**INTRODUCTION**

Siddha system of medicine is one of the oldest systems of medicine practiced in South India especially in Tamil Nadu.  It is a traditional system of medicine which is gradually evolved along with the Dravidians’ culture and hence this system is known as Dravidian system of medicine.

The aim of siddha medicine is to make the body perfect, imperishable and to promote longevity.  For the healthy life, Siddhars have mentioned daily and seasonal regimen including dietary habits and also insisted some code of ethics.  This is the first system to emphasis health as the perfect state of physical, mental, social, moral and spiritual component of human beings. Also Siddhars lead a simple way of life according to the laws of nature and beyond the narrow divisions of caste, creed, religion, colour and nation.

If the methods of treatment taken into account, then Siddha system holds the 8 unique methods of diagnosis. One among these 8 method is naadi. A Siddha physician keenly observes the naadi before starting any treatment. Hence unlike other system of medicines there does not exist only a symptomatic treatment in Siddha. A strong relationship develops between the patient and physician. The physician not only heals the disease of the patient through medicines but also provides an assurance to his mind and prays for the soul. For example, in a patient suffering from psoriasis, medicines are not enough as stress is an aggrevating factor of the the disease. So, it is only possible by a siddha physician to pacify the disturbed mind of the patient by the spiritual councelling.

In Siddha, there is a wide range of drugs which includes medicines that has got no expiry date. They can be preserved life-long. The formulas of medicine was prepared by Siddhars thousand of years ago.

According to Thirumoolar, there are 4448 types of diseases are classified. Gunmam is one of them which is prone to reoccur considerably after improper treatment.

Gunmam is a disease having the symptoms like stomach pain, heart burn, nausea, vomiting, loss of appetite.

Acid peptic diseases is a disorder of Gastro Intestinal Tract. In Siddha system the disease can be correlated with Gunmam. Nowadays Acid peptic disease (Gunmam) affected a large portion of the world population and is induced by several factors including stress, smoking and ingestion of NSAIDs.

Keeping this in mind, the author has selected **“Thesathali kalappu thool”** to study its efficacy in treating **Gunmam**.

**AIM AND OBJECTIVES**

Acid peptic disease is the most common disease of gastrointestinal tract leading to more discomfort and pain on the patient’s side.

In siddha system,the Acid peptic disease can be correlated with Gunmam.

Although the prevalence of the disease is decreasing in many western communities,it still affects approximately 10%.

The male to female ratio for duodenal ulcer varies from 5:1 to 2:1 whilst that for gastric ulcer 2:1 or less.

The aim of this dissertation work is to bring out an effective medicine from our ancient Siddha system for “Gunmam” as in **“Theriyar vagadam”.** Page No. 138.

**“Thesathali kalappu thool”** has been selected for the treatment of Gunmam.

The drug should be easily available, economic, easily administrated and also effective in smaller dose without any adverse effects. So the author has selected this drug for the dissertation purpose.

In this dissertation work, the author has selected Thesathali kalappu thool to review it in the following aspect.

* Botanical aspect
* Gunapadam aspect
* Bio-chemical analysis
* Pharmacological analysis
* Microbilogical analysis
* Heavy metal analysis
* Bio statistical analysis
* Clinical assessment

**[[1]](#footnote-2)GEO-CHEMICAL ASPECT**

**ROCK SALT**

Category – Halite mineral

Chemical Formula – Nacl

Synonyms – sodi chloridum impure.

Rock salt is mineral form of sodium chloride, crystallizing typically in cubes and having perfect cubic cleavage.

Rock salt occurs in crystalline massive and granular to compact form and is brittle mineral with a conchoidal fracture and viterous luster.

It is colourless when pure but often tinged gray, blue, and brown pink because of associated impurities.

1. Colour - Clear (or) White also clear blue nipples

with a large sack, purple pink yellow and grey.

1. Crystal Habit - Predominantly cubes and in massive

sedimentary beds but also granular, fibrous and compact.

1. Crystal System - Isometric 4/m bar 32/m
2. Cleavage - Perfect in three directions in cubes.
3. Mohs scale

hardness - 2 - 2.5

1. Luster - Glassy
2. Refractive

Index - 1.544

1. Streak - white
2. Specific

Gravity - 2.1

1. Density - 2.1 – 2.6 g/cc
2. Solubility - In water
3. Other

Characteristics - Salty flavor

**[[2]](#footnote-3)Formation:-**

It is typically formed by the evaporation for salty water. (such a sea water). Which contain Na+ and cl- ions.

One finds Rock salt deposits ringing at dry lake bed, island marginal sea and in closed bay and estuarles in and regions of the world.

Impurities :-

 Gypsum - Caso4

Sylvite - Kcl

But it is very rare to find potassium sulphate as a mineral also occasionally polyhalite ( K2 Ca2 mg(So4)4. 2H2O)

It found associated with Rock salt deposits.

**Properties :-**

Rock salt is Plastic and flows slowly under great pressure.

**General properties :-**

 Name - Sodium Chloride Impura

 Chemical formula - Nacl

Appearance - White (or) Clear solid

**[[3]](#footnote-4)Physical properties :-**

 Molecular weight (Nacl) - 58.4428

 Atomic weight (Na+) - 22.98768

 (39.337%)

 Atomic weight (Cl-) - 35.4527

 (60.663%)

 Viscosity - 1018 poises at 180

 1017poises at 800

Bulk density - 1.154 (7216/ft3)

Angle of response - 320

Melting Point - 1.4650C

 (2.6690F)

Hardness - 2.5

Critical Humidity at 200C - 75.3%

PH of aqueous solution - Neutral

Specific gravity - 0.204

Heat and fusion - 1 – 3. 5g cal/gm

**Ionic Bonds :-**

 Na. [(Ne)3S1] + [(Ne)3 S23P5]

 Na + [(Ne)]+ Cl- [(Ne)3 S23P6]

**Content of Nacl ;-**

 1gm. of Nacl contains.,

 0.3934 gm of Sodium (Na+)

 0.6066 gm of Chlorine (Cl-)

**Safety ;-**

 Ingestion - Dangerous in Large quantities

 Inhalation - may cause irritation

 Skin - may cause irritation

 Eyes - may cause irritation

 Radio Active - Don’t have Radio active properly

**Crystal structure :-**



 Nacl form crystals with cubic symmetry. In this the larger chloride ions are arranged in a cubes close packing white, the smaller Sodium ions fills the octahedral gaps between them. Each ion is surrounded by six of the other kind. This same basic structure is found in many other minerals and is known as the Halite structure.

Varieties of salt ;-

* + - Rock salt
		- Sea salt
		- Lake salt
		- Sub soil salt
		- Earth salt

**[[4]](#footnote-5)Distribution :-**

 Composition of Rock salt. From mandi Himachal Pradesh (% basis)

|  |  |  |
| --- | --- | --- |
|  | **Drang Area** | **Guma Area** |
| **Represented Sample** | **Selected Sample** | **Represented Sample** | **Selected Sample** |
| Sodium Chloride | 65.85 | 78.89 | 79.87 | 90.76 |
| Calcium Sulphate | 0.55 | 0.67 | 0.70 | 0.79 |
| Calcium Chloride | 0.53 | 0.83 | 0.57 | 0.54 |
| Magnesium Chloride | 0.43 | 0.56 | 0.43 | 0.39 |
| Sodium bi Carbonate | 0.74 | 0.61 | 0.65 | 0.50 |
| Insoluble matter | 30.34 | 16.70 | 16.24 | 6.86 |
| Moisture | - | - | 1.54 | 0.16 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 |

 Rock salt deposits in Himachal Pradesh which the only state where Rock salt is mined in India.

**Quality & Specifications :-**

 Quality of salt is determined by its sodium chloride content.

The presence of salts other than sodium chloride like magnesium chloride, calcium chloride, sodium sulphate and sodium carbonate is considered undesirable. Magnesium chloride and sulphate being hygroscopic make the salt delique scent and to eliminate them anti – caking agents like high magnesium carbonate tricalcium phosphate (or) hydrated calcium, silicate subjects to a limit of 1% are added which make the salt free flowing and suitable for table uses.

Apart from chemical composition, the quality of salt is also correlated to its Physical characteristics, viz its colour and particle size.

Colour of salt should be white as possible and the crystals should be finer particularly for table use.

Composition and colour can be controlled by washing out the impurities and size by grinding.

**Therapeutics :-**

**[[5]](#footnote-6)Biological Importances :-**

 Sodium chloride is essential to life on Earth most biological issues and body fluids contains a varying amount of salt.

The concentration of sodium ions in the blood is directly related to the regulation of safe body – fluid levels.

Propayation of nerve impulses by signal transportation is regulated by sodium ions.

0.9% sodium chloride in water is called physiological solution. Because it is isotonic with blood blasma. It is known medically us normal saline.

Physiological solution is the main stay of fluid replacement therapy that is widely used in medicine in prevention and treatment of dehydration (or) as an intravenous therapy to prevent hypovolemic shock.

**Salt for Human Nutrition ;-**

 Human nutrition is a major. Market for salt , because salt is an essential component of the human diet.

**Sodium :**

 Major extra cellular (The serum of human blood contain 5.5 parts / 1000 by weight of Nacl) electrolyte responsible for regulating water balance pH and osmotic pressure.

**Chloride :-**

 Essential to good health.

It preserves acid base balance in the body fluid, potassium absorption, supplies the essence of digestive stomach acid, and enhances the ability of the blood to carry carbon di – oxide from respiring tissue to the lungs.

Daily intake – 6 – 10gm salt / day

**Flavour enhancer :-**

 Salt is commonly used as a flavour enhancer for food and has been identified as one of the basic tastes.

Unfortunately the excess amount of salt intake where the required intake is much, lower causes elevated levels of blood pressure, increased risks of heart attack and stroke.

**Other uses :-**

 Many micro organisms can not surve in an excessive salty environment, water is drawn out of their cells by osmosis. For this reason it is used to preserve some foods. Such as smoked bacon of fish. It has also been used to disinfect wounds.

Salt promotes digestion and cell formation act as a stimulant and causes the increased flow of saliva in the human body. The serum of human blood contain 5.5 parts/1000 by weight sodium chloride which maintains the osmotic pressure in the body and keeps it in a good health.

Salt also finds many uses in medicine. It is used in the treatment of sprains, prevention of Goitre and for standard intravenous injection.

Salt baths in sea water are said to have stimulant effect on the skin salt is also used in many Ayurvedic preparation, surgical operations and veterinary practice.

**BOTANICAL ASPECT**

**[[6]](#footnote-7)SEERAGAM**

**Botanical name:**

Cuminum cyminum.Linn

**Taxonomical classification:**

 Kingdom : Plantae

 Division : Angiosperms

 Class : Dicotyledonae

 Sub class : Polypetalae

 Series : Calyciflorae

 Order : Apiales

 Family : Apiaceae

 Genus : Cuminum

 Species : cyminum

**Vernacular names:**

Arabic : Kamuna

Bengal : Jira

Burma : Ziya

Egypt : Kamum

English : Cumin

Greek : Kyminon

Gujarat : Jiru

Hind : Zira

Mal : Jikarkam

Marathi : Jiraghi

Persian : Zira

Telgu : Jiraka

Urdu : Jirah

**[[7]](#footnote-8)Identification of the plant:**

The slender annular herb about 1ft height with a much branched angular or striated stem bearing 2or 3 partite linear leaves twice or thrice 3 partite ,ultimate segments filiform umbels compound,rays few. Bracts and bracteoles several,linear,rigid.Calyx –teeth small,subulate,unequal.Petals oblong or obovate,emarginated,white often unequal.Fruit cylindric,tip narrowed primary ridges,filiform,distinct,secondary usually hispidulous,vittae large, solitary under each secondary ridge,carpophores 2 partite or 2 fid.Seed some what dorsally compressed, convex, concave.

**Habitat:**

The plant is grown extensively in south eastern Europe and North Africa bordering the Mediterranean sea and in india and China.It is cultivated in almost all the states in India except Bengal and Assam.The chief areas are reported to be UP and Punjab.In Jaipur an area of about 13930 acres are under cumin cultivation in Khalsa territory.

In Madras it is cultivated over limited areas in Coimbatore,Cudappah and Kurnool districts.

**Part used:**

Fruits and Seeds.

**[[8]](#footnote-9)Phyto chemistry of Cuminum cyminum :-**

Apigennin - 7 - 0 - Glucoside and Luteolin. - 7 - 0 - Glulcoside isolated from fruits.

[[9]](#footnote-10)Detection of α .pinene, α.phellandrene, α.terpinene, limonene, p-cymene and cuminaldehyde in seed oil by GLC.

[[10]](#footnote-11)Isolation of apigenin -7-0- glucopyranoside apigenin – 5- 0 glucopyranoside and Lutcolin -7-0- glucopyranoside.

[[11]](#footnote-12)Cuminaldehyde (21.95) detected in fruit essential oil (1.4%)

Fatty oil, resin, mucilage, gum, protein compounds, ,alates, and an essential oil to which the aromatic odour and taste is due.

[[12]](#footnote-13)A valuable essential oil Thymene rich in ‘Carvone’ obtained from the fruits.

It contain cuminol (or) cumic aldehyde 56% a mixture of hydrocarbons,’Cymene’ or ‘Cymol’, terpene etc.,

Thymol occurs in a fairly large proportion in the oil of ajowan, which is distilled from the fruits in India. This essential oil is colourless (or) pale yellow with a strong odour and flavour of the fruit. It is intended to produce a freely alcohol soluble oil with especially high carvenone content, the whole fruits must be used.

The fruit should not contain more than 2% foreign organic matter and not more than 8% ash.

