

4.2.2.4 Table 4. Hematological parameters after 28days treatment with the Velvanga chunnam

Parameter	Control	250mg/kg	500 mg/kg	1000 mg/kg
RBC (mm^3)	5.45±0.36	5.52±0.38	5.40±0.31	4.99±0.34
HB (%)	14.12±0.30	14.32±0.34	14.28±0.31	13.55±0.40
Leukocyte ($x10^3/mm^3$)	4.58±0.4	4.62±0.5	4.55±0.5	4.15±0.4
Platelets/ul	1.50±0.12	1.55±0.14	1.54±0.10	1.66±0.32
MCV (gl)	80.16±4.2	82.18±4.0	84.13±4.15	78.22±4.17
N	45.33±3.18	42.11±4.24	47.10±4.34	45.24±5.18
L	42.64±4.5	44.19±4.10	43.60±4.03	58.05±5.95**

M	3.19 ± 2.61	3.24 ± 2.35	3.33 ± 2.88	3.41 ± 2.57
E	2.28 ± 0.22	2.44 ± 0.21	3.52 ± 0.30**	4.30 ± 0.32**
B	1.32 ± 0.30	1.65 ± 0.36	1.38 ± 0.37	1.36 ± 0.36
ESR (mm)	1±00	1±00	1±00	1±00
PCV	45.11±2.9	43.28±3.2	40.88±2.8*	42.64±2.6
MCH pg	30.55±1.92	32.20±1.88	31.19±1.92	30.45±1.65
MCHC g/dl	34.10±0.4	35.65±0.5	34.88±0.4	34.22±0.4

Values are mean of 6 animals ± SEM (Dunnet't's test). *P<0.05; **P<0.01. N=6.

4.2.2.5 Table5.Effect of treatment with Velvanga chunnam on biochemical parameter-LFT

Dose (mg/kg)	**Control**	**250mg/kg**	**500 mg/kg**	**1000 mg/kg**
Total Bilirubin (mg/dL)	0.58±0.16	0.62±0.20*	0.66±0.27**	0.68±0.29**
ALP (IU/L)	60.02±4.2	58.15±4.1	63.22±4.4	65.44 ±5.2
AST (IU/L)	82.25±5.6	80.27±5.1	78.10±4.8	82.00±5.0
ALT (IU/L)	87.55±5.2	91.14±4.8	90.4±6.02	90.10±4.66
Protein (g/dl)	5.12±0.5	5.22±0.5	5.30±0.5	5.28±0.5
Albumin (g/dl)	4.35±0.4	4.60±0.5	4.9±0.4	4.8±0.5

Values are mean of 6 animals ± SEM (Dunnett's test). **P<0.05 *vs. control* N=6.

4.2.2.6Table-6 RFT

Dose (mg/kg)	**Control**	**250mg/kg**	**500 mg/kg**	**1000 mg/kg**
Urea (mg/dl)	34.48±4.2	32.40±3.9	31.07±4.0	33.11±4.6
Creatinine (mg/dl)	0.98±0.20	1.36±0.24	1.68±0.26	1.74±0.37
Uric acid (mg/dl)	5.37±2.10	5.44±1.22*	5.59±2.24**	5.75±2.16**
Sodium	140±2.05	141±2.21	140±2.10	140.12±2.15
Potassium	6.56±0.45	7.02±0.50	6.88±0.58	6.69±0.51
Chloride	104.11±2.55	104.52±2.68	104.12±2.82	105±2.98

Values are mean of 6 animals ± SEM (Dunnet 't' test). *P<0.05 *vs control* N=6.

4.2.2.7.Table-7 Lipid Profile

Dose (mg/kg)	**Control**	**250mg/kg**	**500 mg/kg**	**1000 mg/kg**
Cholesterol (mg/dl)	78.19±4.78	76.12±4.66	78.10±4.54	77.95±5.45
HDL (mg/dL)	15.48±2.61	15.58±2.55	15.50±2.62	14.88±2.58

LDL (mg/dL)	35.85±2.53	37.22±2.98	40.12±2.56*	42.46±2.87**
VLDL (mg/dl)	21.12±2.36	22.05±2.45	21.79±2.46	20.85±2.62
Triglyceride (mg/dl)	90.12 ± 15.58	88.43 ± 14.10	93.98 ±16.16	96.49 ± 18.22
Glucose (mg/dl)	102±5.0	102±4.8	104±7.2	105±7.6

Values are mean of 6 animals ± SEM (Dunnet 't' test). **P<0.01;*P<0.05 *vs control*N=6.

4.2.2.8Table-8 Urine Analysis

Parameters	**Control**	**250mg/kg**	**500 mg/kg**	**1000 mg/kg**
Colour	Yellow	Yellow	Yellow	Yellow
Transparency	Clear	Clear	Clear	Slightly turbid
Specific gravity	1.010	1.010	1.010	1.010
pH	7.2	>6.8	>6.2	>6.0
Protein	Nil	Nil	1+	1+
Glucose	Nil	Nil	Nil	Nil
Bilirubin	-ve	-ve	+ve	+ve
Ketones	-ve	-ve	-ve	+ve
Blood	Absent	Absent	Absent	Absent
Urobilinogen	Normal	Abnormal	Abnormal	Abnormal
Pus cells	Nil	0-cells/HPF	Nil	Nil
RBCs	Nil	Nil	0-1cells/HPF	Nil
Epithelial cells	Nil	Nil	Nil	Nil
Crystals	Nil	Nil	Nil	Nil
Casts	Nil	Nil	Nil	Nil
Others	Bacteria seen	Bacteria seen	Bacteria seen	Bacteria seen

4.4.2.9Table 9. Effect of oral administration of Velvanga Chunnam on organ weight

Dose (mg/kg)	**Control**	**250mg/kg**	**500 mg/kg**	**1000 mg/kg**
Liver (g)	4.18±0.20	4.56±0.32*	4.84±0.19**	5.12±0.14**
Heart (g)	0.58±0.10	0.60±0.12	0.56±0.12*	0.58±0.06
Lung (g)	1.54±0.04	0.62±0.06*	0.60±0.05	0.61±0.04*
Spleen (g)	0.34±0.05	0 .35±0.05	0.32±0.02	0.30±0.02
Uterus (g)	1.40±0.12	1.33±0.10	1.18±0.10*	1.17±0.12*
Testis (g)	1.30±0.13	0.63±0.10**	1.66±0.12**	1.30±0.14