**[[13]](#footnote-14)Analysis of fruits:**

 Moisture : 11.9%

 Protein : 18.7%

 Ether extract : 15.0%

 Carbohydrates : 36.0%

 Fibre : 12.0%

 Mineral matter : 5.8%

 Calcium : 1.08%

 Phosphorous : 0.49%

 Iron : 31.0/100gm.

 Carotene (Vit A) : 870 Iu/100g

 Vit C : 3mg/100gm.

The oil is soluble in 11 vols of 80% alcohol at 20.

**Specific gravity :** 0.900 - 0.930

N, 1.494 – 1.50

α, +3.0 to 8.0

Aldehydes : 25 - 35%

Acid value : 3.3

Ester value : 176

Iodine value : 9.18

Saponin value : 179.3

Unsaponified matter : 2.06

**[[14]](#footnote-15)ASAMATHA OMAM**

**Botanical name:**

Trachyspermum roxburghianum(DC)Craib

**Taxonomical classification:**

Kingdom : Plantae

Division : Angiosperms

Class : Dicotyledonae

Sub Class : Polypetalae

Series : Calyciflorae

Order : Apiales

Family : Apiaceae

Genus : Tracyspermum

Species : roxburghianum

**Synonyms:**

 Trachyspermum involucratum Wolff non Marie,

Carum roxburghianum Benth ex kurz

**Vernacular names:**

 Eng : Aprum involucratum

 Mal : Ajamotha omum

 Hind : Ajwan

 Tel : Ajamodagam

 Kan : Ajamodu-omune

 Sans : Ajamoda

 Burmese : Kant-balu

 Thai : Phak chi lom

**Habitat:**

It is native to tropical Asia and is cultivated in Bangladesh,India and Indo-china,in India mainly North East part of the country specially West Bengal.

**[[15]](#footnote-16)Morphology:**

**Stem:**

Annual, erect, aromatic herb, upto 90 cm tall. Stem much branched, striate, subglabrus.

**Leaves:**

Alternate, pinnately compound;blade ternately pinnate or 1-2 pinnate,leaflets pinnatifid to pinnatipartiate,gradually becoming nearly filiform upward.

**Inflorescence:**

Terminal or axillary,compound umbel;peduncle upto 8cm long;involucral bracts 2-5,linear lanculate;primary rays2-9 upto 4cm long;secondary rays 5-15 upto 7mm long.

**Flowers:**

Very small, crowded all bisexual.

**Calyx:**

Teeth 5,small or obscure.

**Petals:**

5,obcordate with broadly inflexed obtuse apices.

**Pistil:**

Pistil with compressed,glandular hairy ovary.

**Fruits:**

Fruit laterally compressed,ovoid to subglobose schizocarb,easily splitting into 2,one-seeded mericarps;mericarb with 5 prominent longitudinal ribs.

**Part used:**

Seeds.

**Effect on doshas:**

Ajmoda pacifies Kapha and Vatha dosha and aggrevates Pitta dosha.

**Uses:**

* It has been known to be used in folk medicine in the treatment of dyspepsia, hic cough,vomiting and pain in bladder.
* Ajmoda is best useful in digestive disturbances.It is specially indicated in Vatha disturbances of the digestive system like flatulence,gaseous belching and constipation.
* Ajmoda is used in flatulence,dyspepsia and diarrohea as a home remedy.
* Ajmoda is also a good antimicrobial agent so it gives relief in conditions like urinary tract infections.
* Ajmoda is antispasmodic,stimulant,tonic and carminative properties .So it has a lot to do with the problems of digestive system.
* A paste of the crushed fruit of Ajmoda when applied externally relieve colic pains.

**[[16]](#footnote-17)CHEMICAL CONSTITUENTS OF T.ROXBURGHIANUM FRUITS:-**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Name of Compounds** | **Percentage** |
| 1 | α – pinene | 0.04 |
| 2 | Sabinene | 0.03 |
| 3 | β – pinene | 0.01 |
| 4 | β - Myrcene | 0.02 |
| 5 | α – Phellandrene | 0.82 |
| 6 | Limonene | 17.11 |
| 7 | Ocimene | 0.02 |
| 8 | α – 4 - Dimethylstyrene | 0.17 |
| 9 | Decane, 3 – methyl | 0.02 |
| 10 | Cis – p – mentha – 2,8 – dien – 1 – 01 | 0.03 |
| 11 | α – pinene oxide | 0.10 |
| 12 | Limonene oxide | 0.06 |
| 13 | 2 – Aminoimidazole | 0.08 |
| 14 | 3,6 – Dimethyl – 2,3,3a, 4,5,7a* Hexahydrobenzofuran
 | 0.04 |
| 15 | Dihydrocarvone | 7.89 |
| 16 | Trans – Carveol | 0.16 |
| 17 | 2- Cyclohexen – 1 – one,2-Methyl – 5 – (1 – methylethenyl) | 40.03 |
| 18 | 2- Cyclohexen – 1 – one,3-Methyl – 6 – (1 – methylethenyl) | 0.11 |
| 19 | 3- Hexadecyne | 0.11 |
| 20 | Eugenol | 1.68 |
| 21 | Myristicin | 12.30 |
| 22 | Elemicin | 0.16 |
| 23 | Apiol | 18.71 |

**[[17]](#footnote-18)THIPPILI**

**Botanical name:**

Piper longum.Linn

**Taxonomical classification:**

Kingdom : Plantae

Division : Magnoliophyta

Class : Magnolipsida

Order : Piperales

Family : Piperaceae

Genus : Piper

Species : longum

**Synonyms:**

Piper sarmentosum

Piper latifolium

Charica roxburghii

Charica sarmentosa

**Vernacular names:**

Tamil : Thippili

English : Long pepper

Mal : Thippili

Persian : Daraife-fil

Telgu : Pippilia

Sans : Pippali

 Duk : Pipliyan

 Kan : Hippili

**Habitat:**

It is found throughout India especially in the warmer places.It is also found in Malaysia,Indonesia,Singapore,Srilanka and South Asian regions.

**Morphology:**

It is a slander aromatic climber with perennial woody roots.The stems are jointed;the leaves ovate and cordate with broad rounded lobles at the base,entire and glabrus;the spikes,cylindrical,male spikes larger and slender,the fruits ovoid and yellowish orange.

**[[18]](#footnote-19)Phyto chemical constituents:**

**Pippali** contains less essential oil than its relatives (about 1%), which consists of sesquiterpene hydrocarbons and ethers (bisabolene, β-caryophyllene, β-caryophyllene oxide, each 10 to 20%; α-zingiberene, 5%), and, surprisingly, saturated aliphatic hydrocarbons: 18% pentadecane, 7% tridecane, 6% heptadecane.

The fruits contain the **alkaloid piperine**, which contributes to their pungency Long pepper is known to contain **Piperlongumine**, a compound believed to have an anti-tumor effect.

**Piperine**

**Alkaloids and amides:**

The fruit of P. longum contains a large number of alkaloids and related compounds, the most abundant of which is piperine, together with methyl piperine, iperonaline, piperettine, asarinine, pellitorine, piperundecalidine, piperlongumine, piperlonguminine, refractomide A, pregumidiene, brachystamide,brachystamide-A, brachystine, pipercide, piperderidine, longamide and tetrahydropiperine, terahydro piperlongumine, dehydropipernonaline piperidine,piperine, terahydropiperlongumine and trimethoxy cinnamoyl-piperidine.

**[[19]](#footnote-20)Uses:**

* **Long pepper** is useful in respiratory discomfort (including asthmatic condition) and cough.
* It is used in therapeutic cleansing of the body parts abole the clavicle level.
* It is useful in therapeutic vomiting and alleviates anorexia.
* Stimulates digestive fire making a person feel hungry and having tranquillizer (Pain killer) action.
* Increases sexual desire and a rejuvenator of the body
* **Long pepper** is useful in All skin diseases and Useful in all urinary disorders including Diabetes
* It removes unnecessary fat from the body and useful in all infectious conditions
* In chronic fever **long pepper** powder should be taken with jaggery.
* Taking long pepper powder with castor oil and cow urine is very effective in management of neurralgic conditions specially the Sciatica.
* Thippili should be taken with honey to get rid of unwanted fat and maintain normal body weight. -Ayurvedic herbal plants

**GUNAPADAM ASPECT**

**[[20]](#footnote-21),e;Jg;G**

**ROCK SALT.**

**[Sodium Chloride impura (or) Sodii chloridum impura]**

**NtWngah;fs;:**

ire;jtk;> rpe;J}uk;> re;jpuDg;G> kjp$h;ik> kjpAg;G> kpe;jhr;nrhy;.

**NtWngah;fs;:**

[[21]](#footnote-22)G+ukpj;U

[[22]](#footnote-23)rpe;J}uj;jk;> ire;jtk;> re;jpuTg;G kjp$h;ik> gdp$h;ik> kjpAg;G> rpthyk;> kjpG+ukpj;U> ghz;lj;jpw;F rikj;j cg;G.

**Vernacular Names :-**

Tamil - Inthuppu.

Eng - Rock Salt, Halite.

Hindi - Khanji namka, Saindhava, Lahori namak.

Mar - Mitha.

Guj - Mitha.

Bng - Nimok, Nun.

,e;Jg;G – nraw;if cg;G – 15 vd;gjpd; fPo; cs;sJ.

gQ;rG+j mbg;gilapy; :-

**gQ;rG+j cg;G:**

* [[23]](#footnote-24),e;Jg;G – thA
* [[24]](#footnote-25),e;Jg;G – thA

**[[25]](#footnote-26)gQ;r cg;G:**

 “ts;spa fhpAg; gpe;J

 tisAg;Gf; fy;Yg;NghL

 njs;spa ntbAg;ige;Nj”

vd;gjpy; ,Ue;J ,e;Jg;G gQ;r cg;Gfspy; xd;whFk;.

,e;Jg;Gjhd;

G+uk;> tisaYg;G Kjypatw;wpd; Glj;Jf;F Mjpahk;.

,ij fPo;fz;l thp %yk; mwpayhk;.

[[26]](#footnote-27)“<ug;gh ,e;Jg;gpy; g+u Kg;ghk;

 ,ayhd tisaYg;G Glj;Jf;fhjp.”

**[[27]](#footnote-28)fpilf;Fk; ,lk;:**

rpe;J Njrj;jpYk;> gQ;rhg; tlNkw;Fg; ghfq;fspYk; G+kpapy; ,Ue;J ntl;b vLf;fpd;whh;fs;.

**vil:**

 2 – 10 gTz;L vilAs;s fl;b.

**epwk;:**

 Nkw;gf;fk; mOf;F gbe;j fgpy epwkhAk;> cl;gf;fk; ntz;ikahfTk;> thapy; ,by;> cg;ghAkpUf;Fk;.

**itg;G Kiw:**

 rKj;jpu ePh; 100 gbia (12000 ypl;lh;) GJrl;bapy; ,l;L fha;r;rp cg;ngLj;J ,t;Tg;gpy; 100 gyk; (310 fpNyh) mb fdj;jpUf;Fk; rl;bapy; ,l;L fUk;ghiy mLg;gpd; kPJ itj;Jf; fhlhf;fpdpaha; vhpf;f cg;G cUFk;.

mr;rkaj;jpy;

 ntbAg;G - 5 gyk; (175 fpuhk;)

 rPdhf;fhuk; - 5 gyk; (175 fpuhk;)

 G+ePW - 3 gyk; (105 fpuhk;)

 ,itfis nghbj;J J}tp xd;Wgl cUfpf; Fsputpl;nlLf;f fl;Lk;. cilj;J ghh;f;fpy; ituk; NghypUf;Fk;.

,jpy; gr;ir fw;G+uk; kbAk;.

G+uk; Kg;ghk;.

,J kz;G+j ruf;fhFk;.

 [[28]](#footnote-29),e;Jg;G - ngz; ruf;F

gr;ir fw;G+uk; - Mz; ruf;F.

**[[29]](#footnote-30)nra;if:**

 Laxative - kyfhhp

 Carminative - mfl;Ltha;tfw;wp

 Diuretic - rpWePh; ngUf;fp

 Stomachic - grpj; jP J}z;b

kyfhhp nra;ifapy; ,J “fPhpk; Mg; lhh;lhiuf;” fhl;bYk; NkyhdJ.

**Rj;jp Kiwfs; :**

* ,jid fhbapy; %d;W ehs; Cw Nghl;L> #hpa xspapy; cyh;j;jp vLf;f Rj;jpahFk;.
* ,jid fhb my;yJ nts;shl;L ePhpy; %d;W ehopif kj;jpj;J ntapypy; cyh;j;jp nfhs;s Rj;jp.

**msT :**

* 1-2 tuhfd; (4.2 – 8.4 fpuhk;)

 kyk; ,sFk;.

* 4-5 tuhfd; (16.8 – 21 fpuhk;)

 ePh; ePuha; NgjpahFk;.

 ,jid jdpj;J nfhLg;gJ kpfTk; mhpJ. ,J rpwg;gha; fhf;ful;lhd; tpij J}Sld; $l;b nfhLf;fg;gLfpwJ.

**nghJ Fzk;:**

“ml;lFd;k ke;jk; mrph;f;fuQ;#h; rPjgpj;je;

Jl;litak; ehbg;Gz; Nlhlq;fs; - nfl;l kyf;

fl;Ltpl tpe;ijaf; fhkpaNeha; td;fug;ghd;

tpl;Ltpl tpe;Jg;ig tps;”

,e;Jg;gpdhy; **vz; tpj Fd;kk**; myrk;> mrph;fuk;> fggpj;jk;> fghjpf;fk;> euk;G fpue;jp> jphpNjh~k;> kyge;jk;> tp~k;> Rf;fpyk;> fLtd; Mfpa Neha;fs; ePq;Fk;.