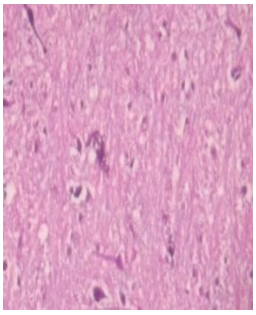
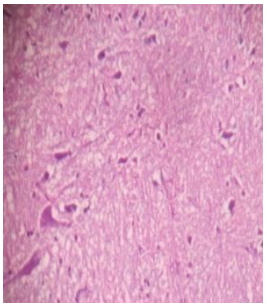
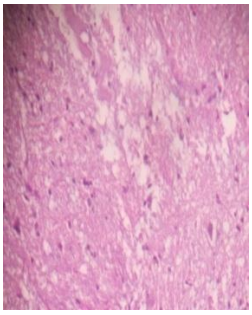
Brain (g)	1.42±0.21	1.38±0.20	1.52±0.12*	1.40±0.18
Kidney (g)	0.62±0.04	0.65±0.05	0.60±0.04	0.60±0.05
Stomach (g)	1.32±0.05	1.40±0.05	1.30±0.06	1.31±0.04

Values are mean of 6 animals ± SEM. *P<0.05; **P<0.01 *vs control* N=6

4.2.4.2.HISTOPATHOLOGICAL EVALUATION FOR SUB-ACUTE TOXICITY:

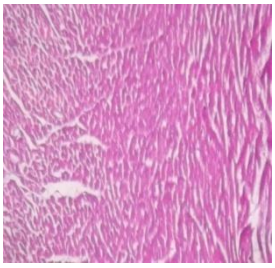
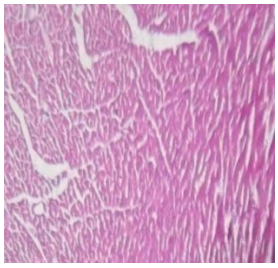
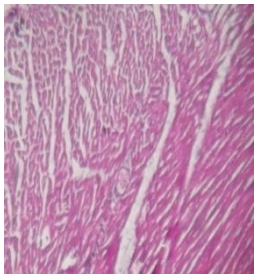
BRAIN :

HIGH DOSE MID DOSE LOWDOSE

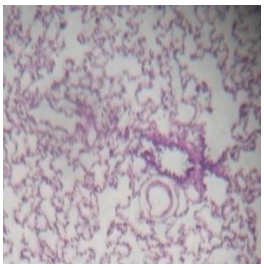
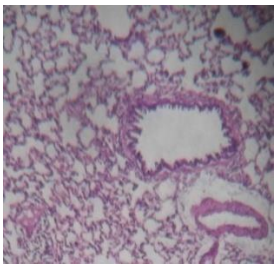
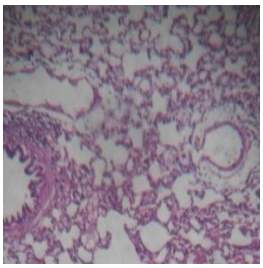
HEART:

HIGH DOSE MID DOSE LOWDOSE

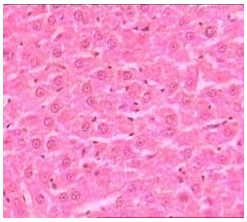
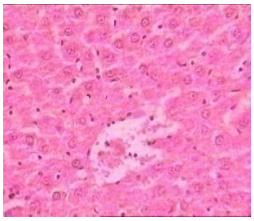
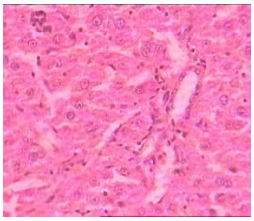
LUNGS:

HIGH DOSE MID DOSE LOW DOSE

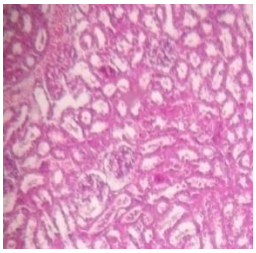
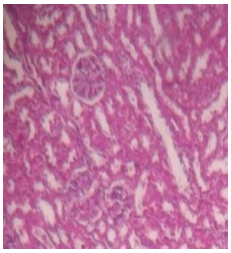
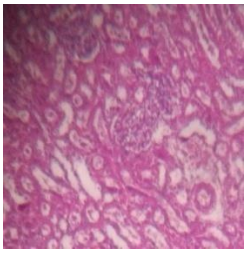
LIVER :

HIGH DOSE MID DOSE LOW DOSE

KIDNEY:

HIGH DOSE MID DOSE LOW D

SPLEEN:

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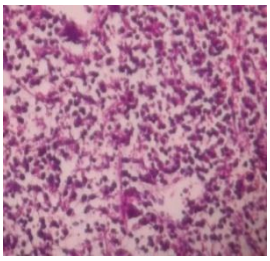
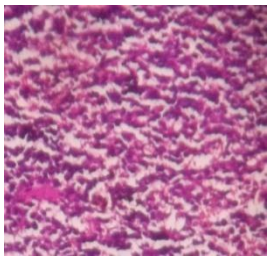
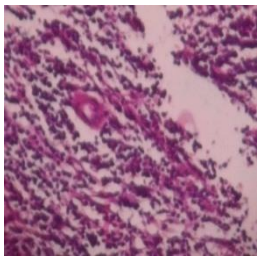
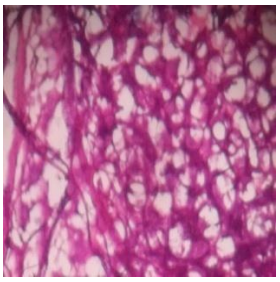
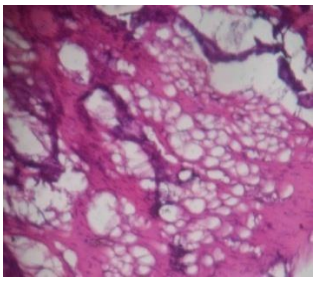
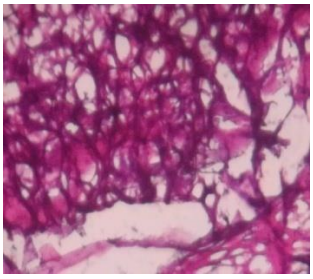




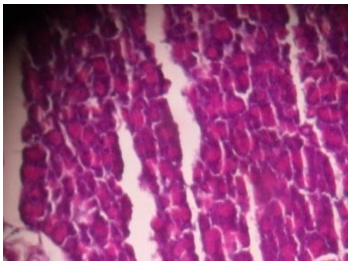
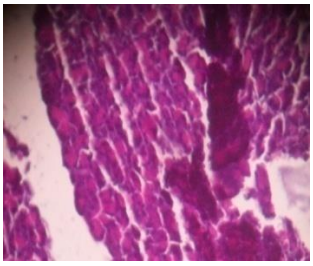
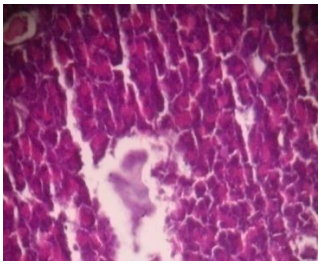
STOMACH :