 “nrd;dpf;fz;zh gw;W}h; nrtpfTs;fz; lk;gfNeha;.

re;jpah rq;fhre; jhfkpiug; - Gd;dpuj;j

%yQ; rpye;jpesp %bfeQ; #ijtyp

#yQ; rpijAkpe;jhw; nrhy;.”

jiy> tpop> eh> je;j %yk;> jhJ> fd;dk;> fz;lk;> Nahdp ,t;tplj;J Neha;fs;> re;epahrk;> Nej;jpufhrk;> jhfk;> Rthrk;> ,uj;j %yk;> Kjypa gpzpfs;> rpye;jp> Njs;> vyp tp~q;fs;> thjf;fLg;G> #iy Kjypad ePq;Fk;.

**cgNahfq;fs; :-**

* Njfj;jpw;F RSf;F te;jhy; ,e;Jg;ig gw;wplyhk;.
* typAld; $ba tPf;fq;fSf;F ,ij #lhf;fp xw;wlkplyhk;.
* ,sk; #lhd nte;ePhpy; fiuj;J the;jp cz;Lgz;z cgNahfpf;fyhk;.

**,e;Jg;G NrUk; kUe;Jfs; :-**

**[[30]](#footnote-31)Fkl;b Fok;G :-**

 Fkl;bfha;rhW - 1400 ypl;lh;.

 gor;rhW - 1400 ypl;lh;.

 ntz;Ks;sprhW - 1400 ypl;lh;.

 nehr;rp ,iy rhW - 1400 ypl;lh;.

 ,Q;rprhW - 1400 ypl;lh;.

 ,urk; - 5 fpuhk;.

,ypq;fk; - 5 fpuhk;

 ngUq;fhak; - 5 fpuhk;.

,e;Jg;G - 5 fpuhk;

 ntq;fhuk; - 5 fpuhk;

fLF - 5 fpuhk;

 kQ;rs; - 5 fpuhk;

nte;jak; - 5 fpuhk;

 kpsF - 5 fpuhk;

fhe;jk; - 5 fpuhk;

 Neh;thsk; - 5 fpuhk;

**nra;Kiw :**

 Kjypy; 5 rhWfis xd;W $l;b xU ghj;jpuj;jpy; ,l;L rpW jPapy; vhpj;J Ie;jpy; xd;whf fhar;rp FWf;fp nfhz;L kw;iwa ruf;Ffspy; nghbf;f Ntz;baitfis nghbj;J miuf;f Ntz;baitfis miuj;J Nkw;gb Fok;gpy; Nrh;j;J rpW jPapy; fpz;b gok;Gsp ghfj;jpy; ,wf;fp itj;J nfhs;sTk;.

**msT**– 300 kp.fpuhk;. fhiy kl;Lk;.

**Jiz kUe;J**– gidnty;yk; (or) fUk;G nty;yk;.

**jPUk; Neha;fs; :**

 **Fd;kk;>** ngUtapW> ePuhik> ntg;Gghit> ftpir> ntSg;G> tplghfk; thA.

**[[31]](#footnote-32)Fd;kFNlhhp :**

,e;Jg;G - 1 gq;F kpsF - 1 gq;F

fy;Yg;G - 1 gq;F Xkk; - 1 gq;F

Nrhw;Wg;G - 1 gq;F fpuhk;G - 1 gq;F

cokz; - 1 gq;F Nkhb - 1 gq;F

ntq;fhuk; - 1 gq;F Nfhl;lk; - 1 gq;F

ethr;rhuk; - 1 gq;F ngUq;fhak; - 1 gq;F

tisaYg;G - 1 gq;F chpj;j G+z;L - 5 gq;F

ntbAg;G - 1 gq;F gidnty;yk; - 5 gq;F

Rf;F - 1 gq;F Njd; - 5 gq;F

jpg;gpyp - 1 gq;F

**nra;Kiw :**

 ,itfis fy;tj;jpy; ,l;L ,sfpa gjk; tUk; tiu miuf;fTk;.

**msT :**

 500 kp.fpuhk; - 1000 kp.fpuhk; 2 Ntis.

**jPUk; Neha;fs; :-**

 **Fd;kk;>** G+g;G fhyj;jpy; cz;lhFk; #jftha;tpd; typ> moy;> ke;jk;> nrhpahik.

**,e;Jg;G NrUk; gpw kUe;Jfs; :-**

* jphpfLfhjp #uzk;

**-fz;Zr;rhkp guk;giu itj;jpak; Pag. No. 116.**

* J}Jtisahjp #uzk;

**ruNge;jpuh; itj;jpa Kiwfs; (fhr – Nuhf rpfpr;ir Pag. No. 153)**

* ,Q;rp nea;

**-mfj;jpah; 2000 Pag. No. 441**

* Nfhl;l vz;nza;

**- ruNge;jpuh; itj;jpa Kiwfs;**

**(faNuhf> ciskhe;ij Nu;hf rpfpr;ir Page 53)**

* tpshq;fhjp #uzk;

**- Nfh~hap mDNghf itj;jpa gpuk;k ufrpak; Pag. No. 194**

* Rf;F fy;gk;

**-ruNge;jpuh; itj;jpa Kiwfs; Pag. No. 154**

* jphpgyh #uzk;

**-mfj;jpah; 2000 gf; 478.**

* Ff;Fyhjp khj;jpiu

**-ruNge;jpuh; fhr Rthr rpfpr;ir. Pag. No. 46**

* ghtdf; fLf;fha;

**-rpj;j itj;jpa jpul;L Pag. No. 223.**

* jr%y nea;

**-ruNge;jpuh; fhr Rthr rpfpr;ir Pag. No. 17**

* gpj;jf;f~hak;

**Fzghlk; jhJ – rPt tFg;G. gf;. vz; - 371**

* ,e;Jg;Gr; #uzk;

**Fzghlk; jhJ – rPt tFg;G. gf;. vz; - 372**

* Njq;fha; ~huk;

**Fzghlk; jhJ – rPt tFg;G gf;. vz; - 372**

**[[32]](#footnote-33)jpg;gpyp**

**GUNAPADAM ASPECT.**

**NtWngah; :**

Mh;fjp> cz;ruk;> cyitehrp> fhkd;> FNlhhp> Nfhyfk;> Nfhyp> NfhioaWf;fp> ruk;> rhb> Jstp> khfjp> nrsz;b> jz;Lyp> fzk;> f]pzp> ghzk;> gpg;gpyp> itNjfp> mk;G> MjpkUe;J.

**nfhbtif :**

,jid njd;dpe;jpahtpYk;> tq;fhsj;jpYk; gaphpLfpd;whh;fs;> kpsif fhl;bYk; fhuk; mjpfk; ,Uf;Fk;. ,jpy; 2 tif cz;L

1. mhprp jpg;gpyp 2. ahid jpg;gpyp.

,jpy; mhprp jpg;gpypNa Ma;Tf;fhf vLj;Jf;nfhs;sg;gl;lJ.

**gr;ir :**

Rit(Taste) - ,dpg;G(sweet)

jd;ik(Potency) - jl;gk;(coolent)

gphpT(Bio-transformation) - ,dpg;G(sweet)

**cyh;e;jJ :**

 Rit(Taste) - fhh;g;G(Pungent)

 jd;ik(Potency) - ntg;gk;(Hot)

 gphpT(Bio-transformation) - ,dpg;G(sweet).

**nra;if(Actions) :**

 ntg;gKz;lhf;fp - Stimulant

 mfl;Ltha;tfw;wp - Carminative.

**Fzk; :**

**cyh;e;j jpg;gpyp :**

,Uky;> Fd;kk;> ,iug;G><is> njhz;il Neha;> nghUky;> ghz;L kaf;fk;> Ritapd;ik> jiytyp> %h;r;ir> ePNuw;wk;> fz; - fhJ - %f;F Neha;fs; GONeha;fs; Mfpait ePq;Fk;.

**nghJFzk; :**

 “,Uky; Fd;kk; ,iug;G fag;gpzp

 <is ghz;L re;ahrk; mNuhrfk;

 nghUky; Cij rpug;gpzp %h;r;irNeha;

 G+hpf; FQ;ry Njhlk; gPypfKk;

 tUk yg;ngUf; NfhL kNfhjuk;

 thjk; MjpKj; NjhlQ; Ruq;Fsph;

 ngUkhiyg; Ghp Nkfg; gplfKk;

 NgUq; jpg;gpypg; Nguq;Fiuf;fNt.”

 **- fl;lisf; fypg;gh.**

“MrdNeha; njhz;ilNeha; Mtuz gpj;jKjy;

ehrptpop fhjpitNeha; ehl;GONeha; - tPrpLtp

aq;fyhQ;r dQ;rpijAk; mk;gha; moptpe;Jk;

nghq;fyhQ;r eq;ifah; Nfhl;Nghy;”

 **- Njiuah; Fzthflk;**

“fl;b najph;epd;W fLNehnay; yhk;gzpAk;

jpl;b tpidafYk; Njfnkj;j - Gl;bahk;

khkDf;F khkndd kw;wtDf;F kw;wtdhq;

fhknkDe; jpg;gpypf;Fk; if.”

**- Njud; ntz;gh.**

fLikahd Iag;gpzpfis mfw;wp> clYf;F td;ik mspj;jpLk;.

“<is apUk ypiug;Gg; grg;gpzpfs;

khs nthopahky; thl;LNk – ahSKiw

ghq;fh awpe;Jnra;tPh; gz;bjj;ijg; gz;bjNu

Ntq;iftha;g; ghd;fiz nka;.”

**- Njiuah; ntz;gh.**

<is> ,Uky;> ,iug;G> cg;gprk; Kjypa gpzpfis Nghf;f jf;fthW jpg;gpypia Ms Ntz;Lk;.

**Vernacular names:**

Eng - Long Pepper.

Tel - Pippillu

Mal - Thippili

Kan - Hippili

Sans - Pippali

Duk - Pipliyan.

Pers - Daraife – fil

**gad;gLk; cWg;G :**

 fha;> mhprp.

**jpg;gpyp NrUk;; Fd;kj;ij ePf;Fk; kUe;Jfs; :-**

**[[33]](#footnote-34)gpg;gpy;ahrtk**;

**ruf;Ffs; :-**

kpsF> jpg;gpyp nrt;tpak;> Nfhiuf;fpoq;F> re;jdk;> tha;tpsq;fk;> Nfh~;lk;> ,ytq;fk;> ,ytq;fg;gl;il> Vyf;fha;> ntl;bNth;> Rf;F> rpj;jpu%yk;> nfhl;ilghf;F> Nyhj;jpuk;> nfhz;iz Nth;>

,itfs; jdpj;jdp ½ gyk; tPjk; Nrh;j;J kpUJthf #uzpj;J 512 gyk; ryj;jpy; Nghl;L mjpy; 300 gyk; nty;yk; Nghl;L fhl;lhj;jp G+ 10 gyk; jpuhl;r;ir 60 gyk; Nrh;j;J kz;ghz;lj;jpy; itj;J me;j ghidia thia%b

 1 khjk; (or) 1 gl;rk; itj;J gpwF Njfgyk; fz;L mUe;jp tu.

**jPUk; Neha; :**

 **Fd;kk;**> fhrk;> ghz;L> %ytpahjp>

**[[34]](#footnote-35)Fd;khjpf;F #uzk; :-**

Gurk; gl;il - 3 gyk;

jpg;gpyp - 3 gyk;

Rf;F - 3 gyk;

nts;isG+z;L - 3 gyk;

kpsF - 3 gyk;.

**nra;Kiw :**

,tw;iw xd;wha; ,bj;J jz;zPhpy; Nghl;L frhak; Mf;fTk; frhaj;ij ,wf;fp mjDld; tz;lyhf jq;fp epw;Fk; ruf;Ffis miuj;J Fog;gp rhg;gplTk;.

**jPUk; Neha; :**

 **Fd;kk;**

**jpg;gpyp NrUk; gpw kUe;Jfs; :-**

* re;jdhjp fpUjk;

**- fz;Zrhkp guk;giu itj;jpak; Pag. No. 232**

* gQ;rhkph;j khj;jpiu

**- mfj;jpah; ml;ltiz thflk; Pag. No. 196.**

* mkph;jhjp khj;jpiu

**- mfj;jpah; ml;ltiz thflk; Pag. No. 98**

* Mde;j igutk;

**- mfj;jpath; ml;ltiz thflk; Page. No. 192**

* rPjRuj;jpw;F frhak;

**- mfj;jpah; ml;ltiz thflk; Pag. No. 260**

* fLf;fha; ,sfk;

**- mDNghf itj;jpaetePjk; ghfk;-8 Pag. No. 23**

* fhsNkf ehuhazr; nre;J}uk;

**- itj;jpa rhurq;fpufk; Pag. No. 496 – 497**

* gQ;r #j nkOF.

**- A+fpfhpry; - 151 ghly; vz; 16 – 24.**

* nts;sp gw;gk;

**- mf];jpah; ghpG+uzk; 400 ghly; vz; 226 – 228.**

* kfhtre;j FR khfuk;

**- rpj;j itj;jpa jpul;L Pag.No. 67 - 71**

**[[35]](#footnote-36)rPufk;**

**CUMINUM CYMINUM**

**NtWngah;fs; :-**

mir> rPhp> cg Fk;ggPrk;> ew;rPhp> Jj;jrhk;gyk;> gpuj;jp tpfh> gpj;jehrpdp> NghrdFNlhhp> Nkj;jpak;

**Vernacular names:**

 Eng - Cumin Seeds of fruits.

 Tel - Jilakarra

 Mal - Jirakam.

 Kan - Jiriga

 San s - Jirakams

 Hind - Zira.

**gad;gLk; cWg;G :**

 tpij – Seeds.

 Rit(Taste) – fhh;g;G(Pungent)> ,dpg;G(sweet)

 jd;ik(Potency) – jl;gk;(coolent)

 gphpT(Bio-transformation) - ,dpg;G(sweet)

**nra;if(Actions) :-**

 mfl;Ltha;tfw;wp - Carminative

 ntg;gKz;lhf;fp - Stimulaut

 grpj;jPj;J}z;b - Stomachic

 Jth;g;gp - Astringent.

**nghJ Fzk; :-**

Nghrd FNlhhp

gpj;jnkD ke;jphpiag; gpd;dg; gLj;jpatd;

rj;JUit Ae;Jwe;J rhjpj;J – kj;jndDk;

uhridA kPntd;W ez;igg; gyg;gLj;jp

NghrdFlhhp nrAk; Nghh;

**- Njud; ntz;gh.**

jP Fw;wj;ij jd;dpiygLj;jp> tapw;wpd; ke;jj;ij Nghf;fp> grpia cz;lhf;fp czit nrhpf;FkhW nra;Ak;.

[[36]](#footnote-37)“the;jp aUrpFd;kk; tha;Neha; gPypfkpiug;

Ngw;wpUky; fy;yilg;gp yhQ;rd;Kl; - Nrh;e;jfk;ky;

MrdF lhhp naDk; me;jf; fpufzpAk;

NghrdFlhhp Az;zg; Nghk;”

**Fzk; :**

the;jp>**Fd;kk**;> tha;Neha;><uy;Neha;> fhrk;> fy;yilg;G> FUjp fopr;ry;> ,iug;G> fk;ky; %f;F ePh; gha;jy;> ntwp Neha;> tsp Neha; ,itfs; tpyFk;. ,‡J clYf;F tYit je;J fz;Zf;F Fsph;r;rpiaAk; cz;L gz;Zk;.

[[37]](#footnote-38)“thANthL ehrpNeha; td;gpj;jQ; NruhJ

fhak; nefpohJ fz;FspUe; - J}akyh;f;

fhusfg; ngz; kapNy! iffz;l jpj;jidAQ;

rPufj;ij ePjpdKe; jpd;”

**rPufk; NrUk; Fd;kk; ePf;Fk; kUe;Jfs; :-**

**[[38]](#footnote-39)nfsrpfh; Fok;G :-**

- fLf;fha; - 1 gq;F - jpg;gpyp - 1 gq;F

- fLF - 1 gq;F - mhpjhuk; - 1 gq;F

- ,e;Jg;G - 1 gq;F - rPufk; - 1 gq;F

- ngUq;fhak; - 1 gq;F - fLF Nuhfpdp - 1 gq;F

- ntq;fhuk; - 1 gq;F - ehgp - 1 gq;F

- ,urk; - 1 gq;F - Neh;thsk; - 12 gq;F

- kNdhrpiy - 1 gq;F - njd;dq; FLf;if fhp - 5gq;F

 - nty;yk; - 5 gq;F

 - NtypgUj;jp rhW - Njitahd msT

 - Njq;fha;ghy; - Njitahd msT

**nra;Kiw :**

1 – 12 tiuAs;s ruf;Ffis nghbj;J Neh;thsj;Jld; Nrh;j;J NtypgUj;jp rhw;wpy; 24 kzp Neuk; miuj;J 14> 15 ruf;Ffis Nrh;j;J Njq;fha; ghy; tpl;liuj;J Fok;G gjj;jpy; vLf;fTk;.

msT: 125 – 500 kp.fp.

mDghdk; - jfiu rhW

jPUk; Neha; - Fd;kk;> the;jp.

**[[39]](#footnote-40)jhsprhjp #uzk; :-**

jhsprgj;jphp - 1 gq;F jpg;gpypfl;il - 1 gq;F

,ytq;fg;gl;il - 1 gq;F fpuhk;G - 1 gq;F

Vyk; - 1 gq;F rhjpgj;jphp - 1 gq;F

Rf;F - 1 gq;F fw;flfrpq;fp - 1 gq;F

mjpkJuk; - 1 gq;F rhjpfha; - 1 gq;F

ngUq;fhak; - 1 gq;F jhd;wpfha; Njhy; - 1 gq;F

ney;ypKs;sp - 1 gq;F fLf;fha; Njhy; - 1 gq;F

Nfhl;lk; - 1 gq;F rlhkhQ;rpy; - 1 gq;F

jpg;gpyp - 1 gq;F kpsF - 1 gq;F

fUQ;rPufk; - 1 gq;F rpWehfG+ - 1 gq;F

rjFg;ig - 1 gq;F rz;gfnkhf;F - 1 gq;F

Xkk; - 1 gq;F tha;tplq;fk; - 1 gq;F

ew;rPufk; - 1 gq;F ,ytq;fg;gj;jphp - 1 gq;F

 nfhj;jky;yp tpj;J - 6 gq;F

 rh;f;fiu - 12 gq;F

**nra;Kiw :**

 Nkw;$wpa ruf;Ffis J}a;ik nra;J ntapypy; fha itj;J nghd; tWtyhf tWj;J ,bj;J rypj;J rh;f;fiu Nrh;j;J fye;J itf;fTk;.

**msT:**

 500 – 1000 kp.fpuhk; 2 Ntis

**Jiz kUe;J :**

 Njd;.

**jPUk; Neha;fs; :**

 **Fd;kk;>** moy;Fd;kk;> thA> tapw;Wtyp> ePh;RUf;F> fhkhiy> Ruk;> thapy; ePh; Ruj;jy;> nts;is> cs;twl;rp> jhfk;> nghUky;> fhjpiur;ry;> ,Uky;> if fhy; Filr;ry;> ntg;gk;> njhz;ilfl;L> ePh;fl;L> tapw;wpy; nfz;il> kaf;fk;> kUe;jPL> cs;SUf;fp><uy;twl;rp> vd;GUf;fp> ePh;fLg;G> neQ;nrhpg;G> if fhy; fLg;G> vd;GRuk;> ePh; vhpr;ry;> fghythA> tsp – 80> moy; - 40 Iak; - 96 nrhwprpuq;F ePf;Fk;.

**rPufk; NrUk; gpw kUe;Jfs; :-**

* ml;lhjp #uzk;

**- jQ;ir itj;jpauh[ rpe;jhkzp Kjy; ghfk; Pag.No.21 – 22.**

* ,Q;rp #uzk; (fz;lhj;jphp #uzk;)

**- rpj;j itj;jpa jpul;L. Pag. No. 216.**

* rPufr; #uzk;

**- Gypghzp itj;jpak; - 500 Pag.No. 339 – 341**

* jpuhl;rhjp #uzk;

**- Njud; fhpry; - 300 Pag.No. 85, 86**

* gQ;rjPghf;fpdp #uzk;

**- mfj;jpah; itj;jpa uj;jpd RUf;fk; Pag.No. 137 – 138.**

* kapypwfhjp #uzk;

**- Njiuah; ghly; jpul;L Pag.No. 26**

* jkuf FbePh;

**- rpj;j itj;jpa jpul;L Pag.No.293**

* gpj;j Ruf; FbePh;

**- rpj;j itj;jpa jpul;L Pag.No. 291**

* NfhNuhrdj;Jfs;

**- rpj;jitj;jpa jpul;L Pag.No.165**

* ,urfe;jp nkOF

**- Gypghzp itj;jpak; - 500 Pag.No. 248 – 255**

* ee;jp nkOF

**- rpj;j itj;jpa jpul;L Pag.No. 187 - 193.**

**[[40]](#footnote-41)Fd;kk;**

**NtWngah; :** Fy;kk;

**,ay;**

,e;Nehapy; cz;Zk; czT> nrhpahJ cz;l rpwpJ Neuj;jpw;nfy;yhk; tapw;Ws; jhq;f Kbahj vhpr;riyAk;> typiaAk;> cz;lhf;fp> cz;l czit the;jpnaor; nra;J> cl;nrd;w czitg; gadw;wjhf;Fk;. mjdsthf clypd; Cl;lKk; td;ikAk; ehSf;F ehs; nkyptile;J nfhz;Nl cly; Fd;Wk; : Fd;wpa clypdsthf kdKk; Fd;Wk; vd;Dk; ,t;tpay;GfisAila Nehapy;> xNu fhyj;jpy; cliyAk; kdijAk; Fd;wr; nra;J capiuAk; kha;f;fr; rpe;jpf;fr; nra;Ak; Neha;. Mjyhy;> ,jidf; Fd;knkdg; ngahpl;ldh; NghYk;.

 ,e;Neha; tiffs; xd;wpy;> tapw;Ws; fhw;W $b cz;iliag; Nghy; jpuz;LUz;L ,q;Fk; mq;Fkhf cyhtpj; Jd;GWj;Jk; ,ay;Gila Nehapidr; rpy E}Nyhh; Fy;knkdg; ngahpl;ldh;.

**Neha; Njhd;Wk; top :**

kpFjpAk; #Ls;s nghUl;fisAk;> fhw;iw tapw;Ws; epug;gf; $ba nghUl;fisAk;> kz;> ckp> fy;> J}R> ,itfs; fye;j nghUl;fisAk; cz;gjhYk;> RidePh;> Xl;lkw;w ePh;> Rz;zhk;G fye;j ePh; ,itfis mUe;JtjhYk;> Njq;fha;g;ghy; Mfpa nrhpf;ff;$lhg; nghUl;fis kpFjpAk; nfhs;tjhYk; mbf;fb rpdq;nfhs;sy;> gl;bdp ,Uj;jy;> kdr;rypg;G miljy;> Mfpatw;whYk; ,e;Neha; cz;lhFk;. <jd;wpAk;> top jtwp %r;ir milj;J Nahf epiyapy; ,Ug;Nghh;f;Fk; ,e;Neha; tUnkdf; $WthUKsh;.

 ‘nra;ahd Fd;kj;jpd; Njhw;wj; jd;idr;

 nrg;gplNt Jth;g;ghd nghrpg;gp dhYk;

 ka;ahd kq;ifAld; kUt yhYk;

 tifahFq; fpoq;Ftif aUe;j yhYk;

 ca;ahd kpsFtif Aiug;gp dhYk;

 cWgrpia mlf;fpLk; ke;jj; jhYk;

 ja;ahd rz;lhs Nfhgj; jhYk;

 rypg;ghYk; Fd;kk;te; jilAk; ghNu”

* **A+fp rpe;jhkzp**

**Nehapd; Kw;Fwpfs; :**

,e;Neha;f;F Kw;Fwpahfg; grpapd;ik> grpAz;lhapDk; cztpd; Nky; tpUg;gkpd;ik> tha; Fkl;ly;> mbf;fb Vg;gk; cz;lhjy;> tha; ePUwy;> cz;l czT vjpnuLj;jy;> tapW Guz;L Nehjy;> the;jpahjy;> Gspj;Njg;gk;> tapW ,iujy; Mfpaitfisj; Njhw;Wtpf;Fk;.

**Neha; vz; :**

‘nra;aNt vz;Fd;kr; nraiyf; Nfsha;

 nrayhd thAFd;k thj Fd;kk;

 va;aNt gpj;jFd;k nkhpFd;k khFk;

 Vyhd typFd;kQ; rj;jp Fd;kk;

 ijaNt rd;dpFd;kQ; Nrl;g Fd;kk;

 rhfkhq; Fd;kq;f nsl;L khFk;

 nfha;aNt ajDila Fzq;f nsy;yhk;

 Fwpg;gwpe; njht;nthd;wha;f; $W NthNk”

vd

A+fpKdp tFj;jgb

* thA Fd;kk;
* thjFd;kk;
* gpj;j Fd;kk;
* **vhpFd;kk;**
* typFd;kk;
* rj;jpFd;kk;
* rd;dp Fd;kk;
* Nrj;Jk Fd;kk;

vd vz; tifg;gLk;.

**vhp Fd;kk; :**

‘jpLf;Fkh nkhpFd;kr; nraiyf; Nfsha;

 rpWtapw;wp nyhpe;JNk Fly; FKUk;

 tLf;Fk; tha; ePh;Ruf;Fe; jiyt ypf;Fk;

 tapWg;gpf; fpWfpWj;Nj Vg;g khFk;

 ntbf;Fkaph; fhy;NjhWk; tpah;it ahFk;

 kpfg;nghUkp tapWfope; jpiur;r yhFk;

 vLf;FNk Flypisf;F kpuq;fh jd;ik

 vhpANk Alnyq;F kpUk yhNk”.

czT nfhz;l rpwpJ Neuj;jpw;nfy;yhk; tapw;wpy; jhq;f Kbahj vhpr;riy cz;lhf;fp tapw;iw KWf;fpaJ Nghd;w typiaj; jUk;. thapy; ePh; Ruj;jy;> jiytypj;jy;> Gspj;Njg;gk; cz;lhjy;> tapW}jp ,iue;J fopjy;> kaph;f;fhy; NjhWk; tpah;j;jy; vd;Dk; ,j;Jizj; Jd;gq;fis tpistpj;J cliy ,isf;fr; nra;Ak;.