HIGH DOSE MID DOSE LOW DOSE

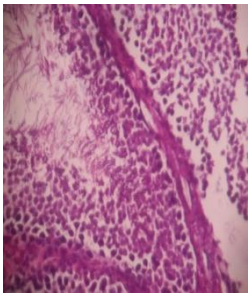
PANCREAS:

HIGH DOSE MID DOSE LOWDOSE

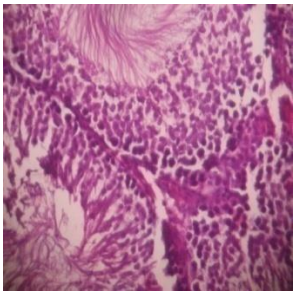




TESTIS:

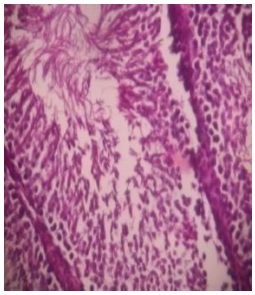
HIGH DOSE



MID DOSE

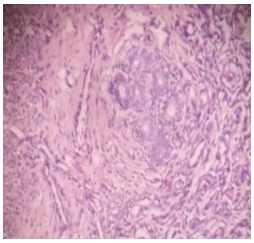


LOW DOSE

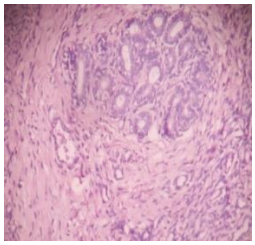


OVARY:

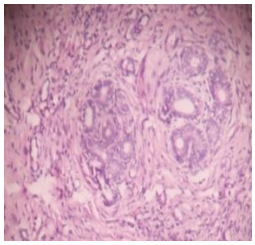
HIGH D



MID DOSE



LOW DOSE



RESULTS AND DISCUSSION OF PHARMACOLOGICAL ACTIVITY

4.5.1.RESULTS OF THE ANALGESIC ACTIVITY:

Mortality in the acute oral toxicity test was not seen in the limit test up to dose 5000mg/kg. One-tenth of the maximum tolerable dose was considered for the further pharmacological studies. No other toxic symptoms were observed in any of the dose treated animals. Writhing method is the most common test for evaluating the analgesic efficacy of drugs/compound in rodents. Abdominal constrictions in mice were caused by the intraperitoneal injection of acetic acid.

The animals were previously treated, by oral administration (p.o.) with Velvanga Chunnam 1 h before the stimulation with acetic acid. Control animals received the same volume of vehicle. Five minutes after the acetic acid injection, the number of times that each animal presented abdominal constriction was counted for 20 consecutive minutes. The abdominal constriction response induced by glacial acetic acid is a sensitive procedure to establish peripherally acting analgesics. This response is thought to involve local peritoneal receptors.

The number of writhing observed during a 20 min period in control group was 35.64 ± 3.25. It was also observed that animals in test group showed delayed onset of writhes (after 10min) as compared to other groups in which onset of writhes was within 5 min. The Velvanga Chunnam 500 mg/kg, p.o.) showed the significant ($P<0.01$) reduction in the number of writhes induced by acetic acid. Diclofenac significantly reduced the number of writhes ($P<0.01$). There was a significant, inhibition of pain response in mice.

The Acetic acid -induced writhing response is believed to be produced by the liberation of endogenous substance, notably metabolites of the arachidonic cascade. Hence, Acetic acid causes analgesia by liberating endogenous substances including serotonin, histamine, PGs, bradykinin and substance P, which stimulate pain nerve endings. Local peritoneal receptors are postulated to be partly involved in the abdominal constriction response.

The method has been associated with prostanoids in general, i.e. increased levels of PGE_2 and $PGF_2\alpha$ in peritoneal fluids as well as lipoxygenase products. Therefore, the Velvanga Chunnam might inhibit the synthesis and/or release of these endogenous substances. Significant reduction in abdominal constriction compared with vehicle treated animals was considered as antinociceptive response. So from the results it can be

concluded that the siddha drug Velvanga Chunnam possess excellent peripheral analgesic property which is equipotent to standard drug used in this study.

4.5.b.RESULTS AND DISCUSSION OF THE ANTI-ARTHRITIC ACTIVITY OF *Velvanga chunnam*:

In acute toxicity studies, the *Velvanga Chunnam* up to 5000 mg/kg did not produce any toxic symptoms or mortality in mice, and hence the *Velvanga Chunnam* was considered to be safe and non-toxic and one tenth of this maximum tolerable dose was used as therapeutic dose for further pharmacological screening. The animals at all the dose levels in the acute toxicity study showed hypnotic symptom. Rheumatoid arthritis is a chronic debilitating autoimmune disorder that affects about 2.1 million Indians and Americans etc. However, besides their high cost, the prolonged use of many of these drugs is associated with severe adverse reactions and toxicity, including some risk of infections in subsets of patients being treated with biological response modifiers. Thus, there is a need to systemically study of *siddha* formulation *Velvanga Chunnam*, has been used for the treatment of rheumatic diseases in India for centuries. Freund's adjuvant-induced arthritis have been used as a model of sub-chronic or chronic inflammation in rats and is of considerable relevance for the study of patho physiological and pharmacological control of inflammatory processes, as well as the evaluation of analgesic potential or anti-inflammatory effects of drugs. One of the reasons for the wide utilization of this model is due to the strong correlation between the efficiency of therapeutic agents in this model and in rheumatoid arthritis in humans. The arthritis is induced by a sub-cutaneous injection of Freud's adjuvant. The denatured Mycobacterium butyricum suspended in mineral oil can be injected sub-cutaneously at the base of the rat's tail or in the paw's plantar surface, or by intra-joint via. The adjuvant elicits arthritis predominantly in the joints of hind limbs, promoting significant reduction of motor activity and increased itching and scratching behaviors. The arthritic syndrome is induced by injection of Freunds adjuvant consisting of dead and fast mycobacteria in liquid paraffin without any additional antigen. This syndrome was characterised by the appearance of inflamed lesion remote from the injection site approximately after 7days

The results of the present study indicate that the *Velvanga Chunnam* exhibits anti-inflammatory effect in rats with Freund's adjuvant-induced arthritis, either on its acute as well as its chronic phase. The model of adjuvant-induced arthritis in rats has been extensively used in the study of inflammatory processes and validated as a model of

chronic pain. This fact is corroborated by evidence of spontaneous pain behaviors in arthritic rats, such as reduced locomotor activity and increased itching and scratching behaviors in the affected paw and attempt at protection of the affected paw, as evidenced by curving and/or elevation, as well as avoidance to support its own weight. In addition, altered sleep pattern has been observed in these animals. The significant difference for acute and chronic treatments, demonstrating that the method used for induction of arthritis by administering Freund's adjuvant was effective, reducing the pain threshold in the injected animals, thus, revealing the applicability of induced arthritis as an experimental model of chronic pain.