**nghJ FwpFzq;fs; :**

,e;Neha; ngUk;ghd;ikAk;> ,Ugj;ije;J taJ Kjy; ehw;gj;ije;J taJila Mz; kf;fSf;F tUtjhFk;. MapDk; rpWghd;ik ngz;fSf;Fk; tUtJz;L> md;wpAk; Kjph;e;j tajpYk; fhZk;.

cly; td;ik kpFe;J> vt;TzitAk; nrhpg;gpf;Fq; jd;ik cs;sNghJ> jpBnudg; grpapd;ik> tha; Fkl;ly;> gpj;J gpj;jhf the;jpahjy;> cz;l czT nrhpahky; Vg;gkply;> Gspj;Njg;gk; vd;Dk; Fwpfs; cz;lhfp> ehl;nry;yr; nry;y Nehia tYf;fr; nra;Ak;. mg;NghJ cz;l czT nrhpahik> Gspj;Njg;gk;> tapW gSthf ,Ug;gJ Nghd;w Njhw;wk;. tapW Guz;L Nehjy;> Nghfg; Nghfj; jhq;f Kbahj typ Kjypad Vw;gLk;. mt;typiaj; jhq;f Kbahky; tpuyhy; njhz;iliaf; Fj;jp the;jp vLf;Fq;fhy;> mt;typ rw;W FiwAk;. rpyh;> rpyNghJ ,t;typiaj; jhq;f Kbahky; Guz;lOth;. ,t;typiaj; jhq;f KbahJ rpyh; jw;nfhiyAk; nra;J nfhs;tJz;L.

**Fw;w Kjypa NtWghLfs;:**

‘thj ge;jkyhJ Fd;kk; thuhJ’

 vdj; Njud; $wpajhy;> cztpd; NtWghl;lhYk; jfhj elj;ijahYk; tspf;Fw;wq; Nflile;J> mjw;Fj; Jizahf kw;w Fw;wq;fSk; $b> ,aw;ifj; njhopy; Ghpah> Nflile;j Fw;wq;fspd; msthf> fhy;fSs; fPo;Nehf;Fq;fhy; (mghd thA)> Nky;Nehf;Fq; fhy; (cjhdthA) vd;Dk; ,t;tpuz;bd; njhopiyAk; nfLj;J> cz;Zk; czitr; nrhpahjgb nra;J FUjpapd; td;ikiaAq; Fiwf;fpwJ. m∴jd;wpAk;> fPo;Nehf;Fq;fhy; vUitf; fl;Lg;gLj;jpAk; tapw;Wf; fhw;iwg; ngUf;fpAk; Nky;Nehf;Fq;fhy; the;jpia cz;lhf;fpAk; Jd;gk; nra;Ak; ,e;Neha;fisg; gpwg;gpf;Fk;.

**ehb :**

tsp ehbahdJ ,lj;jpy; my;yJ gf;fj;Nj elf;fpd; tsp Fd;kk; vd mwpaTk;.

,jid>

‘Guz;lhy; thj Fd;kj;ijg; gpwg;gpf;Fk;

thje;jhDk; jdpepw;fpy; typFd;kk; te;J NrUk;”

mt;thNw kw;iwa ehbfs;> jj;jkstpy; Neh;topr; nry;yhJ> ,lj;jpNyDk;> gf;fj;jpNyDk; gpwo;e;J elf;fpd;> me;je;j Fd;k Neha;fs; fhZk; vd E}y;fs; $Wk;.

 ‘rpwg;ghf gpj;jj;jpy; thjehb Nrhpy;....

 ..................................................... Fd;kk;

 ...................................................................

 ..................................................................

 thjKk; gpj;jq;$b td;ngyj;JlNd Nahbw;

 wPjW tapw;p Ds;Ns jpuz;lNjhh; ke;jk; gw;wp

 Ntjid nahpg;Gq; $b tpuz;bL nkhpjf; Fd;kk;”

tsp ehbAk;> moy; ehbAk; xd;W $bdhw; Nghy; ,t;tpuz;by; td;ikAq; $b> xNu td;ikahff; nfhz;L elg;gJ Nghy;fhzpd;> ke;jj;jhYz;lhd vhp Fd;knkdf; nfhs;sTk;.

‘thje;jh Djwp epw;fpy; typFd;kk; te;J NrUk;”

* **Fzthflk;**

tsp ehbahdJ ,aw;if eilapd;wpf; fapw;iwg; gpbj;Jf; nfhz;L mf;fapw;iw tpuyhy; gpbj;Jj; J}f;fptpbd;> mJ vt;thW cjWNkh mt;thW ehb cjwp elf;fpd;> typ Fd;k Nehapidf; Fwpf;Fk;.

**[[41]](#footnote-42)MODERN ASPECT OF THE DISEASE**

**PEPTIC ULCER:**

Peptic ulcer disease is a problem of the gastrointestinal tract characterized by mucosal damage (erosions equal to or greater than 0.5 cm) secondary to pepsin and gastric acid secretion. It usually occurs in the stomach and proximal duodenum; less commonly, it occurs in the lower esophagus, the distal duodenum, or the jejunum, as in unopposed hyper secretory states such as Zollinger-Ellison syndrome, in hiatus hernias(Cameron ulcers), or in ectopic gastric mucosa (e.g., in Meckel’s diverticulum).

**Causes of Peptic Ulcers**

**1. Hereditary factors:**

Close relatives of patients suffering from this problem are more liable to develop peptic ulcers than relatives of normal people.

2. **Occupation:**

It is seen that some occupations predispose to ulcers. Irregular food habits and mental stress and strain may be the underlying cause.

3. **Personality type :**

Highly nervous, emotional, ambitious and aggressive individuals are more prone to ulcers. Anxiety, worry and strain may cause hyper secretion of acid and increase motility of intestines.

4. **Irritants:**

Excessive consumption of strong tea, coffee, spices, alcohol, tobacco and drugs like steroids and analgesics may also cause ulcers. Smoking is very strongly related to the occurrence of ulcers.

5. **Eating Habits:**

Eating hurriedly, improper mastication of food and missing meals predispose to ulcer formation.

6. **Helicobacter pylori infection:**

A major pathogenic factor in gastric ulcers appears to be gastritis from H. pylori infection which impairs mucosal defense making it more susceptible toulceration.

7. **Endocrinal causes**:

Zollinger- Ellison’s syndrome-Hyperparathyroidism

**Signs and Symptoms:**

Small ulcers may not cause any symptoms. Some ulcers can cause serious bleeding.

* Pain- “Burning” Epigastric pain :

Abdominal pain is a common symptom, but it doesn't always occur. The pain can differ from person to person.

* Tenderness may present in right hypochondrium or epigastrium
* Feeling of fullness - unable to drink as much fluid
* Hunger and an empty feeling in the stomach, often 1 - 3 hours after a meal
* Mild nausea (vomiting may relieve this symptom)
* Upper abdominal pain that wakes you up at night
* Abdominal distension
* Regurgitation

**Other possible symptoms include:**

* Bloody or dark tarry stools
* Chest pain
* Fatigue
* Vomiting, possibly bloody
* Weight

**COMPLICATIONS OF PUD:**

* Gastrointestinal bleeding
* Perforation
* Penetration
* Gastric outlet obstruction
* Cancer of stomach

**Peptic Ulcer Disease in Different Populations:**

**Children :**

**Incidence:**

Rare; most ulcers occur between eight and 17 years of age;

Duodenal ulcer up to 30 times more common than gastric ulcer.

**Cause:**

Helicobacter pylori infection contributory

**Presentation:**

Patients may present with poorly localized abdominal pain.

**Complications:**

25 percent of bleeding duodenal ulcers may be silent; perforation and penetration rare.

**Older Patients:**

**Presentation:**

More likely to have painless ulcers; 50 percent present acutely(e.g., with perforation); may present with nonspecific complaints.

**Complications:**

Perforations associated with mortality three times higher than in younger patients; hemorrhagic complications more likely (20 percent from silent ulcers); more likely to have continued bleeding and to need transfusions and surgery.

**Patients with stress ulcers:**

**Cause:**

Breakdown of mucosal protectants as a result of stress leads to splanchnic hypo perfusion and ulcer;

**Risk Factors:**

Include mechanical ventilation longer than 48 hours burns,coagulopathy, moderate to severe trauma, head or spinal cord injury, liver failure, and organ transplantation.

**Presentation:**

Patients may be asymptomatic or may develop bleeding or perforation.

**Pregnant women:**

**Presentation:**

Ulcer symptoms milder and may improve during pregnancy; vomiting isnocturnal or postprandial and worse in third trimester.

**Complications:**

Infrequent; hypotension treated vigorously to minimize placentalHypo perfusion; risk of miscarriage, abruption, and preterm labor if complications ensure.

**INVESTIGATIONS:**

* Complete Blood Picture- Tc, Dc, ESR, and Hb.
* Routine Blood Examination- Blood sugar and urea
* Video Endoscopy
* To know the extent of the lesion
* To confirm the diagnosis
* To take biopsy
* EGD *–*esophagogastroduodenoscopy
* Ultrasound abdomen
* Barium Meal Study
* Duodenal ulcer - deformed duodenal cap is seen
* Gastric ulcer - appears as a Niche in the lesser curvature due to ulcer crater and as a Notch on the greater curvature due to the spasm of stomach.
* To detect gastric outlet obstruction.

**TEST FOR H.PYLORI**

* **Non- invasive test**
1. Serology
2. Urea breath test
3. Faecal antigen test
* **Invasive test**
1. Histology(Antral biopsy)
2. Rapid urease test
3. Microbiological culture

**LATERAL RESEARCH WORKS**

**1.[[42]](#footnote-43)Piper longum:**

* **Antiasthmatic activity:**

An extract of the fruits in milk reduced passive cutaneous anaphylaxis in rats and protected guinea pigs against antigen-induced bronchospasm.

* **Antidiabetic activity:**

The antihyperglycemic and antilipidperoxidative effects of ethanolic extract of Piper longumdried fruits in alloxaninduced diabetic rats were studied . The blood glucose level, carbohydrate metabolizing enzymes and the statusof lipid peroxidation and antioxidants were assayed using specific colorimetric methods. Oral administration of dried fruits has shown significant anti-hyperglycemic, antilipidperoxidative and antioxidant effects in diabetic ratscomparable to that of the standard reference drug glibenclamide.

* **Hypochoesterolaemic activity:**

Methyl piperine significantly inhibited the elevation of total serum cholesterol, and the total cholesterol to HDLcholesterol ratio, in rats fed with a high cholesterol diet.The unsaponificable fraction of the oil of P. longumalso

significantly decreased total serum cholesterol and hepatic cholesterol in hypercholesterolaemic mice.

* **Anti-inflammatory activity:**

The fruit decoction showed anti-inflammatory activity against carrageenin induced rat paw edema.

* Immunomodulatory activity
* Anti-cancer activity
* Anti-depressant activity
* Antiulcer activity
* Effect on Reproductive system
* Bioavailability enhancement
* Hepato-protective activity
* Insecticidal and acaricidal activity
* Antifungal activity
* Anti-amoebic activity
* Antimicrobial activity
* Effect on respiratory system
* Effect on cardiovascular system
* Antioxidant activity
* Analgesic activity

**2.[[43]](#footnote-44)Cuminum cyminum:**

* **Anti inflammatory activity:**

The fruits of C.cyminumLinn (Umbelliferae.) were investigated for antiinflammatory activity in carrageenan-induced rat paw oedema. The volatile oil showed dose–dependent inhibition of rat paw oedema, at dose of 0.1ml/kg, body wt i.p, when compared to control group. The activity was compared with that of the standard drug, diclofenac sodium.

* **Anti microbial activity:**

The susceptibilities of isolates to different antibiotics were tested using agar disk diffusion method. The rates of resistances were determined to antibiotics as follows: Gentamicin 96%, ceftazidime 100%, tobramycin 100%, kanamycin 100%, amikacin 73%, ceftizoxime 100%, piperacillin 94.2%, imipenem 50% and ciprofloxacin 71%. Cumin essential oils possessed antibacterial effect against all isolates of  P. aeruginosa, with MIC and MBC values in the range of 0.015 to 0. 25 ml mL-1. These results suggest the potential use of the cumin essential oil for the control of  P. aeruginosa  infections.

* **Anti oxidant activity:**

 The cumin oil was investigated for its antioxidant activities using four different tests then compared with BHT. Results showed that cumin oil exhibit a higher activity in each antioxidant system with a special attention for beta-carotene bleaching test (IC(50): 20 microg/ml) and reducing power (EC(50): 11 microg/ml). In the light of these findings, we suggested that C. cyminum essential oil may be considered as an interesting source of antibacterial, antifungal and antioxidants components used as potent agents in food preservation and for therapeutic or nutraceutical industries.

**3.[[44]](#footnote-45)Trachyspermum roxburghianum:**

* **Anti-diarrhoeal:**

Fruit -50 % alcoholic extract in broth culture at 125 mcg / ml . is active Vs E.histolytica  . Seeds exhibited activity against E.histolytica .

* **Anti-tumor:**

Fresh  leaf – Methanol extract at 200 mg / ml . showed strong activity Vs CVells Raji . EBVactivation induced by HPA ( 40 mg / ml . )

* **Anti-oxidant:**

oil produced marked diuretic effect in rabbits .

* **CNS:**

Fruit – 50 % alcoholic extract given I / P in mice at 500 mg / kg . showed neuroleptic activity  . Seeds induced hyperactivity of CNS.

* **Diuretic:**

oil produced marked diuretic effect in rabbits .

* **Cardiovascular:**

Fruits left after extraction of essential oil showed marked cardio tonic activity. Ether extract showed anti aggregating effect against platelet aggregation but arachidonic acid .probably due to effect on throboxane production Prostaglandin.

* **Hypotensive:**

Essential oil and crystalline substance loweredblood pressure in dogs and ratsdue to direct action on blood vessels .

* **Spasmolytic:**

Seeds – Ketonic compound showed antispasmodic actvity particularly on smooth muscle of rabbit gut.

**MATERIALS AND METHODS**

**DRUG SELECTION:**

The drug **“THESATHALI KALAPPU THOOL”** was taken for treating **‘Gunmam’** in this dissertation. This drug was prepared as per the specification given in the siddha text **THERIYAR VAGADAM** p.no-138.

**COLLECTION OF THE RAW DRUGS:**

Induppu was purchased from a raw drug dealer in Nagerkoil and the herbal drugs such as Arisi thippili,Asamada omam,Seeragam were purchased from a raw drug dealer in Tirunelveli town and were properly identified by the Medicinal botany and Gunapadam department staffs.

**PREPARATION OF THE TEST DRUG:**

**INGREDIENTS :**

* Indhuppu(Sodium Chloride impura)-1 part
* Narseeragam(Cuminum cyminum.Linn)-2 part
* Asamadha Omam(Trachyspermum roxburghianum)-3 part
* Arisi Thippili(Piper longum)-4 part

**PURIFICATION OF THE RAW DRUGS:**

* Narseeragam - Remove the impurities and allow to dry

it undersunlight for a day.

* Indhuppu - Immerse Indhuppu in kadi neer or

goat’s urine for3 nazhikai and dry it under sunlight.

* Asamadha Omam - Wash it with chunna neer(Lime stone

solution)anddry in shade.

* Arisi Thippili - Immerse Arisi thippili in Kodiveli leaf

juice (Plumbago indica)for one nazhikai and dry it under sunlight.

**PROCESS:**

The dried plants were ground by stone mortar and pestle into fine powder and filtered through a clean white cloth ( Vasthirakayam ).

**PURIFICATION OF THE TEST DRUG:**

A clay pot is taken and is filled with equal parts of milk and water, a white cotton cloth is tied tight around the mouth of the pot.

The prepared chooranam is placed over the cloth and then is covered with another clay pot. It is kept on the fire until the milk level decreases. The chooranam was taken out and it is dried in sunheat. Then the chooranam was stored in a clean dry air tight container, since the life time for chooranam is only three months it should be used within that period.

**ROUTE OF ADMINISTRATION :** Oral route

**THERAPEUTIC DOSE**

1 gm with luke warm water twice a day before taking food.

The prepared “Thesathali kalappu thool” was used for the treatment of Gunmam and analysed by the following methods.

* Bio chemical analysis
* Pharmacological analysis\
* Microbiological analysis
* Heavy metal analysis
* Clinical assessment

**PHYSICO-CHEMICAL STANDARDIZATION**

The standardization parameters of Thesathali kalappu thool was done at Sastra universityThanjavur.

The tests done are as follows.

**pH at 10% of aqueous solution:**

Five grams of Thesathali kalappu thool is weighed accurately and placed in clear 100 ml beaker. Then 50 ml of distilled water is added to it and dissolved well. Wait for 30 minutes and then apply in to pH meter at standard buffer solution of 4.0, 7.0 and 9.2

**Loss on drying@ 1050 C:**

Five gram of Thesathali kalappu thool is heated in a hot oven at 1000 C to constant weight. The percentage of loss of weight was calculated as 10.35 %.

**Determination of ash value:**

Weighed accurately 2 grams of Thesathali kalappu thool in tarred platinum or silica dish and incinerate at a temperature not exceeding 4500C until free from carbon, cooled, and weighed. Calculate the percentage of ash as 3.975 with reference to the air dried drug.

**Water soluble ash:**

To the gooch crucible containing to the total ash, added 25 ml of water and boiled for 5 minutes. Collected the insoluble matter in a sintered glass crucible or on ash less filter paper. Wash with hot water and ignite in a crucible for 15 minutes at a temperature not exceeding 450 0 C substract the weight of the insoluble matter from the weight of the ash the difference of the weight represents the water soluble ash. Calculate the percentage of water soluble ash as 305 with reference to the air dried drug.

**Alkalinity as CaCO3 in water soluble ash:**

Five grams of Thesathali Kalappu Thool converted to ash, boiled with water filtered. Filtered was tilt rated against 0.1 N of HCl using phenophthalin as an indicator.

Alkalinity of water soluble ash = X x of acid/ 0.1 x W

X –Titre value

W - Weight of material taken

Alkalinity is given as 1.14 % of 0.1 N of HCl equated to 1 gm.

**Acid in soluble ash;**

Boiled the ash 5 minutes with 25 ml of dilHCl. Collect the insoluble matter in gooch crucible on an ash less filter paper wash with hot water and ignite. Cooled in a dessicator and weighed. Calculated the percentage of acid insoluble ash as 1.96% with reference to the air dried drug.

**BIO–CHEMICAL ANALYSIS OF THESATHALI**

**KALAPPU THOOL.**

**PREPARATION OF THE EXTRACT**

5gms of the drug was weighed accurately and placed in a 250ml clean beaker. Then 50ml of distilled water is added and dissolved well. Then it is boiled well for about 10 minutes. It is cooled and filtered in a 100ml volumetric flask and then it is made up to 100ml with distilled water. This fluid is taken for analysis.

**QUALITATIVE ANALYSIS:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl.No.** | **Experiment** | **Observation** | **Inference** |
| 1 | **TEST FOR CALCIUM:** 2ml of the above prepared extract is taken in a clean test tube. To this add 2ml of 4% Ammonium oxalate solution.  | A white precipitate is formed | **Indicates the presence of Calcium** |
| 2 | **TEST FOR SULPHATE:**2ml of the extract is added to 5% Barium chloride solution.  | No white precipitate is formed | Absence of Sulphate |
| 3 | **TEST FOR CHLORIDE:**The extract is treated with silver nitrate solution.  | A white precipitate is formed | **Indicates the presence of Chloride** |
| 4 | **TEST FOR CARBONATE:** The substance is treated with concentrated HCL.  | No brisk effervessence is formed | Absence of Carbonate |
| 5 | **TEST FOR STARCH:** The extract is added with weak iodine solution.  | Blue colour develops | **Indicates the presence of Starch** |
| 6 | **TEST FOR FERRIC IRON:** The extract is acidified with Glacial acetic acid and potassium ferro cyanide**.**  | No blue colour is formed | Absence of Ferric iron. |
| 7 | **TEST FOR FERROUS IRON:** The extract is treated with concentrated nitric acid and ammonium thiocyanate solution. | Blood red colour is formed | **Indicates the presence of Ferrous iron** |
| 8 | **TEST FOR PHOSPHATE:** The extract is treated with Ammonium molybdate and concentrated nitric acid. | No Yellow precipitate is formed  | Absence of Phosphate. |
| 9 | **TEST FOR ALBUMIN:** The extract is treated with Esbach’s reagent. | No yellow precipitate is formed | Absence of Albumin. |
| 10. | **TEST FOR TANNIC ACID:** The extract is treated with ferric choloride. | No blue black precipitate is formed | Absence of Tannic acid |
| 11 | **TEST FOR UNSATURATION:** Potassium permanganate solution is added to the extract**.**  | It gets decolourised | **Indicates the presence of Unsaturated compound** |
| 12 | **TEST FOR THE REDUCING SUGAR:** 5ml of Benedict’s qualitative solution is taken in a test tube and allowed to boil for 2 mts and added 8-10 drops of the extract and again boil it for 2 mts.  | No colour change occurs | Absence of Reducing sugar |
| 13 | **TEST FOR AMINO ACIDS:** One or two drops of the extract is placed on a filterpaper anddried it well. After drying, 1% Ninhydrin is sprayed over the same and dried well.  | No Violet colour is formed | Absence of Amino acid. |
| 14 | **TEST FOR ZINC:**The extract is treated with potassium Ferrocyanide**.** | No white precipitate is formed | Absence of zinc |

**INFERENCE**

The given sample of **“THESATHALI KALAPPU THOOL”** indicates the presence of **Calcium, Chloride, Starch, Ferrous Iron,** and **UnsaturatedCompounds.**

**PHARMACOLOGICAL ANALYSIS**

**ANTI ULCER STUDY ON**

**“THESATHALI KALAPPU THOOL”**

**Preparation of the test drug:**

1gm of “**THESATHALI KALAPPU THOOL”** was mixed with 10ml of luke warm water and 2ml was given to each rat. This 2ml contains 200mg of **THESATHALI KALAPPU THOOL**

**Aim:**

To study the anti-ulcer activity of **THESATHALI KALAPPU THOOL** by pyloric ligation method.

**Procedure:**

6 Albino rats were fasted for about 48hours. After fasting, the abdomen of the rats were opened under the anasthetic ether and the pylorus of the stomach were ligated. At the time of ligation 2 rats were given 200mg of test drug in the stomach. 2 rats received 10mg of Ranitidine as standard drug in the stomach and other 2 rats were given 1 ml of water as control drug in the stomach. The incision were closed and the rats were allowed to recover. The animals were sacrificed 18 hours later. After the pyloric ligation, the stomach content of gastric secretion was collected. 1ml of gastric secretion pipetted out and the free HCL and total HCL levels of gastric secretion were analyzed by using 0.001 N sodium hydroxide solution using topffers reagent as indicator. The stomach was opened along the greater curvature and was put in formalin for fixation. After that, the stomach was mounted in moist cork board. The ulcers were examined and degree of ulceration was noted. The results of the above experiments are shown in.

**ANTI – ULCER EFFICACY OF**

**THESATHALI KALAPPU THOOL.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group** | **Dose/100gm body weight** | **Volume of gastric secretion** | **Free HCL in units** | **Total HCL in Units** | **Degree of ulceration** |
| Control(water) | 1 ml | 2.5 ml | 100 | 75 | 100% |
| Standard (Ranitidine) | 10 mg | 7 ml | 5 | 15 | 5% |
| Test drug (**THESATHALI****KALAPPU****THOOL**) | 200mg | 5ml | 10 | 20 | 15% |

**Inference:**

From the above tabulation and the degree of ulceration as shown in photographs, we came to know that the drug **THESATHALI KALAPPU THOOL**

has **good** anti-ulcer action.

**ANTI – MICROBIAL ACTIVITY**

**BY KIRBY BAUER METHOD**

**Aim:**

To determine the Antimicrobial activity of **“Thesathali kalappu thool”Components of Muller Hintan Agar Medium:**

Beef Extract : 300 gms /lit

Agar : 17 gms /lit

Starch : 1.5 gms / lit

Casein Hydroxylate : 17.5 gms/lit

Distilled water : 1000 ml.

PH : 7.6.

**Procedure:**

The method of antimicrobial activity study is **upsDiffusion** Method. Antibiotic discs are prepared with known concentration of antibiotic are placed on agar plates that has been inoculated with the known pathogenic Micro organism. The antibiotic diffuses through the agar producing an antibiotic concentration; gradient Antimicrobial susceptibility is proportional to the diameter of the inhibitory zone around the disc. If the Micro organism which grows upto the edge of the disc are resistant to the antimicrobial agent.

The recommended medium in this method is Muller Hinton Agar, its PH should be between 7.2 – 7.6 and should be poured to uniform thickness of 4mm in the petri plate (25ml).

**Methodology:**

Muller Hinton Agar plates are prepared and Pseudomonas, Staphylococcus, Candida, Escherichia coli, Streptococcus are inoculated separately.

The prepared discs of Thesathali kalappu thool are placed over the incubated plate using sterile forceps and incubated for 24 hours at 37ºcelcius.

The plates after 24hours incubation are observed for the zone of inhibition.

**Result:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.No** | **Test Drug** | **Organisms (Culture)** | **Susceptibility** | **Zone size (mm)** |
| 1. | **Thesathali kalappu thool** | Escherichia coli | **Sensitive** | 12 mm |
| 2. | Staphylococcus aureus | **Sensitive** | 14 mm |
| 3. | Streptococcus pneumoniae | **Sensitive** | 16 mm |
| 4. | Pseudomonas aeruginosa  | **Sensitive** | 14 mm |
| 5. | Candida albicans | Resistant | - |

**Report:**

 The Thesathali kalappu thool is **sensitive to Pseudomonas, E.Coli, Staphylococcus and Streptococcus organism**.

**TOXICOLOGICALANALYSIS**

**ACUTE TOXICITY STUDY**

**ANIMAL USED FOR THE STUDY:**

Wister albino rats bred in the animal house attached to the Post Graduate Pharmacology Department, Govt. Siddha Medical College, Palayamkottai were used.

**Sex:**

Animals of both sex were used.

**Weight:**

Animals weighing 100-120gms were selected.

**Food and water:**

The animals were maintained with standard laboratory pellet food and water ad-Libitum.

**Preparation of Animals:**

The animals were randomly selected and were marked with picric acid on for and kept in their cages for five days prior to dosing, to allow acclimatization to the laboratory conditions.

**Separation of Animals in Groups:**

10 rats were divided into 5 groups each consisting of 2 rats, one group is kept as control group by giving water alone.

**Dose Levels:**

 The following dose levels were arbitrarily fixed by persuming range of least toxic to high toxic doses.

 I Group - 40 mg/kg body weight of animal

 II Group - 80 mg/kg body weight of animal

 III Group - 160 mg/kg body weight of animal

 IV Group - 320 mg/kg body weight of animal

 V Group - 640 mg/kg body weight of animal

**Route of Administration:**

The drug was administered orally.

**Test Dose Preparation:**

The preparation was done in such a way as 1ml of the suspension contained 40mg of test drug and administered as given above in each group. The drug was administered once on the day of the experiment and there after other 24 hour parameters were used.

**Experimental set up:**

All the five groups were fasted for overnight prior to dosing. Following the period of fasting the animals were weighed and test substance was administered through “Rat oral intubation tube”.

After the administration of the test drug, food was withheld for 1 to 2hrs.

**OBSERVATION:**

The following parameters were noted.

**Central effects:**

**I. Stimulation**

* Hyper activity
* Piloerection
* Twitching
* Rigidity
* Irritability
* Jumping
* Colonic convulsion
* Tonic convulsion

**II. Depression**

* Ptosis
* Sedation
* Sleep
* Loss of traction
* Loss of Pinna reflex
* Ataxia
* Catatonia
* Loss of muscle tone
* Analgesia

**Autonomic Effect:**

* Straub’s tail flicking
* Laboured respiration
* Cyanosis
* Blanching
* Reddening
* Abnormal secretions

 At the end of 24 hrs, the number of animals dead in each group was noted and the approximate LD50 was determined. The animals were morphologically examined for any toxic symptoms.