RA develops as a result of interaction of many factors, which include genetic (inherited) factors, environmental (viral or bacterial) factors and hormonal factors. A variety of tools are used to diagnose RA and these include; medical history, physical examination, laboratory test (rheumatoid factor, white blood cell count and erythrocyte sedimentation rate, measurement of C-reactive protein**s**) and X-rays. The goals of managing arthritis are basically the same no matter what treatment approach is chosen; these are to relieve pain, reduce inflammation, slow down or stop joint damage and improve a sense of well being and ability to function. Rheumatoid arthritis is a progressive, disabling, chronic multisystem disease of unknown cause characterized by pain and stiffness of synovial joints.

In right paw there was increase in paw edema from 1st to 3rd day and began to decline from 4th to 8th day during primary phase. During the late phase there was increase in paw edema from 9th to up to 30^{th} day. Little increase in paw volume was noticed from1st to 3rd day and began to decline from 4th to 8th day during primary phase in the non injected left paw during primary phase. In secondary phase there was increase in paw edema from 9th up to 30^{th} day. Deregulation of IL-6 expression causes the synthesis and release of many inflammatory mediators, which may result in pain and edema. Due to its multiple stimulatory effects on cells of the immune system and vascular endothelial cells, it is believed that excess IL-6 plays a pathogenic role in the development of inflammation, resulting in hyperalgesia and edema. Modulation of immune responses to alleviate pain and inflammation has been of interest for many years. Due to the central role played by IL-6 in a number of manifestations of inflammatory diseases, therapeutic inhibition of IL-6 represents a novel approach to the treatment of chronic inflammation. Studies have demonstrated that some symptoms of inflammation with a significant cytokine component, such as rheumatoid arthritis, can be

treated by inhibition of IL-6. However, IL-6 has been shown to elicit both pro- and anti-inflammatory effects.

Rats exhibited a gradual increase WBC, ESR compared with control group, whereas RBC count and haemoglobin percentage decreased compared with control group. Here attempt has been made to evaluate pharmacological potential of *Velvanga Chunnam* after stability study by using parameters likes change in paw edema in chronic model Freund's Complete – Adjuvant induced arthritis. The result of anti-arthritic activity of *Velvanga Chunnam* after stability studies showed that *Velvanga Chunnam* is having better anti-arthritic potential as compare to control.

Oral administration of *Velvanga Chunnam* (500mg/kg p.o. b.w.), once each a day during the 30days of adjuvant-induced arthritis showed a significant decrease ($P< 0.001$) in injected paw edema from 12th day till 30^{th} day. From the beginning of the treatment, the doses used were capable to abolish the progressive increase of the paw's dimensions, observed in the control group, either during the acute (6 days after induction of arthritis) or the chronic study (21 days after adjuvant administration).

Histopathological changes in footpad:

The tissue sections of CFA injected hind paws of the arthritis control revealed the pathological changes that can be correlated with arthritis as compared to the normal control. In particular, marked hyperkeratosis of skin of footpad, infiltration of leukocytes and eosinophilic inflammatory exudates, edema in deeper subcutaneous tissues and proliferation of collageneous tissues was evident. The treatment with Velvanga Chunnam 500mg/kg showed marked reduction of the injury to hind paw tissue sections and most of the histological changes were minimized and found negligible as compared to the arthritis control. In particular, marked reduction in hyperkeratosis of skin of footpad, leukocytic and eosinophilic infiltration, edema and proliferation of collageneous tissues was evident.

Rheumatoid arthritis mostly involve in immunological derangements. The adjuvant arthritis model satisfies mostly the allied conditions of arthritis in rat, which resembles human. In adjuvant arthritis bacterial peptidoglycan and muramyl dipeptide are responsible for its induction. It can occur through cell mediated auto immunity by structural mimicry between mycobacteria and peptidoglycan in rats. The response to the CFA administration arthritis is biphasic it consists of acute phase and polyarthritic for a chronic phase, correspond to day 0-10 and 10-28 post CFA inoculation respectively. The

acute phase response is characterized by unilateral inflammatory edema of the ipsalateral paw peaking around a 4-6 followed by subsequent arthritis and chronic phase response which begin around day 10 characterized by inflammatory edema in contra lateral paw.

Hence the results demonstrate the anti- arthritic effects of *Velvanga Chunnam* in the Freund's adjuvant-induced arthritis in rats. The most probable mechanism of this drug might be the inhibition of proinflammatory cells by *Velvanga Chunnam*, which could have led to an alteration in the immunological milieu during the delayed phase of the response. Thus it can be concluded that the *Velvanga Chunnam* has significant antiarthritic activity in rats. Further studies involving the investigation of the detailed biochemical pathway responsible for this action may result in the development of a potent anti-arthritic agent.

4.4.1.Table1.The analgesic activity of *Velvanga chunnam* in acetic acid induced writhing method:

Test Sample	Dose (mg/kg)	No of Writhings (mean±SEM)	% of Writhing	% of Inhibition
Control	2% CMC + 0.7% acetic acid	35.64±3.25	100	---
Test	VC(500mg/kg)+ 0.7% acetic acid	5.33±1.36	14.95	85.04**
Standard	Diclofenac (45mg/kg))+2% acetic acid	3.94±0.78	11.05	88.94**

The writhing in control was taken as 100%. The mean writhing was calculated from three determinations in each group (n=6) of mice. P<0.01VsControL.