**Result:**

 During the acute toxicity study none of the albino rat was found dead. During morphological examination of the rats no toxic symptoms were found. This proves the safety of the test drug.

**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. Infrared Spectroscopy gives information on the vibrational and rotational modes of motion of a molecule and hence an important technique for identification and characterisation of a substance.. The Infrared spectrum of an organic compound provides a unique fingerprint, which is readily distinguished from the absorption patterns of all other compounds; only optical isomers absorb in exactly the same way. Hence FTIR is an important technique for identification and characterization of a substance

Infrared spectrum is useful in identifying the functional groups like –O-H,C-H,-N-H,-NH2,, etc be analyzed.



Thesathali Kalappu Thool 30.10.12.pk

2.SP 3601 4000.0 400.0 3.1 100.0 4.0 %T 4 2.0

PT

REF 4000 100.0 2000 90.3 600

3404.0 4.4 2925.4 3.1 2855.5 8.9 2362.2 53.2 2343.7 57.5

1744.8 30.4 1643.0 26.4 1436.2 45.7 1244.7 51.6 1155.1 38.1

1023.9 37.5 702.2 85.5

END 12 PEAK(S) FOUND

Coment:

3404cm-1- due to hydroxyl group in kaempferol, 2925cm-1-2855cm-1 is due to due weak C-H group in Triacontane, 2362cm-1 and 2343cm-1 is due to H-bonded O-H in the drug, 1744cm-1- due to aldehyde C=O group in cuminol, 1643cm-1 due to keto group in piperine, 1436cm-1 is due to chain alkanes in triacontane, 1244cm-1 is due to C-O stretching, 1155cm-1- due to C-N stretching, 702cm-1- due to phenyl ring.

**SCANNING ELECTRON MICROSCOPE (SEM)**

The Scanning Electron Microscope (SEM) is a microscope that was electronsrather than light to form an image. There are many advantages to using the SEM insteadof a light microscope.

**Resolution :**

1.2 nm gold particle separation on a carbon substrate

**Magnification :**

From a min of 12 x to greater than 1, 00,000 X

A scanning electron microscope (SEM) is a type of electron microscope that produces images of a sample by scanning it with a focused beam of electrons. The electrons interact with electrons in the sample, producing various signals that can be detected and that contain information about the sample's surface topography and composition. The electron beam is generally scanned in a raster scan pattern, and the beam's position is combined with the detected signal to produce an image. SEM can achieve resolution better than 1 nanometer. Specimens can be observed in high vacuum, low vacuum and in environmental SEM specimens can be observed in wet condition*.*

**SEM picture of THESATHALI KALAPPU THOOL**



**SEM-Micro graph particle size average range is 45 nm**

**INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION**

**SPECTROMETRY (ICP-OES):**

Inductively Coupled Plasma (ICP) analytical techniques can quantitatively measure the elemental content of a material from the ppt to the wt% range. The only elements which cannot be measured by ICP methods are C, H, O, N and the halogens.

Solid samples are dissolved or digested in a liquid, usually an acidic aqueous solution.

The sample solution is then sprayed into the core of and inductively coupled argon plasma, which can reach temperatures of approximately 8000°C. At such high temperature, all analyte species are atomized, ionized and thermally excited, and they can then be detected and quantified with either an emission spectrometer (OES) or a mass spectrometer (MS).

|  |  |  |
| --- | --- | --- |
| **Sample ID** | **ELEMENT** | **CONCENTRATION** |
| **Thesathali Kalappu Thool** | As193.696 | BDL |
| As193.696 | 07.148 mg/L |
| Cd 226.502 | BDL |
| Cu 324.754 | 04.435 mg/L |
| Co 228.616 | 06.514 mg/L |
| Fe 238.204 | 14.781 mg/L |
| Hg253.652 | BDL |
| Na 589.592 | 521.158mg/L |
| Ni 58.693 | BDL |
| Pb 230.204 | BDL |
| Sb 206.833 | 14.741 mg/L |
| Si 251.611 | 423.125 mg/L |
|  | Zn 213.856 | 31.454 mg/L |
| BDL – Below Detection Limit |

 .

**CLINICAL ASSESSMENT**

The drug “**Thesathali kalappu thool”** is therapeutic agent specifically indicated for Gunmam.

A clinical trial of anti-ulcer activity of this drug on Gunmam was carried out in Government Siddha Medical college hospital, palayamkottai.

Patients of different age groups from both sexes were selected in outpatient and inpatient ward of Government Siddha Medical college hospital.

The patients were diagnosed as Gunmam according to the criteria derived by ancient siddhars.

The patients were also examined meticulously by modern investigation such as lab investigation and endoscopy for upper gastro intestinal tract.

The patients were selected as Gunmam in accordance with the following including and excluding criteria.

**DESIGN OF THE STUDY:**

 Open clinical trial, phase II B

**Inclusion criteria**

* Epigastric pain
* Nausea and vomiting
* Upper abdominal discomfort
* Water brash
* Heart burn
* Loss of appetite
* H/o Smoking & Chronic alcoholism
* Age 25-60 years
* Other relavent clinical feature

**Exclusion criteria**

* Cholecystitis
* Carcinoma of Esophagus
* Hiatus Hernia
* Ca Stomach
* Zollinger – Ellison Syndrome
* Chronic intestinal amoebiasis
* Recurrent appendicitis
* Cirrhosis of liver
* Jaundice
* Complication of peptic ulcer like
1. Bleeding
2. Perforation
3. Pyloric stenosis
* Intestinal obstruction

**Withdrawal criteria**

* Any other severe acute illness
* Drug intolerance
* Non cooperation of the patient.

**Termination criteria**

* Not reporting subsequently
* Voluntary termination

In the clinical study, 40 cases were selected from either sex. Out of these, 31 were out patients and 9 cases were inpatients.

In 40 cases, 21 cases were male and 19 cases were female.

**Line of treatment**

The patients were orally administered thesathali kalappu thool in a dose of 1 gm twice a day with luke warm water.

**Diet and advice**

* Advised to take easily digestible foods such as rice canjee, tender vegetables.
* Advised to avoid food which hard to digest such as coconut, grams, mutton, fishes and spicy.
* Advised to avoid fast food
* Advised to avoid fasting
* Advised to avoid smoking and alcohol
* Advised to avoid stress and anxiety (through yoga)

**Observation and result**

The result was assessed on the basis of the symptomatic relief obtained by the patients.

Out of 40 cases, 31 cases (77.5%) showed complete relief of symptoms and 7 cases (17.5%) showed moderate relief of symptoms, remaining 2 cases (5%) showed no relief of symptoms.

**Tabulation indicates the results**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Response** | **No. of persons** | **Percentage** |
| 1. | Good | 31 | 77.5 |
| 2. | Fair | 7 | 17.5 |
| 3. | Poor | 2 | 5 |
|  | Total | 40 | 100 |

**BIO STATISTICAL ANALYSIS**

 The clinical trials of the drug **Thesathali kalappu thool** are differentiated in terms of percentages. The effectiveness of the drug is assessed by Non parametric chi-square and Binomial test (Z proportion test) within the groups. The responses of the patients to the drug are analyzed in terms of proportions. The above statistical procedures are performed by the statistical package S.P.S.S (13.0) The P-values is set at 0.05 which is considered as statistically significant.

 **Description of the study subjects:**

The study subjects of **Thesathali kalappu thool** were described according to their sex and age.

**Table 1: Sex wise distribution of clinical trials.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Age group (Years)** | **Males** | **Females** | **Total** |
| **n** | **%** | **n** | **%** | **n** | **%** |
| 20-29 | 3 | 14.2 | 4 | 21.2 | **7** | 17.5 |
| 30-39 | 6 | 28.5 | 2 | 10.5 | 8 | 20 |
| 40-49 | 5 | 23.9 | 9 | 47.5 | 14 | 35 |
| 50-5960-69 | 43 | 19.114.3 | 31 | 15.65.2 | 74 | 17.510 |
| TOTAL | 21 | 100 | 19 | 100 | 40 | 100 |

The table -1 above shows that the male participation was 52.5% and the female is 47.5% and are normally distributed about the mean age. And most of the patients are above 35 years of age.

**Table – 2 Comparison of male and female according to their age.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sex** | **Age (Years)** | **‘t’** | **d.f** | **Significance****P** |
| **Mean** | **S.D** |
| Male | 48.37 | 9.148 | 1.220 | 38 | 0.230 |
| Female | 44.0 | 12.950 |

The study subjects are compared with reference to their age and sex in the above table – 2. The mean ages of male and female were 47.5±9.332 and 46.14± 9.891 years respectively. The difference of mean age between the sexes was not statistically significant (P>0.05). The subjects selected for the study are same regarding the age. Now it is very clear that the age and sex may not a confounding factor for the test drug.

**Assessment of the effectiveness of drug:**

The effectiveness of the drug was assessed by the relief of the patients from Epigastric pain, and heart burn.

**Table – 3 Assessment of the effectiveness of the drug**

|  |  |  |
| --- | --- | --- |
| **Days** | **Epigastric pain****Relieved** | **Heartburn Relieved** |
| **n** | **%** | **n** | **%** |
| First wk | 21 | 52.5 | 7 | 21.8 |
| Second wk | 12 | 30 | 15 | 46.8 |
| Third wk | 4 | 10 | 7 | 21.9 |
| Not relieved | 3 | 7.5 | 3 | 9.5 |
| Total | 40 | 100 | 32 | 100 |
| Median week | 1 | - | 2 | - |

The above table – 3 assess the effect of test medicine on epigastric pain and heartburns. The maximum 33 (82.5%) cases were relieved from epigastric pain by third week. The heartburn was relieved to 30 (75%) patients by third week of treatment. The median wks required to relieve from epigastric pain and heartburn were 1 weeks and 2weeks respectively.

The nonparametric chi-square test shows much difference in effectiveness between the weeks at P=0.01 and the binomial test is used to find the significance of the treatment effect, which shows that the test drug is effective in reducing the Epigastric pain within1 weeks and heart burns in 2 weeks, and it is statistically significant (p<0.05)

**Table – 4 Response of the drug to the GUNMAM.**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Response** | **No. of persons** | **Percentage** |
| 1. | Good | 31 | 77.5 |
| 2. | Fair | 7 | 17.5 |
| 3. | Poor | 2 | 5 |
|  | Total | 40 | 100 |

**Inference:**

The test drug was very effective in curing the disease (gunmam) and good response was shown within three weeks among the clinical trials.

**RESULTS AND DISCUSSION**

The drug **THESATHALI KALAPPU THOOL** was selected in this dissertation to study its therapeutic efficacy in the management of **Gunmam**.

According to Siddha literatures the basic abnormality in Gunmam is the derangement of Vadhahumour.

‘njhlh; thjge;jkyhJFd;kk; tuhJ”

jprjhsp fyg;G J}s; ngUk;ghd;ikAk; ntg;gtPhpaKilaJ. **ntg;gtPhpaKilait**tpiutpy; nrhpg;gpj;jy; nraiyr; nra;J**thjj;ijr; rkg;gLj;Jk;.**

 ‘rpwg;ghd**gpj;jj;jpy; thjehb**

 ………………………………...

 ciwg;ghfr; nrhpahikFd;kQ;#iy

 …………………………………………

 The vadhahumour is affected initially, then it is followed by **pithahumour**, reflecting the clinical signs and symptoms like epigastric pain, heart burn, nausea, anorexia, vomiting, water brash etc.,

**According to arusuvai theory,**

 ‘gpj;jkjpfhpg;gpd; NgRk; gupfhuk;

 Rj;jJtnuhLnrhy;ypdpg;Gr; rj;jhFk;

 ifg;Gr; RitNafUJtjd; tPW

 va;g;GilAnkd;Wiuj;jhhpq;F”.

 **- fz;Zrhkpak;**

 “thjNkypl;lhy; kJuk; GspAg;G”

**- rpj;j kUj;Jt Neha; ehly; Neha; Kjy; ehly; jpul;L gf; 22**

,dpg;G> Gspg;G> cg;G ,k;%d;W RitfSk; thjkpFjpiar; rkdg;gLj;Jk;

The taste of thesathali kalappu thool is predominantly sweet. It brings the increased vatha to normal.

All the patients were given THESATHALI KALAPPU THOOLwithluke warm water as vehicle(Anupanam) for the drug.

Sodium chloride preserves acid base balance in the body fluid, potassium absorption, supplies the essence of digestive stomach acid,and it regulates the gastric pH level.

 Bio chemical and pharmacological studies, botanical aspects, gunapadam aspects and method of preparation of the drug are described in this dissertation.

`Bio chemical analysis showed that the drug contained **Calcium,Chloride, Starch, Ferrous Iron,** and **UnsaturatedCompounds.**

Calcium is necessary for coagulation of blood. It is also necessary for the clotting and digestion of milk. Its presence is required for the formation of calcium paracaseinate.Calcium ions are necessary for the maintanance and regulation of acid base balance and water balance in the body.

Chloride regulate the acid base balance of the body fluid. It regulates the gastric secretion. Excessive chloride is excreted in urine.

Starch contains fibre.So it regulates bowel habits.

The presence of ferrous iron improves the haematological

level in most of the patients.

Pharmacological analysis shows that the drug has got **good Anti**

**ulcer activity.**

Microbiological analysis shows that the drug has got sensitivity to**Pseudomonas, E.Coli, Staphylococcus and Streptococcus organism**.

In chemical and elemental analysis done with sophisticated analytical instruments namely ICP-OES, it showed the presence of the following elements namely ,Na,Si,Zn,Fe,Sb,B,Co,Cu, in the descending manner in quantitative and qualitative basis.

 Sodium is responsible for regulating water balance pH and osmotic pressure.

Zinc is also used in Haemoglobin formation and it has Anti oxidant property.

Copper is necessary for the absorption of iron from the

gastrointestinal tract.

Cobalt are essential for the utilization of iron duringhemoglobin formation.

The presence of ferrous form ofIron is necessary for the formation of heme part of thehemoglobin.Ferrous form of iron is easily absorbed than Ferric form.

Physico chemical analysis, The analytical parameters like total Ash value, Acidinsoluble ash value, Loss on drying values are helping us to interpret the digestion andsolubility capacity of the crude extract. As per the result the tested sample contains goodpercentage of solubility as well as digestive capacity.

In FTIR,it showed the functional groups related to,hydroxyl,amides,phenols,alcohols,alkanes and carboxyl groups.

SEM picture shows Nano particle (Micro level) size of thesample is 45nm which is within the normal limit.The extremely small size of nanoparticles allows them topenetrate cells and interact with cellular molecules. Due to nanoparticle size a low dose of thedrug can cure the diseases.

In the clinical assessment of the 40 cases 77.5% showed good response 17.5% showed fair response and 5% showed poor response.

Bio statistical analysis shows that the drug was very effective in controllingGunmam.

The response of the drug was 77.5 % good and patients were completely relieved off their epigastric pain and heart burn within3 weeks.

The drug was effective.

The improvement was proved by the alleviation of signs andSymptoms present before the treatment.

During the clinical trial the patients showed no adverse reaction.

**SUMMARY**

The drug **Thesathalikalapputhool** was selected for the study to establish its Anti – Ulcer activity on **Gunmam**.

To collect informations about the drug, various text books, literatures and journals were referred. From then the author came to an idea about the drug and its efficacy on Gunmam.

The Bio – chemical analysis revealed that the drug contains **Calcium, Chloride,Starch,Ferrous iron and Unsaturated compound.**

Pharmacological experiments exerted that the drug has got**good**anti – ulcer activity.

Acute toxicity shows that this drug has **no toxiceffect.**

Biostatistical analysis showed that this drug has significant effect in treating Gunmam without any adverse effects.

From the clinical assessment it was inferred that the drug showed good response to 77.5 % of the cases, moderate response to 17.5% of the cases and poor response to 5% of total cases.

**CONCLUSION**

It is concluded that the drug **ThesathaliKalappuThool** possesses an effective anti - ulcer activity in **Gunmam** patients without causing any side effects.

**BIBLIOGRAPHY**

1. muq;fuhrd;. r. P.I.M. (gjpg;ghrphpah;) (1991) mfj;jpah; ml;ltiz thflk;. Kjw;gjpg;G. ruRtjp kfhy; E}yfk;> jQ;rhT+h;.
2. fz;Zr;rhkpg;gps;is. rp. (itj;jpa tpj;thd; kzp) (1991). “fz;Zr;rhkpak; vd;Dk; itj;jpa Nrfuk;”- gj;jhk; gjpg;G> e.,uj;jpd ehafh; mz;l; rd;;];> nfhz;bj; Njhg;G> nrd;id.
3. fz;Zr;rhkpg;gps;is. rp. (itj;jpa tpj;td; kzp) (1993)> “rpfpr;rhuj;ejPgk; ,uz;lhk; ghfkhfpa itj;jpa rpe;jhkzp:” -vl;lhk; gjpg;G> gp. ,uj;jpdehafh; mz;l; rd;];> nfhz;bj;Njhg;G> nrd;id.
4. fz;Zr;rhkpg;gps;is. rp. (itj;jpa tpj;thd; kzp) (1998). “rpj;j itj;jpa gjhh;j;j Fz tpsf;fk;”. B.,uj;jpd ehafh; mz;l; rd;]; nfhz;bj;Njhg;G> nrd;id.
5. Fg;Grhkp Kjypahh;.f.eh. (1987)> “rpj;j kUe;Jtk;”- ,uz;lhk; gjpg;G. jkpo;ehL rpj;j kUj;Jt thhpa ntspaPL> jkpo;ehL muR> nrd;id. thhpak;> nrd;id.
6. rz;KfNtY> k. (1987). ‘rpj;j kUj;Jt Neha; ehly; Neha; Kjdhly; jpul;L”. - Kjy; ghfk;. jkpo;ehL rpj;j kUj;Jt thhpa ntspaPL> jkpo;ehL muR> nrd;id.
7. ntq;fl;uh[d;. S. (gjpg;ghrphpah;) (2006) mfj;jpah; ,uz;lhapuk; (ghfk; I & ghfk; II) Mwhk; gjpg;G. Kd;dhs; MAh;Ntj gz;bjh;> jQ;rhT+h; kfhuh[h ruNgh[papd; ruRtjp kfhy; E}yfk;> jQ;rhT+h;.
8. A+fpkhKdpth; (mUspath;). “A+fp itj;jpa rpe;jhkzp”. (1998). Kjw;gjpg;G - ,e;jpa kUj;Jtk; - XkpNahgjpj;Jiw> nrd;id.
9. ‘mDgt itj;jpa Njt ufrpak;> n[.rPjhuhk; gpurhj;> 1991> nrd;id
10. Njiuah; thflk;> lhf;lh; u. jpahfuh[d;> godp
11. ruNge;jpuh; itj;jpa uj;ehtsp> uh[h ruNgh[p> ,uz;lhk; gjpg;G> 1965> jQ;rhT+h;
12. mfj;jpah; Fzthflk; - jhkiu E}yfk;> tlgodp> nrd;id.
13. itj;jparhurq;fPufk;> fe;jrhkp Kjypahh;> uj;dehaf;fh; md;l; ]d;];> nrd;id
14. Fzg;ghlk; %ypif tFg;G> f.eh.Fg;Grhkp Kjypahh;> Kjy; gjpg;G> 1951> nrd;id
15. ruNge;jpuh; itj;jpa uj;ehtsp> uh[h ruNgh[p> ,uz;lhk; gjpg;G> 1965> jQ;rhT+h;
16. Fzghlk; jhJ [Pt tFg;G kU.jpahfuh[d;> ,e;jpa kUj;Jtk; kw;Wk; N`hkpNahgjp Jiw nrd;id.
17. mfj;jpah; gs;S – 200> lhf;lh; u. jpahfuh[d;> godp
18. gpuhzu\hkph;j rpe;J – 2 tJ ghfk;
19. gQ;r fhtpa epfz;L> uhkr;re;jpud;> jhkiu E}yfk;
20. mDNghf itj;jpa etePjk; ghfk; 2>3 gh.Kfk;kJ mg;Jy;yh rhfpG> jhkiu E}yfk; 3rd Edition.
21. mgpjhd rpe;jkzp
22. Neha;fSf;F rpj;j ghpfhuk; ghfk; - 2> kU.rz;KfNty; jkpo;ehL rpj;j kUj;Jt thhpa ntspaPL 1987.
23. urj;ud rKr;rak;> uhkr;re;jpud;> jhkiu E}yfk;
24. Njiuah; akf ntz;gh Kjy;ghfk;> jpahfuh[d>; Kjy; gjpg;G 1997
25. nfhq;fzh; FWe;jpul;L> uhkr;re;jpud;> jhkiu E}yfk>; Kjy; gjpg;G
26. fz;Zrhkp guk;giu itj;jpak;> fz;Zrhkp gps;is> uj;jpd ehaf;fh; & rd;]; 2006
27. rpj;j kUj;Jtf; FUFyk; > nry;tuhrd; ,uhz;lk; gjpg;G
28. ;mf];jpah; itj;jpa fhtpak; 1500> ,uh. khjtd; jQ;rt+h; jkpo; gy;fiyf; fofk;
29. rpj;j itj;jpaj; jpul;L kU. Fg;Grhkp Kjypahh;> kU. cj;jkuhad;> ,e;jpakUj;Jtk; kw;Wk; N`hkpNahgjp Jiw> nrd;id 1998.
30. Indian Medicinal Plants, a compendium of 500 species, orient longman.
31. (Nadkarni’s Indian Materia medica Vol.I Page no. 1229)

The wealth of India – Vol x Page No. 283

1. Indian Medicinal Plants Part I. Kirtikar and Basu Page No. 419.
2. (Nad Karni’s Indian Materia Medica Vol.I Page No. 1229.)
3. Medicinal plants and folklores page no. 34.& By V.K.Singh & ABRAR M.Khan
4. vspa itj;jpa Kiwfs; - kUj;Jt Kidth; Nr.gpNukh

mDgt itj;jpa fsQ;rpak; Page No.75

A+fp Kdp itj;jpa fhtpak; page.no 29.

A+fp itj;jpa fhtpak;-Page 61

A+fp itj;jpa rpe;jhkzp Page no.77

gjpndd; rpj;jh; mUspnra;j Mj;kul;rhkph;jnkd;Dk; itj;jpa rhu rq;fpufk;.-Page 342.

Siddhu Indian fung 1449,10,119

1. Chem. Abstr :1978, 89, 103738P
2. Indian perfume : 1978, 22,164, chem.. Abstr. 1980, 92, 82217D

Egypt.J. Pharm. Sci. 1979,18, 245 chem. Abstr. 1981, 94, 273776

Gunapadam Thathu Seeva Vaguppu

1. rhk;grptk;gps;is mfuhjp – 27.

Nghfh; epfz;L g.vz; 7.

1. mfj;jpah; toiy gd;dpuz;L.
2. Njud; fhpry;

**WEBSITES**

* [www.pharmaic.global.info](http://www.pharmaic.global.info)
* [www.wikipedia.com](http://www.wikipedia.com)
* [www.globalreasearchonline.com](http://www.globalreasearchonline.com)
* [www.medica.com](http://www.medica.com)
* [www.evaidyaji.com](http://www.evaidyaji.com)
* [www.banglajol.info](http://www.banglajol.info)
* [www.iinpp.com](http://www.iinpp.com)
1. www.webmineral.com [↑](#footnote-ref-2)
2. The Wealth of India Page No. 136 [↑](#footnote-ref-3)
3. www.geology .net [↑](#footnote-ref-4)
4. www.webmineral.com [↑](#footnote-ref-5)
5. The Wealth of India, Raw materials Vol - IV pg. no. 184 [↑](#footnote-ref-6)
6. www.iinpp.com [↑](#footnote-ref-7)
7. Siddhu Indian fung 1449,10,119 [↑](#footnote-ref-8)
8. Chem. Abstr :1978, 89, 103738P [↑](#footnote-ref-9)
9. Indian perfume : 1978, 22,164, chem.. Abstr. 1980, 92, 82217D [↑](#footnote-ref-10)
10. Egypt.J. Pharm. Sci. 1979,18, 245 chem. Abstr. 1981, 94, 273776 [↑](#footnote-ref-11)
11. Chem. Abstr. 1987,106 , 38197 [↑](#footnote-ref-12)
12. Chopras ID of I. pg.81 [↑](#footnote-ref-13)
13. Rao et.al.J Ind Inst. Sci 1925 8a.182. [↑](#footnote-ref-14)
14. www.**banglajol**.info [↑](#footnote-ref-15)
15. www.**evaidyaji**.com [↑](#footnote-ref-16)
16. www.medica.com [↑](#footnote-ref-17)
17. www.wikipedia.com [↑](#footnote-ref-18)
18. www.pharmaic.global.info [↑](#footnote-ref-19)
19. www.globalreasearchonline.com [↑](#footnote-ref-20)
20. Gunapadam Thathu Seeva Vaguppu [↑](#footnote-ref-21)
21. rhk;grptk;gps;is mfuhjp – 27. [↑](#footnote-ref-22)
22. Nghfh; epfz;L g.vz; 7. [↑](#footnote-ref-23)
23. mfj;jpah; toiy gd;dpuz;L. [↑](#footnote-ref-24)
24. Njud; fhpry; [↑](#footnote-ref-25)
25. epfz;L. [↑](#footnote-ref-26)
26. gjhh;j;j Fz tpsf;fk; gf; - 107. [↑](#footnote-ref-27)
27. Fzghlk; jhJ rPt tFg;G gf; -369 [↑](#footnote-ref-28)
28. rpj;j itj;jpa gjhh;j;j Fz tpsf;fk; [↑](#footnote-ref-29)
29. Fzghl jhJ rPt tFg;G [↑](#footnote-ref-30)
30. mfj;jpah; itj;jpa fhtpak; - 1500-Pag. No. 387 – 389. [↑](#footnote-ref-31)
31. rpj;j itj;jpa jpul;L [↑](#footnote-ref-32)
32. Fzghlk; %ypif tFg;G [↑](#footnote-ref-33)
33. ruNge;jpuh; Fd;kNuhf rpfpr;ir Pag. No. 60 [↑](#footnote-ref-34)
34. ruNge;jpuh; Fd;kNuhf rpfpr;ir Pag. No. 60. [↑](#footnote-ref-35)
35. Fzghlk; %ypif tFg;G [↑](#footnote-ref-36)
36. Njiuah; Fzthflk; [↑](#footnote-ref-37)
37. mfj;jpah; Fzthflk; [↑](#footnote-ref-38)
38. rpj;j itj;jpa jpul;L Pag.No. 204 – 213. [↑](#footnote-ref-39)
39. rpj;j itj;jpa jpul;L [↑](#footnote-ref-40)
40. rpj;j kUj;Jtk; gf; 279 [↑](#footnote-ref-41)
41. Davidson Text book of medicine [↑](#footnote-ref-42)
42. nopr.niscair.res.in [↑](#footnote-ref-43)
43. www. scholarsresearchlibrary.com [↑](#footnote-ref-44)
44. www.findmeacure.com [↑](#footnote-ref-45)