RESULTS OF THE ANTI-ARTHRITIC ACTIVITY:

4.4.2.1Table 1: Effect of Velvanga Chunnam on paw volume in CFA induced arthritis in rats

Group	Treatment	Dose	% Inhibition of paw edema				
			7^{th} Day	15^{th} day	20^{st} day	25^{th} day	30^{th} day
Normal	Saline	1ml/kg	--	--	--	--	--
Control (RA)	Ghee alone	1ml/kg	--	--	--	--	--
Test	Velvanga Chunnam+Ghee	500mg/kg	--	12.27	38.16	61.18	64.12
Standard	Indomethacin	10mg/kg	--	19.76	44.81	68.35	89.46

4.4.2.2Table 3: Effect of Velvanga Chunnam on body weight in arthritic rats

Group	Treatment	Dose	0 day	7th Day	15th day	20th day	25th day	30th day
Normal	Saline	1ml/kg	164±2.0	169±2.0**	174±2.2**	178±1.8**	180±2.2**	182±2.1**
Control (RA)	Ghee alone	1ml/kg	150±2.0	152±1.4 ns	156±2.2**	161±2.0 **	166±1.8 **	170±3.2 **
Test	Velvanga Chunnam+Ghee	500mg/kg	162±2.2	166±1.7 *	171±2.0 **	175±2.1 **	178±2.2 **	181±3.0**
Standard	Indomethacin	10mg/kg	165±1.8	167±1.5 ns	166±2.8 ns	168±1.9 *	172±2.6 **	178±2.8**

Values are expressed as Mean ± SEM; N = 6; **p<0.01vs 0day

4.4.2.3Table 4: Effect of Velvanga Chunnam on Biochemical parameters in CFA induced arthritic rats

Group	Treatment	Dose	ALT (IU)	AST (IU)	TP (g/dl)	CRP (µg/m)
Normal	Saline	1ml/kg	33.15±0.77	101.71±6.31	11.10±0.98	168.31±4.2
Control (RA)	Ghee alone	1ml/kg	46.64±0.92	140.22±10.82	14.26±1.12	398.20±8.7
Test	Velvanga Chunnam+Ghee	500mg/kg	30.11±0.35**b	96.34±4.96**	9.15±0.33*	225.75±10.2**b
Standard	Indomethacin	10mg/kg	22.08±0.48**b	57.90±3.67**b	8.82±0.42**	201.19±4.6**b

Values are as Mean ± SEM; N = 6; bP<0.01vs Normal, *P<0.05, **P <0.01 vs arthritic control

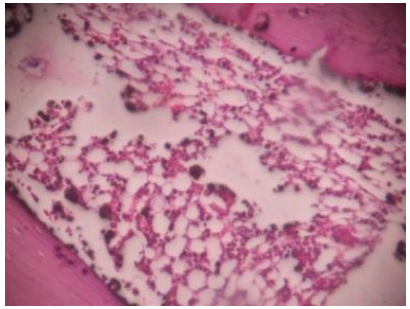
4.4.2.4Table 5: Effect of Velvanga Chunnam on heamatological parameters in arthritic rats

Group	Treatment	Dose	TWBC count (Cells/cu.mm)	RBC count (millions/cu.mm)	Hb (gm%)	ESR (mm/hr)
Normal	Saline	1ml/kg	7.68±0.06	5.34±0.14	14.22±0.10	2.18±0.16
Control (RA)	Ghee alone	1ml/kg	7.54±0.08	5.12±0.16	12.51±0.26	4.06±0.11
Test	Velvanga Chunnam+Ghee	500mg/kg	7.61±0.05	5.52±0.20	13.24±0.15*	3.00±0.12**b
Standard	Indomethacin	10mg/kg	7.60±0.08	5.43±0.11	14.63±0.15**	3.01±0.13**b

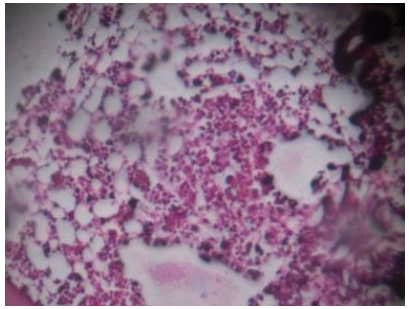
Values are expressed as Mean ± SEM; N = 6; bP<0.01 Vs N

4.4.2 Histopathological changes in footpad:

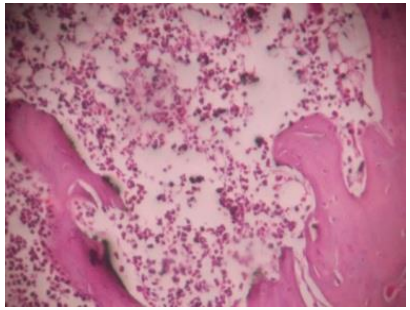
GHEE TREATED



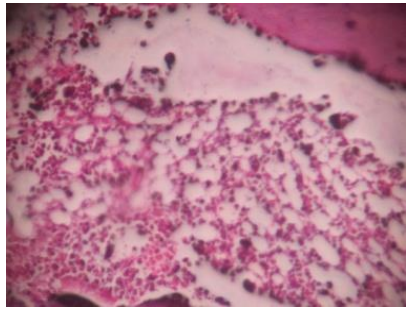
ARTHRITIC-CONTROL



VELVANGA CHUNNAM TREATED



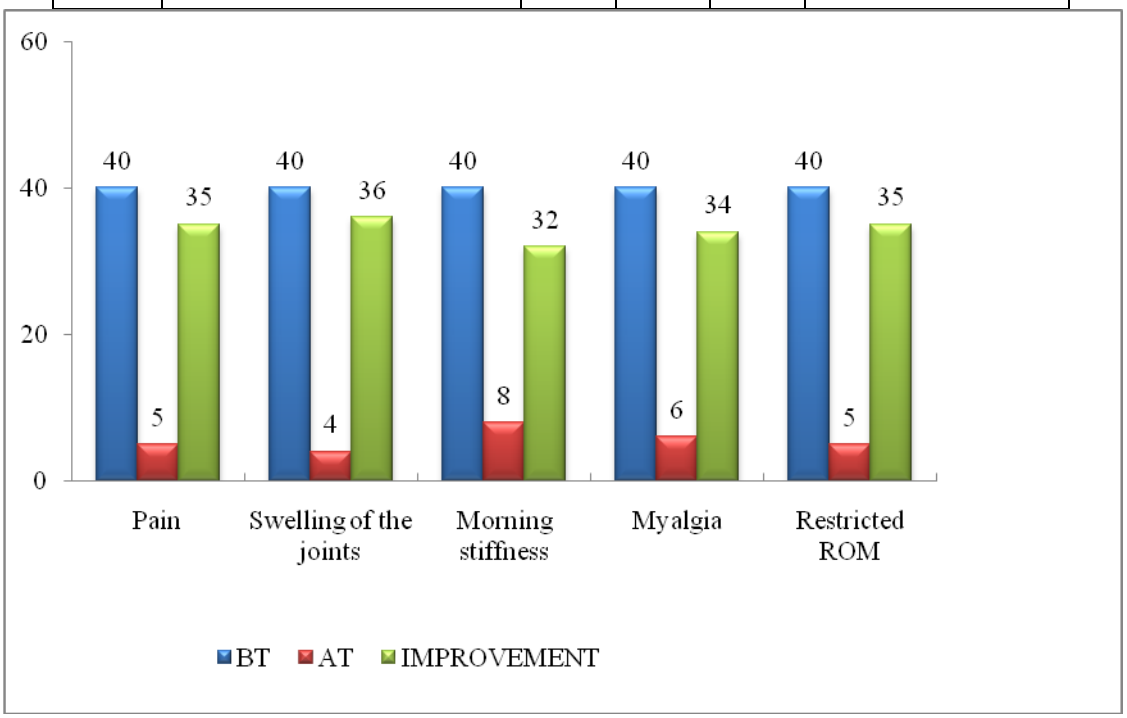
NORMAL



RESULTS AND DISCUSSION OF CLINICAL ASSESMENT

IMPROVEMENT IN SIGNS AND SYMPTOMS

SL. NO	SIGNS AND SYMPTOMS	NO. OF PATIENTS			
		BT	AT	IMP.	IMPROVEMENT (%)
1	PAIN	40	5	35	90
2	SWELLING OF THE JOINTS	40	4	43	91
3	MORNING STIFFNESS	40	8	29	78
4	MYALGIA	40	6	39	86
5	RESRICTED ROM	40	5	34	87

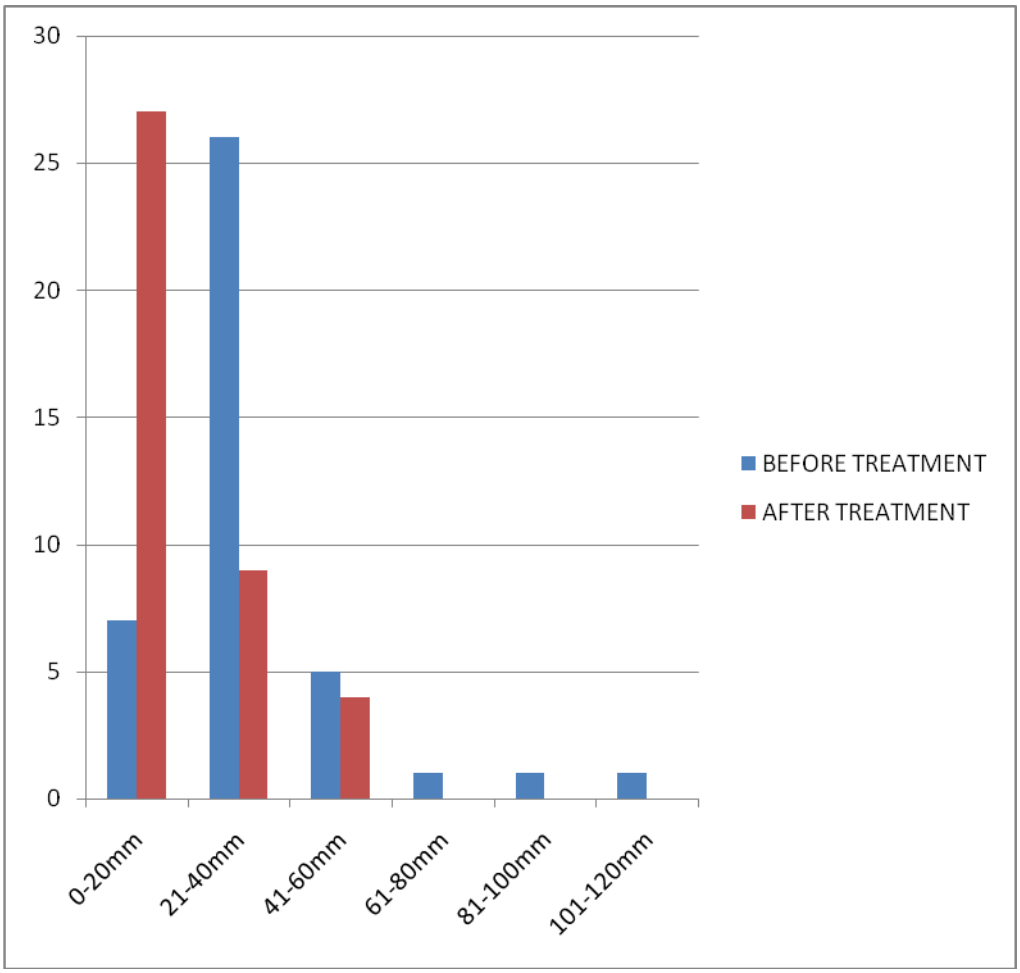


DISCUSSION:

Among 40 patients,

- 35 out of 40 patients were relieved from pain
- 36 out of 40 patients were relieved from swelling
- 32 out of 40 patients were relieved from morning stiffness
- 34 out of 40 patients were relieved from myalgia
- 35 out of 40 patients were relieved from restricted ROM

COMPARISON OF ESR VALUES RA PATIENTS BEFORE AND AFTER TREATMENT



S.NO	ESR VALUES	Before treatment	After treatment
1.	0–20	7	27
2.	21–40	26	9
3.	41–60	5	4
4.	61–80	1	0
5.	101–120	1	0
Total		40	40

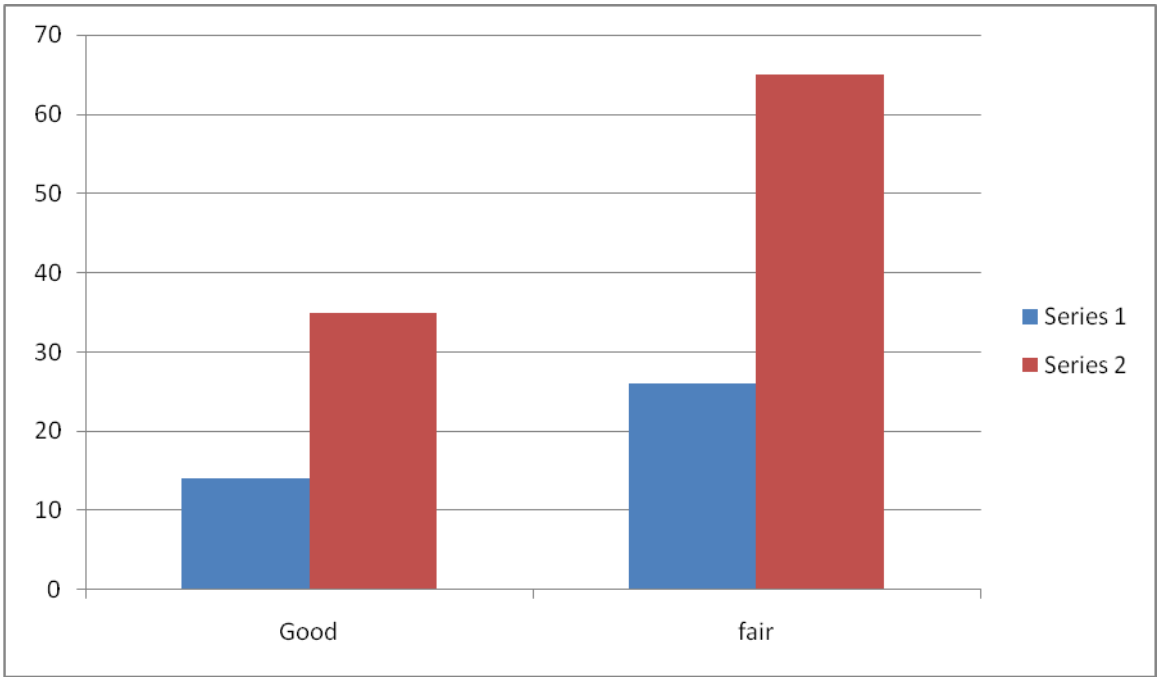
DISCUSSION

Out of 40 patients, 27 patients showed good prognosis with ESR values of 0-20. 9 of 40 patients showed prognosis with ESR values of 21-40. 4 out of 40 patients showed prognosis with ESR values of 41-60. All patients had higher values of ESR and recovered to low values of ESR after treatment with *Velvanga Chunnam.*

GRADATION RESULT

SL. NO	LEVEL OF IMPROVEMENT	NO.OF PATIENTS	PERCENTAGE (%)
1	Good	14	35
2	Satisfactory	26	65
TOTAL		50	100

GRADATION RESULT



Clinical study:

40 patients of both sexes were selected.

Among the 40 patients, 35 patients were treated as out- patients in the Post graduate department of Gunapadam, Govt.Siddha medical college hospital and Govt. Arignar Anna hospital, Arumbakkam, Chennai- 106. 5 patients were treated as in - patients.

The patients were observed regularly.

The trial drug *Velvanga Chunnam* was given to the patients at the dose of 65 mg twice a day with ghee before meals. On administration of *Velvanga Chunnam* 65 mg twice a day for 7 weeks should significant anti ulcer activity. Hot water which was used as vehicle also has anti-oxidant property as per classical siddha literature.

Among 40 patients, 35 out of 40 patients were relieved from Pain. 36 out of 40 patients were relieved from swelling of the joints. 32 out of 40 patients were relieved

from morning stiffness. 34 out of 40 patients were relieved from myalgia. 35 out of 40 patients were relieved from restricted ROM.

The results revealed that the drug possess 35% good relief, 65% fair results.

STATISTICAL ANALYSIS

DESCRIPTIVE STATISTICAL FOR IMPROVEMENT OF SIGNS & SYMPTOMS IN *"PEPTIC ULCER"*

PAIRED "t" TEST RESULT:

"p" value & statistical significance:

Treatment	ESR values	Mean	S.D	S.E.M
Before treatment	40	52.63	15.43	2.44
After treatment	40	22.33	11.71	1.85

From the table we calculated the descriptive statistic like Mean, S.D & S.E.M of Mean for the improvement score before and after treatment.

"t" Table:

t-Table	S.D	"t" Value	"p" Value
Pre vs Post	0.989	30.23	0.0001

The two-tailed P value is less than 0.0001.

By conventional criteria, this difference is considered to be extremely statistically significant.

RESULT AND DISCUSSION:

Improvements of signs and symptoms by statistical analysis shows the two tailed "p" value equals 0.0001, by conventional criteria, this difference is considered to be extremely statistically significant. From the above results $p < 0.05$, it shows the improvement in the ESR parameters produced by *Velvanga Chunnam* statistically significant.

CONCLUSION

The trial drug of "*Velvanga Chunnam* " has been selected and its efficacy was analyzed in the treatment of Rheumatoid arthritis.

The drug is easily prepared and preparation is very simple when compared to modern drugs.

The trial medicine is cost effective.It containsessential elemental, organic, constituents for its basic and potentiality and it represented the nano particles of its content.

The drug shows good Analgesic and Anti-Arthritic activity.

All the patients of RA showed significant reduction of the symtoms in terms of pain, swelling of the joints, morning stiffness, and restricted ROM.

The ESR values are also greatly reduced and moved towards normalcy.

There were no adverse effects of the *chunnam* during treatment duration.

The general conditions of the body was also felt better. Increase in urine output,reduction of the body tiredness and improvement of movements of the joints were also improved.

Some patients of very long duration showed moderate significant effect in terms of pain, but swelling was reduced in the joints.

The trial drug of "*Velvanga Chunnam* " has been selected and its efficacy was analyzed in the treatment of Rheumatoid arthritis.

No adverse effects were produced during the entire clinical trial.

From the above clinical observation, I conclude that the drug "*Velvanga chunnam*" gives a new hope in the field of Rheumatoid Arthritis Treatment might through anti-oxidant mediated analgesic and anti-arthritic activity.

SUMMARY

The trial drug of "*Velvanga Chunnam* " has been selected and its efficacy was analyzed in the treatment of Rheumatoid arthritis.The drug is easily prepared and preparation is very simple when compared to modern drugs.The trial medicine is cost effective. It contains essential elemental, organic, constituents for its basic and potentiality and it represented the nano particles of its content.

The drug shows good Analgesic and Anti-Arthritic activity which was mediated through anti-oxident avtivity.

All the patients of RA showed significant reduction of the symtoms in terms of pain, swelling of the joints, morning stiffness, and restricted ROM.

The ESR values are also greatly reduced and moved towards normalcy.

There were no adverse effects of the *Velvanga chunnam* during treatment duration.

The general conditions of the body was also felt better. Increase in urine output,reduction of the body tiredness and improvement of movements of the joints were also improved.

Some patients of very long duration showed moderate significant effect in terms of pain, but swelling was reduced in the joints.

The trial drug of "*Velvanga Chunnam* " has been selected and its efficacy was analyzed in the treatment of Rheumatoid arthritis

No adverse effects were produced during the entire clinical trial.

From the above clinical observation, I conclude that the drug "*Velvanga chunnam*" gives a new hope in the field of Rheumatoid Arthritis Treatment might through anti-oxidant mediated analgesic and anti-arthritic activity.

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7. Korakkar namanasa thiravu kozlp.g86
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ANNEXURE – VI

CONSENT FORM

I certify that I have disclosed all the details about the study in the terms readily understood by the patient.

DATE: **SIGNATURE**

NAME

CONSENT BY THE PATIENT

I have been informed to my satisfaction by the attending physician the purpose of the clinical trial and the nature of the drug treatment and follow up including the lab investigations to be performed to monitor and safeguard my body functions.

I am aware of my right to opt out of the trial at any time during the course of the trial without having to give reasons for doing so.

I ,exercising my free power of choice , hereby give my consent to be included as a subject in the clinical trial of VELVANGA CHUNNAM for the treatment of VALIAZHAL KEELVAYU

DATE: **SIGNATURE**

NAME

Aringnar Anna Govt.Hospital of Indian Medicine and Homeopathy,Chennai-106.				
Govt.Siddha Medical College , Chennai-106.				
Name of the study.	Anti-inflammatory and anti-arthritic activity of Velvanga Chunnam. Dose :35 mg bds Duration:48 days. Diagnosis:			
OP NO:	Name:	Age:	Sex:	Religion:

Country: Marital status: Occpation:	Personal Habits: Income:	Past history: □DM □SHT □BA□TB□Allery □Epilepsy □Drug intake: □Surgery□Trauma Others;	Address:
Vitals:	PR / RR / BP		T˚

S.No	SYMPTOMS	Before treatment	After treatment[in weeks]						
			I	II	III	IV	V	VI	VII
1.	Pain								
2.	Morning stiffness								
3.	Swelling of joints								
4.	Myalgia								
5.	Inability to move joints/restricted movements.								
6.	Others.								
Signature of M.O.									

Inspection	Before treatment	After treatment[in weeks]						
		I	II	III	IV	V	VI	VII
No.of affected joints 1.Swelling of joints								
2.Deformity								
3.Skin nodules								
Palpation	Before treatment	After treatment[in weeks]						
		I	II	III	IV	V	VI	VII
1.Tenderness								
2.Range of movement								
Signature of M.O.								

Laboratory investigations:BLOOD:		
	Before treatment	After treatment
TC		
DC		
ESR		
HB		
RA Factor		
CRP		
Blood Urea		
Serum Creatinine		
Serum Bilirubin		
Blood Glucose		
Others		

Laboratory investigations:URINE:		
	Before treatment	After treatment
Albumin		
Sugar		
Deposits		
X-ray		

Neha; ehly;-SIDDHA SYSTEM OF DIAGNOSIS:

vz; tif Njh;T:8 Criterias	rpfpr;irf;F Kd;	rpfpr;irf;F gpd;
1.ehb		
2.ghprk;		
3.eh		
4.epwk;		
5.nkhop		
6.tpop		
7.kyk;		
!8.%j;jpuk;		
ePh;Fwp: epwk; kzk; Eiu nea;Fwp:		

SIGNATURE OF H.O.D . SIGNATURE OF M.O.

I.P CASE SHEET PROFORMA

POST GRADUATE DEPARTMENT, GUNAPADAM(BRANCH-11)

GOVT.SIDDHA MEDICAL COLLEGE& HOSPITAL, CHENNAI-106.

IP NO : OCCUPATION :
BED NO : INCOME :
NAME : NATIONALITY :
AGE : RELIGION :

SEX	:	D.O.A	:
ADDRESS	:	D.O.D	:
		DIAGNOSIS	:
		SIGN OF MO/AMO	:

COMPLAINTS AND DURATION :

HISTORY OF PRESENT ILLNESS:

HISTORY OF PAST ILLNESS :

PERSONAL HISTORY& HABITS :

FAMILY HISTORY :

GENERAL EXAMINATION:

1.Consiousness :
2.Nourishment :
3.Decubitus :
4.Anaemia :
5.Jaundice :
6.Cyanosis :
7.Clubbing :
8.Lymphadenopathy :
9.Oedema :
10.Jugular venous pulsations :
11.Pulse rate :
12.Temperature :

13.Respiratory rate :

14.Heart rate :

15.Blood pressure :

SIDDHA ASPECTS:

Iymporigal / Pulangal

1.Mei (Sensation)

2.Vaai (Taste)

3.Kann (Vision)

4.Mooku (Smell)

5.Sevi (Hearing)

Kanmenthiriyam / Kanmavidayam

1.Kai (Koduthal)

2.Kaal(Nadathal)

3.Vaai(Pesal)

4.Eruvai (Kazhithal)

5.Karuvai(Aananthithal)

Pira urupukalin nilai;

1.Irudhayam :

2.Puppusam :

3.Eraippai :

4.Kalleral :

5.Manneeral :

6.Kudal :

7.Siruneeragam :

8.Siruneerpai :

9.Moolai :

10.Karuppai :

Uyir thathukkal:

Vatham:

1.Pranan

2.Abanan

3.Viyanan

4.Udhanan

5.Samanan

6.Naagan

7.Koorman

8.Kirukaran

9.Devadathan

10.Dhananjayan

Pitham:

1.Analagam

2.Ranjagam

3.Saadhagam

4.Aalosagam

5.Prasagam

Kabham:

1.Avalambagam

2.Kledagam

3.Podhagam

4.Tharpagam

5.Santhigam

Udal Thathukkal:

1.Saaram

2.Senneer

3.Oon

4.Kozhuppu

5.Enbu

6.Moolai

7.Sukkilam / Suronitham

Envagai Thervu:

1.Naa

2.Niram

3.Mozhi

4.Vizhi

5.Sparisam

6.Malam a) Niram

b) Nurai

c) Erugal

d) Elagal

7.Moothiram

(i)Neerkuri a) Niram (ii)Neikuri

b) Edai

c) Manam

d) Nurai

e) Enjal 8.Naadi

MODERN ASPECT: EXAMINATION OF LOCOMOTOR SYSTEM

Inspection:

1.Full Rom of all joints

Shoulder

Elbow

Wrist

MCP

PIP

DIP

Fist

Hip

Knee

Ankle

MTP

2.Symmetry

Alike on both sides:

3.Posture :

4.Spinal curvatures :

5.Gait :

6.Body build :

7.Muscle configuration:

Muscle atrophy, asymmetry, strength:

8.Skin condition :

Palpation:

1. Skin temperature:

2. Tenderness:
3. Swelling:
4. Crepitation :

Other Systems:

1. **Cardio Vascular System**
2. **Respiratory system**
3. **Central Nervous System**
4. **Genito-Urinary System**
5. **Gastro Iintestinal System**

Laboratory Investigation:

1.Blood: TC
DC
ESR 1/2hr
1hr
Hb
Sugar(Fasting / PP / R)
Urea
Creatinine
Cholesterol
RA Factor
CRP Protein

2.Urine: Albumin
Sugar
Deposits

3.Motion: Ova
Cyst

CASE SUMMARY

FINAL DIAGNOSIS

MEDICINE

Velvanga chunnam 65 mg b.d with ghee.

MEDICAL ADVICE

S.NO	DATE	SIGNS AND SYMPTOMS	MEDICINE	SIGNATURE OF M.O

DATE OF ADMISSION	CONDITIONS AT DISCHARGE	DATE OF DISCHARGE	MEDICAL ADVICE TO BE FOLLOWED	SIGNATURE OF M.O

DISCHARGE SUMMARY: