“STANDARDIZATION OF PURIFICATION OF INDHUPPU (SODIUM CHLORIDE IMPURA) - A COMPARATIVE ANALYSIS

The Dissertation Submitted by

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DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled "**Standardization of Purification of Indhuppu (Sodium Chloride Impura) - A comparative analysis**" is a bonafide and genuine research work carried out by me under the guidance of **Prof. Dr.S.Sulfin nihar**, **M.D(s).,** Reader, Post Graduate Department of Nanju Maruthuvam, Govt. Siddha Medical College, Palayamkottai, and the dissertation has not formed the basis for the award of any Degree, Diploma, Fellowship or other similar title.

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- Gunapadam – Thathujeevavaguppu Part 2 &3 – Siddha by Dr.Thiyagarajan.RPage No. 370

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I hereby declared that this dissertation topic selected by me has not formed the basis for the award of any degree, diploma and fellowship and it's not previously done with the similar title or in any way duplicate of the work already done.

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ABBREVIATIONS

UPID	Unpurified Indhuppu
PID	Purified Indhuppu
No.	Number
Mg	Milligram
Kg	Kilogram
ML	Millilitre
%	Percentage
g%	Gram percentage
G	Gram
dil.	Diluted
Con.	Concentrated
FTIR	Fourier Transform – Infra Red Spectroscopy
SEM	Scanning Electron Microscopy
ICP-OES	Inductively Coupled Plasma Optical Emission-Spectrometry
XRD	X-ray Diffraction
BDL	Below Detection Limit

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1. INTRODUCTION

Siddha system of medicine is an excellent ancient medical system mainly practiced in southern part of India. The word “Siddha” comes from the word “Siddhi” which means an object to “attained” or “perfection” or “heavenly bliss”. Siddhi generally refers to "Astama Siddhi” i.e., the Eight great supernatural powers. Those who attained or achieved the above said powers are known as Siddhars. Siddha system of medicine was developed by those supernatural powers.

Siddha Medicine is the first system to emphasis health as the perfect state of physical, mental, social, moral and spiritual component of human beings. In ancient days, Siddhars lead a simple way of life according to the laws of nature and beyond the narrow divisions of current life. In those days, siddhars handled the plants and herbs for long life with better health and lived more than thousand years of age.

Siddha system of medicine not only deals with the diseases and their treatment but also to promote human health through principles of “Unave Marunthu, Marunthae Unavu”. The system has its own principles to follow. The system is mainly based on “96 thathuvas” which consists of Panchboothas, Mukkuttram etc., In this system of medicine, 32 types of internal and external medicine are available.

“The drug which cures physical illness is called Medicine

The drug which cures mental illness is called Medicine

The drug which prevents illness is called Medicine

The drug which gives longevity is called Medicine”

– Thirumoolar

“Siddha Medicine or Siddham is not only a medical system for curing the physical body, but also the way of life formulated by Siddhars through their vision and realisation for getting peace for the mind, health for the physical body and purity for the Soul. Siddhars through their Great powers like Attama siddhikal (8 super-natural powers) and through immense prayers realised the fact that Soul which is ultimately a part of the Supreme is like a drop of water from sea”

In Siddha system, medicines are mainly prepared from three origins such as plants, minerals, and animals.

There is a vast number of Herbal, Herbo-Mineral, Metals and Arsenic compound preparations mentioned in Siddha literatures.

All the karasaram compounds are processed,

To make it absolutely non – toxic.

To make it easily absorbable.

To make it long standing therapeutic effects.

To make it easily for consumption.

The properties of finished products are different from those of plants, raw metals and minerals.

In Siddha System of medicine, metals and minerals are handled large in numbers with proper purification process. Siddhar Bhogar classified the metals and minerals into four groups in his book "Bhogar 7000 & Bhogar karasara thurai" They are,

1. Metals (Ulogam)-11
2. Toxins (Pasanam)-64
3. Minerals (Karasaram)-25
4. Hydrochemicals (Uparasam)-120

As karasarams are taken out from earth it will contain some impurities and are toxic in nature.in siddha system, indhuppu (sodium chloride impura) a type of karasaram is used in many preparation in its purified form

In karasaram, Indhuppu (Rock salt) is a salt compound chemically mimics to Nacl which is in halite form. The Chemical name indhuppu is Sodium chloride impure and literally in tamil synonymic as Sainthavam, Sinthooram

Indhuppu is obtained by boiling sea water in a new earthern pot till the water contents are completely evaporated. The salt 3.800kg is placed in a thick bottomed earthen pot and heated with big fire over a sugarcane press hearth, when the salt melts the above salt powders are sprinkled in it and kindled well. After the pot cools the product hardens. This product is called as rocksalt. If it is split it shines like diamond.

It has got laxative property. Its laxative property is superior than "cream of tartar". This is given in doses of 4.2 gm or 8.4 gm as a laxative. When given in doses of 16.8 gm or 21 gm, it produces watery diarrhoea. It has also got flatulent, diuretic and appetite stimulant properties.

Rock salt cures eight types of gastric ulcer (gunmam), indigestion, blood diseases, kaphapitha, kapathikkam, nerves syphilis, derangement of three humours, constipation, poisonous bite, spermatorrhoea, head, eye, tongue, tooth, skin, trunk,

vagina diseases, delirium, cataract, polydypsia, asthma (dysponea), haemorrhoids, abscess, rat bite, scorpion bite, vatha pain, throbbing pain etc.,

It is one of the ingredient in medicines like Ayakaantha chendhooram, Uloga mandoora chendhooram, Sanga diravagam, Indhuppu chooranam, Thenkai chaaram.

In this materialistic world each and every object has two characters i.e. Good and bad which are lying invariably among them. So, whenever we go for a medicine preparation, we should remove the toxins and unwanted substances from that.

Each and every single drug or compound preparations has its own toxic effect. There is a time hour need to analyze each drug and their toxic effect, in order to provide safest and a very effective treatment to the people.

Suththi (Purification) of the raw drug is a process aimed at both purifications as well as the efficacy of the raw drug. It usually involves processes like cleaning, frying, soaking and grinding with herbal juices until impurities are removed. No medicinal preparations were done without proper Suththi process. This process helps raw material/crude drugs (Moolaporutkal) to lose their undesirable or toxic effect and thereby aid better dosage efficacy.

Siddha system highlighted the proper purification of each raw drug to have effective medicinal preparations.

Purification depicts the uniqueness of Siddha medicine. The word “suththi” means “getting rid of impurities” which are generally found mixed with raw parts of plants, metals, minerals, arsenic compounds and animal products. In order to neutralize the toxins and impurities Siddhars used “Chathru and Mithru” process.

கன்மத்தால் வந்த பிணி நீக்க வேண்டி
கருவறிந்து பண்டிதரே கழரக்கேளிர்
வன்மமெள்ள சரக்குவகை குணங்களாய்ந்து
வளமான சுத்தி செய்து வழங்கினோர்க்கு
தன்மவிளி வேருண்டோ தரணிமீது
தாக்கான சொர்க்கபதி தாள்கிட்டாதோ
உன்மதமாய் முறைப்பிசகி யுதவும்பேர்க்கு
ஒருகாலும் மோட்சமில்லை யூணிப்பாரே.

As said in this text, Siddhars has clearly emphasized the importance of purification.

"All things are poisons and nothing is without poison

Solely the dose determines that a thing is not a poison"- Paracelsus.

From the above, it is clear that every substance is unstable for health, if it is not purified and free from its toxic properties.

SIDDHA TOXICOLOGY:

The Siddha literature insists that for any medicine preparation, the evil effects of the following are to be noted and weeded out primarily. It starts from purification.

1. PORUTPARVAI - PHYSICAL EXAMINATION:

Assessing the worthiness of substance:

The substance should be ascertained whether it is a real one.

Whether it has been prepared a fresh to be beneficial for the intended time and season.

2. PORUT THOOIMAI - CHEMICAL PURIFICATION:

Assessing the purity of the substance:

Whether it has been properly purified?

Whether the properly purified substance is qualified for consumption?

Whether the dosage is suitable for consumption?

Whether the antagonist of substance is avoided?

Even if it is a poisonous substance whether its beneficial effects have been retained?

It is our primary responsibility to protect our health by curing the disorders caused by the toxins of the substances as well as to prevent the occurrence of toxicity.

In Siddha system, purification process was very much concentrated for the preparation of medicine. Our system of purification process has its unique nature as it removes the toxic materials without interfering the therapeutic efficacy. Siddhars explained different purification methods in their literatures for different compounds of herbals, metals, minerals and animal origin. The following are the various processes of purifications.

Various purification processes are

Simple washing with water

Grinding with various juices

Heat treatment with liquids

Soaking in cow's urine

Boiling with cow's milk/goat's milk

Frying with cow's ghee

Thulayanthiram

Removing the outer skin

Removing the inner nuts

Removing the cotyledons

By Pudam process.

In addition to these, there are several other processes and combination of any two or more above mentioned processes were described in our literatures.

OBJECTIVE OF SUTHTHI:

To enhance the safety and potency of a drug

To produce synergistic effect with other metal and mineral preparations as formulation.

Elimination of physical and chemical impurities which are not desired

Elimination or reduction of toxicity of the drug

To make material into suitable form for further processing

Ensure unique and favorable Physico-chemical changes.

To enhance the brittleness

2. AIM AND OBJECTIVES

2.1 AIM:

To standardize the purification process of Indhuppu (sodium chloride impura).

2.2 OBJECTIVES:

To discover the importance of purification process.

To analyze the changes during purification process by chemical analysis.

To analyze the changes during purification process by Physico - chemical analysis.

To evaluate the importance of purification by comparing the unpurified and purified drug by Qualitative and Quantitative analysis.

3. REVIEW OF LITERATURE

3.1 SIDDHA ASPECTS

INDHUPPU

The salts are twenty five in number as evidenced by the text Bogar 2000 and they are classified into…

Natural salts

Synthetic salts

NATURAL SALT:

Natural salts are ten in number as evidenced by the text Bogar's 2000 as follows

1. Soodan - camphor
2. Ceenam – Sindh salt
3. Pooneeru – a efflorescence of fuller's earth
4. Valaiyaluppu – salt extracted from fuller's earth
5. Pachai karpooram – crude camphor
6. Kalluppu – crystalline salt
7. Kariyuppu – sodium chloride
8. Ponnambar – droppings of birds
9. Meenambar – solid opaque, ash coloured substance found in sea
10. Kadal murai – cuttle-fish bone

"..... .....பிறக்கின்ற காரசாரம்
பருதியே பத்துவகைப் பண்பைக் கேளு
பாங்கான சூடனொடு சீனந் தானும்
வருதியே பூநீறு வளைய லுப்பு
மணமாகும் பச்சைக்கர்ப்பூர மாகும்
புருதியே கல்லுப்புக் கறியுப்போடு
பொன்னம்பர் மீனம்பர் நுரையு மாமே"

- போகர் ஏழாயிரம்

SYNTHETIC SALT:

Synthetic salts are 15 in number:

1. Indhuppu – Sindh salt
2. Pottiluppu – nitrate of potash
3. Venkaram – borax
4. Thurusu – copper sulphate
5. Evacharam – impure potassium carbonate
6. Navacharam - ammonium chloride
7. Saththi charam – salt containing salt petre, salt ammonia and common salt
8. Egamba charam - a kind of mineral
9. Kenthi uppu – impure chloride of sodium – black salt – salt obtained from sulphur mixed with other
   Ingredients
10. Thailaa lavanam – salt extracted from sesame plant – a powerful salt
11. Kenthi lavanam – sulphur salt
12. Kaaichu lavanam – nitre – glass gale – fel vetri
13. Pida lavanam – a kind of mineral salt impure sodium chloride
14. Kasi lavanam – mixture of the three salts. Fullers earth, nitre and salt ammoniac.

"அறைந்திட்டேன் காரசா ரத்தின் வைப்பை
அடங்கலாய் மூவஞ்சு தன்னைத் தானும்
தக்கவே சாரகா ரத்தின் வைப்புச்
சமுசயங்க ளில்லாமல் மூவைந் தாகும்"

- போகர் இரண்டாயிரம்

Though the salts mentioned in s.nos.9 and 11 meant the same they might have been differentiating according to synthetic preparation. It is worth to mention here that there are some slight variation in the nomenclatures of the above salts in the text " BOGAR'S KARASARA THURAI ". It is also said that the author of Bogar 7000 and the author of karasara thurai are different.

“காணுகின்ற வாதத்திற் காதி யான
காரமடா சமாதிநிலை வழலைப் பாம்பு
தோணுகின்ற பூவழலை சீனக் காரம்
துடியான சவுக்காரம் பூரஞ் சூடன்
வேணுமென்ற அமுரியுப்பு கல்லுப் போடு
வெடியுப்புப் பொடித்துப்பு வளைய லுப்பு
பூணுகின்ற சவுட்டுப்புப் பொன்வெங்காரம்
பொன்னம்பர் மீனம்பர் பொருந்திக் கேளே”

“பொருந்துகின்ற நவச்சாரம் சத்திச் சாரம்
புகழான எவட்சாரம் காசிச் சாரம்
திருந்தியதோ ரேகம்பச் சாரத் தோடு
திலாலவணம் பிடாலவணம் தீர்க்க மாக
நருந்தியதோர் கந்தகமாம் லவணஞ் சிந்து
லவணமுட னாகாசத் தீயின் கம்பி
கருந்தொகையி லிவையிருபத் தைந்தும் வாத
காரசா ரத்துறையாய்க் கண்ட வாறே”

PANCHA BOOTHA SALTS:

(FIVE ELEMENTS SALTS)

The pancha bhootha salts are :

1. Earth (nilam) – kalluppu – crystalline salt
2. Water (neer) – sathicharam – an acid salt
3. Fire (thee) – vediyuppu – potassium nitrate
4. Air (kaatru) – seenam – alum
5. Sky (vinn) – pooneeru – fuller’s earth.

“பலித்திட்ட சவுக்காரம் பஞ்ச பூதப்
பயனாகப் பண்ணிய பார்த்த நேர்மை
பெலிதிட்ட பிருதிவி மண்கல்லுப் பாச்சு
பேரான வப்புசலஞ் சத்திச் சாரம்
தெவித்திட்ட தேறுவது வெடியுப் பாமே
செயநீர்தான் தீயென்றே செப்ப லாகும்
வலித்திட்ட வாயுவது காற்றச் சீன
மகத்தான வாகாசம் பூநீ றாச்சே”

This is Bogar's school of thought. On the other hand, in the text "AGATHIYAR VAZHALAI PANNIRANDU" the pancha bootha salts are mentioned in a different way as shown below:

1. Earth (nilam) – kambiyuppu – nitre
2. Water (neer) – paarai uppu – rock salt
3. Fire (thee) – kalluppu – crystalline salt
4. Air (kaatru) – indhuppu – Sindh salt
5. Sky (vinn) – vazhalai uppu

"காணப்பா கம்பியுப்பு மண்ண தாகும்
காரணமாம் பாறையுப்பு கருவாந் தண்ணீர்
பூணப்பா கல்லுப்பு தேயு வாகும்
புகழான இந்துப்பு வாயு வாகும்
ஊணப்பா ஆகாயம் வழலை யுப்பு
உத்தமனே! இதையுமறிந் தொன்றாய்ச் சேரு
தூணப்பா துரும்பாகுந் துரும்புந் தூணாம்
துரியமனோன் மணித்தாயும் வாவென் பாளே"

Further in Bogar salts section of kaarasarathurai, two salts are mentioned for each element as shown below:

1. Earth (nilam) – kalluppu – crystalline salt
   Indhuppu – Sindh salt
2. Water (neer) – ammonium chloride (navacharam), an acid salt (sathi charam)
3. Fire (thee) – vediyuppu – potassium nitrate , savuttuppu
4. Air (kattru) – vennkaram (borax) – thurusu – blue vitrol – (copper sulphate)
5. Sky (vinn) – camphor, pooneeru

"பேணிப்பார் பஞ்சபூ தக்கா ரத்தைப்
பேசாமல் மறைத்துவைத் தார்சித்த ரெல்லாம்
தோணிப்பா ரிந்தநூல் தன்னிற் சொல்வேன்
துடியான காரசா ரத்தின் பூதம்
ஊணிப்பார் கல்லுப்பு மிந்தி னுப்பும்
என் மகனே! பிருதிவியென் றியம்ப லாகும்
ஆணிப்பார் நவச்சாரம் சத்திச் சாரம்
அப்புவென்று சொல்வார்க ளறிந்து கொள்ளே"

In addition to all these the text “karisal” mention the following :

1. Earth (nilam) – prithivi – vediyuppu – potassium nitrate
2. Water (neer) – appu – kariyupu – sodium chloride
3. Fire (thee) – theyu – kalluppu – crystalline salt
4. Air (kattru) – vayu – indhuppu – Sindh salt
5. Sky (vinn) – aagayam – pooneeru

“உப்பினலம் பூத முறைக்கநன் நாய்க்கேளாய்
தப்பில் வெடிகரிகல் தானிந்தா - மப்பூநீறு
ஐந்தாம் பிருதிவியப் பாய்தேயு வாயுவின்
சொந்தமுடன் கண்டறிந்து சொல்”

Therefore there is no similarity between the elemental salts and the other grasped five salts. As such the elemental salts and the five grouped salts are different.

PANCHA UPPU:

1. Kariyuppu
2. Indhuppu
3. Valaiyaluppu
4. Kalluppu
5. Vediupppu

“வள்ளிய கரியுப் பிந்து வளையுப்புக் கல்லுப்போடு
தெள்ளிய வெடியுப் பைந்தே”

But we should use the five elemental method for alchemy according to the Bogar’s 7000.

“வாதத்தில் வெடியுப்பும் பஞ்ச பூதம்
வண்மையாஞ் சவுக்காரம் பஞ்ச பூதம்
தீதற்ற செயநீரும் பஞ்ச பூதஞ்
செயமான குருவுக்கும் பஞ்ச பூதங்
கோதற்ற சடத்துக்கும் பஞ்ச பூதங்
குறியாகப் பழுப்பதற்கும் பஞ்ச பூதம்
காதத்த களங்குக்கும் பஞ்ச பூதங்
காரியமாம் வாதமெல்லா மஞ்சு தானே”

The ancient physician Therar (also known as Theraiyar) considered the salts derived from some plants and some toxic materials derived from some living oraganisms as “karasara”. He also considered “kara” as the manifestation of god “siva” and “sara” as the manifestation of goddess “sakthi”.

“காரசா ரத்தருமை காண்பவர்க் கேதெரியும்
பேரெறும்பு சிற்றெறும்பு பின்கிருமி – சேர்பிரண்டைச்
சாற்றிலு நாபிச் சரக்காலு மானவுப்பு
கூற்றான கார மாகும்”

“தேள்பூவை பாம்புதும்பை செவ்வியகாட் டாமணக்கு
வாளான சாம்பிராணி மற்றிதெலா - மாளவரு
பூநீறே சாரமிது போதுஞ் சரக்குவகைக்
காநீறு போலுரிமை யாம்”

-தேரர் வெண்பா

இந்துப்பு சேரும் மருந்துகள்:

சந்திரப்பிரபாவ செந்தூரம்

அளவு : குன்றி எடை

துணை மருந்து : பனைவெல்லம், வேப்பம் கொழுந்தை அரைத்த விழுது, சுக்கை அரைத்த விழுது.

தீரும் நோய் : அக்கிரம சூதகம், சூதகவாயு, சூதக பந்தம், சூதகச்சூலை, பிரசவ காலத்தில் உண்டாகும் அழுக்கு சிக்கல் அதனால் உண்டாகும் சுரம் முதலியவைகள் ஆகிய கருப்பையைப் பற்றிய அநேக நோய்கள் தீரும்.

கண்டரச பற்பம்

அளவு : 1-2 அரிசி எடை.

துணை மருந்து : வெல்லம், சுக்கு தூள், வெண்ணெய், நெய்

தீரும் நோய் : சூசிகாநோய், காமாலை நோய், பாண்டு நோய், மகோதரம், மூலவாயு, அட்ட குன்மம், அண்டவாயு, கிரந்தி நோய்கள், சன்னி நோய்கள் நீங்கும்.

அஷ்ட கற்பூரம்

அளவு : 1-2 குன்றி எடை.

துணை மருந்து : பனைவெல்லம், வெண்ணெய்.

தீரும் நோய் : வயிற்று வலி, குன்ம நோய், சுரம், சன்னி, இசிவு, வலிப்பு, சூலை, புண், புரை முதலிய நோய்கள் நீங்கும்.

தீபாக்கினி ரசாயனம்

அளவு : 1/2 - 1 வராகன் எடை.

தீரும் நோய் : முந்நூற்றறுபது அக்கினிமந்த நோய்களும் தீரும். எட்டு வகை குன்ம நோய்களும் தீரும். வயிறு உப்புசம், வயிற்றுப் பொருமல், வயிற்று இரைச்சல், ஏப்பம் முதலிய இரைப்பை நோய்கள் நீங்கும்.

குன்மச் சூரணம்

அளவு : 1 - 3 வராகன் எடை.

துணை மருந்து : நீராகாரம், மோர், சோம்பு தீநீர், சுக்கு குடிநீர், இஞ்சி குடிநீர், சர்க்கரை, தேன், நெய் முதலியவைகள்.

தீரும் நோய் : எரி குன்மம், வலி குன்மம், வாயு குன்மம் முதலிய எட்டு குன்ம நோய்களும் தீரும். இன்னும் பீலிகை, மகோதரம், வெப்புப்பாவை நோய், பெருவயிறு முதலிய நோய்கள் நீங்கும்.

நாகரசிங்காதிச் சூரணம்

அளவு : 1/2 - 1 வராகன் எடை.

துணை மருந்து : தேன், நெய், வெண்ணெய், தக்க இளக வகைகள் முதலியவைகள்.

தீரும் நோய் : உளை மாந்தை, இருமல், சுவாச காசம் முதலிய நோய்கள் தீரும்.

சீரகாதி இளகம்

அளவு : 1 1/2 - 2 வராகன் எடை.

தீரும் நோய் : அக்கினி மந்தம், சுவையின்மை, பெருங்கழிச்சல், பாண்டு, மஞ்சள் நோய், சோபை, எலும்பு சுரம், எலும்புருக்கி நோய், பீநிச காசம், கருப்பை அனல், எருவாய் எரிவு முதலிய நோய்கள் தீரும்.

உள்ளி நெய்

அளவு : 1 – 1 1/2 வராகன் எடை.

துணை மருந்து : சர்க்கரை அல்லது தேன்.

தீரும் நோய் : எல்லா வகை வாயுக்கள், வாதம், பித்தம், கபம் ஆகியவை சம்மந்தமான நோய்கள் முதலிய பல நோய்கள் தீரும்.

பெருங்காய இளகம்

அளவு : 1/2 - 1 வராகன் எடை.

துணை மருந்து : நெய், தேன்.

தீரும் நோய் : அனல் மந்தம், தொடர் கழிச்சல், சோறு செரியாமை, செரியாமை வயிற்று வலி முதலிய இரைப்பை சம்மந்தமான நோய்கள் தீரும்.

ஊர்க்குருவி இளகம்

அளவு : 1 முதல் 1 1/2 குன்றிமணி எடை

தீரும்நோய் : சூலைக்கட்டு, திமிர்வாதம், கிரந்திசேட்டை, கரட்டுச் சூலை, முடக்குவாதம், சிறுநஞ்சு, மேகவாயு முதலிய நோய்கள் தீரும்.

விடாமிர்த மை

அளவு : 1/2 - 3 குன்றிமணி எடை.

துணைமருந்து : பனைவெல்லம், வாழைப்பழம், வெண்ணெய், சுக்கை அரைத்த விழுது முதலியவைகளாம்.

தீரும் நோய் : எண்பது வகை வாதம், நாற்பது வகை பித்தம், இருபது வகை ஐயம் ஆகிய நோய்களும், பலவகை சுரங்களும், பதின் மூன்று வகை சன்னியும், எழுவகை தோடங்களும், எண்வகைக் குன்மங்களும், பதினெட்டு சூலைகளும், உதிர சம்பந்தமான எல்லா வியாதிகளும் தீரும். நல்ல பாம்பு நஞ்சு, பதினெட்டு வகை எலிக்கடி நஞ்சுகள், பேய் நாய்க்கடி, நரிக்கடி, பூரான்க்கடி முதலிய எல்லா நஞ்சுகள் தீரும். நஞ்சுகளை தீர்க்கும் சக்தி இதற்கு அதிகமாக இருப்பதால் இதற்கு விடாமிர்தமெனப் பெயரிடப் பட்டிருக்கிறது.

புசண்டா ராமபாண மாத்திரை

அளவு : 1/2 - 1 மாத்திரை.

துணைமருந்து : தேன், நெய், வெண்ணெய், சர்க்கரை முதலியவைகளாம்.

தீரும் நோய் : அல்குல் புற்று, லிங்கப்புற்று, கண்டமாலை, அண்டப்புற்று, புண், புரை, சூலை, வாயு, இடிப்புற்று, ஈரல்புற்று, குழிப்புற்று, வெண்குட்டம், முழங்கால்வாதம், சூதகவாயு முதலியவைகளாம்.

நீர்க்கட்டு மருத்துவம்

அளவு : 2 - 5 குன்றி எடை.

துணைமருந்தும் தீரும்நோய்களும் :

சீரகத்தூள், அதிமதுரத்தூள் கற்கண்டுத்தூள் இவை வகைக்கு 1 வராகன் எடை நெய் 3 வராகன் எடை இவற்றை கலந்து மேற்கண்ட பற்பத்தை அளவுப்படி சேர்த்து உட்கொள்ள நீரருகல், சொட்டு மூத்திரம், நீர்க்கடுப்பு, நீரெரிச்சல் முதலியவைகள் தீரும்.

கல்கண்டைப் பொடித்த தூள் 1/2 வரகன் எடை அல்லது பச்சைக் கற்பூரத்தைப் பொடித்த தூள் 2 வராகன் எடை, நெய் 3 வராகன் எடை, இவற்றைக் கலந்து மேற்கண்ட பற்பத்தை அளவுப்படி சேர்த்துண்ண நீர்க்கட்டு, சொட்டுமூத்திரம், சதையடைப்பு தீரும்.

இன்னும் இளநீர், முள்ளங்கிக் கிழங்குச் சாறு, வெள்ளரி விதையை அரைத்துப் பிழிந்தபால் ஆகியவகைகளில் சமயோசிதம் போல் கலந்து கொடுக்க மேற்கண்ட நோய்கள் தீரும். இன்னும் இதனை நீர்ப்பை, நீர்த்தாரை ஆகியவைகளின் நோய்களில் சமயோசிம் போல் தகுந்த துணை மருந்துகளில் உபயோகிக்கலாம்.

ஜலமஞ்சரி

அளவு : 1/4 -1/2 வராகன் எடை.

துணைமருந்து : இளநீர், முள்ளங்கிச் சாறு, சோம்புத் தீநீர், காசினி தீநீர் ஆகியவகளாம்.

தீரும் நோய் : நீர்க்கட்டு, நீரருகல், நீரெச்சல், சதையடைப்பு, கல்லடைப்பு முதலிய நீர்ப்பை, நீர்த்தாரை ஆகியவைகளின் நோய் தீரும்.

உப்புக் குரு

உபயோகிக்கும் முறை : எந்த இளகமாயினும் சரியே, எந்தத் தைலமாயினும் சரியே இதனை கொஞ்சம் பொடித்து போட்டு நன்றாக கலந்து உபயோகித்தால் மிகச் சிறந்த குணத்தைத் தரும். செந்தூரம், பற்பம் ஆகியவைகளிலும் கொஞ்சம் மேற்ப்படி குரு உப்பைச் சேர்த்துச் செய்வதினால் மிகச் சிறந்த குணத்தை தரும்.

துணைமருந்து : இளநீர், முள்ளங்கிச் சாறு, சோம்புத் தீநீர், காசினி தீநீர் ஆகியவகளாம்.

சரபராச மாத்திரை

அளவு : 1/2 - 1 மாத்திரை.

துணைமருந்தும் தீரும் நோய்களும் :

இஞ்சிச்சாறு 1 வராகன் எடை, தேன் 1 வராகன் எடை, இவ்விரண்டையும் கலந்து மேற்படி மாத்திரையை அளவுப்படி சேர்ந்துட்கொள்ள அறுபத்துநான்குவகைச் சுரங்களும் தீரும். இன்னும் வாய்வுகள், சூலைகள், கைகால் பிடிப்பு, கைகால் முடக்கு ஆகியவை தீரும்.

பறங்கிப்பட்டைத்தூள் 1 வராகன் எடை, தேன் 1 வராகன் எடை இவ்விரண்டையும் கலந்து மேற்படி மாத்திரையை சேர்த்துண்ண மேக வகைகள் எல்லாம் தீரும்.

சஞ்சீவி மாத்திரை

அளவு : 1/2 - 1 மாத்திரை.

துணைமருந்தும் தீரும்நோய்களும்:

துத்தியிலைச் சாறு 1 1/2 வராகன் எடை, தேன் 1 வராகன் எடை, இவ்விரண்டையும் சேர்த்து மேற்படி மாத்திரையை அளவுப்படி கலந்து நாற்பது நாள் உட்கொள்ள இளைத்த உடல் பருக்கும்.

தாய்ப்பாலில் இதனை கரைத்து நாசி துவாரத்தில் இரண்டொரு துளிவிட நாசியில் நீர்வடிதல், நீர்ப்பாய்ச்சல் தீரும்.

ரசத்தூய்மைக்கு இந்துப்பு பயன்படும்.

இராமபாண வல்லாதி

அளவு: 3 முதல் 6 குன்றி எடை.

துணைமருந்து : சர்க்கரை, தகுந்த இளகங்கள் ஆகியவைகளாகும்.

தீரும் நோய் :

மேகசூலை, வாதப்பிடிப்பு, பக்கவாதம், குமரகண்டன்வலி, காக்கைவலி, தமரகவலி, அண்டவாயு ஆகியன தீரும்.

இதில் கொஞ்சம் எடுத்து அதற்குக் சமன் தூய்மை செய்த நேர்வாளத்தை சேர்த்துக் கொடுக்க கழிச்சலாகி உடலிலுள்ள தீய மலங்கள், நஞ்சான நீர்கள் ஆகியவை வெளிப்பட்டு உடல் நலமுண்டாகும்.

இதில் கொஞ்சம் எடுத்து வறுத்தத் துருசை சேர்த்து அரைத்து ஆக்கிராணம் செய்யக் கபாலவாயு கபாலசன்னி ஆகியவை தீரும்.

கற்பூர வெற்றிலை இரசத்தில் இதனை கொடுக்க கபம், கோழை ஆகியவைகளை அறுத்து வெளிப்படுத்திவிடும்.

தேங்காய் இளகம்

அளவு : 4 முதல் 6 குன்றிஎடை.

தீரும்நோய்:

வாயுக்கட்டி, மகோதரம், நீராம்பல், ஓயாவயிற்றுவலி, உப்புசம், பலவகைக் கிருமிகள், வயிற்றுளைச்சல், எட்டுவகைக் குன்மங்கள், கருப்பை நுண்புழுக்கள், எட்டுவகைக் கருப்பை விப்புருதி, சூதகவாயு, பதினெட்டு வகைச் சூலைகள் ஆகியவை தீரும்.

கருப்பமில்லாதிருந்தாலும், தீட்டுக்காலத்தில் வயிற்றுவலி இருந்தாலும், சூதகத்தில் வாயு தங்கியிருந்தாலும் தீட்டுக்கண்டிருக்கும் போது முதல் நான் மேற்படி மருந்தை மேற்படி அளவுப்படி காலையில் ஒருவேளை மாத்திரம் கொடுக்கவும். முதல் நாள் கழிச்சல் அதிகமாகும். பின்பு அடுத்த இரண்டு நாளும் அவ்விதமே கொடுக்கவும். இந்த இரண்டு நாளும் கழிச்சல் அதிகமாகாது. இவ்விதம் செய்யில் மேற்கண்ட தீய குணங்கள் நீங்கிக் கருப்பமுண்டாகும் .

இரச பதங்கம்

அளவு : 1 முதல் 1/2 குன்றிஎடை.

துணைமருந்து : மிளகுத்தூள் 1 வராகன் எடை, நெய் 1 வராகன் எடை இவ்விரண்டையும் கலந்து மேற்கண்ட பற்பத்தை அளவுப்படி உண்ண வேண்டும்

தீரும் நோய்கள் : அட்டகுன்மம், பிலீகை, மகோதரம், காசசுவாசம், வயிற்றுவலி, உதிரவர்த்தம், வாதம், ஆறாத புண்புரைகள், அண்டவாதம், துணிவயிறு, பொருமல், மலபந்தம், வயிற்றுப் புழு, அக்கினிமந்தம் முதலிய நோய்கள் தீரும்.

காமளா இரசம்

அளவு : 1 முதல் 2 மாத்திரை.

துணைமருந்து : பசுவின் வெண்ணெய், பசுநெய், பசுவின்பால், பசுவின்நீர், தேன் முதலியவைகளாம்.

தீரும்நோய்கள் : பலவகைக்கட்டிகள், பலவகைக்குழிப்புண்கள், பலவகைக் கொப்பளங்கள், சிலந்திப்புண்கள், பலவகைச்சொறிகள், பலவகை விரணங்கள், சூலைநோய், இருமல், சுவாசகாசம் சுரக்கட்டி, குன்மநோய், பிரமிய நோய்கள், செரியாமை, பாண்டு நோய் முதலியவைகள் தீரும்.

மகாசுந்தரி இரசம்

அளவு : 1 முதல் 2 மாத்திரை.

துணைமருந்து : காடி நீர், புளித்த மோர், சோம்புத் தீநீர் முதலியவைகள்.

தீரும் நோய்கள் :

எல்லா வகைக் கழிச்சல்கள், பெருங்கிரகணி, வயிற்று நோய், இருமல், ஈரல்நோய், மண்ணீரல் நோய், மூல நோய் ஆகியவைகள் தீரும்.

இன்னும் இரைப்பையைப் பலப்படுத்தும், பசி தீபனத்தையும் உண்டாக்கும். வயிற்று நோய்கள், சூலைநோய்கள், சுரநோய்கள், தாகநோய் ஆகியவைகளும் தீரும்.

மூலச் சூரணம்

அளவு : அரை தேக்கரண்டியளவு.

துணைமருந்து : மோர்.

தீரும்நோய் : மூலத்திலிருந்து இரத்தம் வருவது ஒருவாரத்திற்குள் நின்றுவிடும். பேதியையும் கட்டுப்படுத்தும். உடல் வெப்பத்தையும் தணிக்கும்.

உப்பு பற்பம்

அளவு : அரை முதல் ஒரு கிராம்.

துணைமருந்து : வெந்நீர்.

தீரும்நோய் : சூதகவாயுவும், குன்மமும் குணமாகும். பசியை உண்டாக்கும்.

அகத்தியர் குழம்பு

அளவு : குன்றிமணி அளவு

துணைமருந்து : சுக்குகற்கம், கடுக்காய்க் குடிநீர், பசுநெய், எருமைபால், மிளகுத்தூள், வெள்ளை வெங்காயச்சாறு, தேன், இஞ்சிச்சாறு, உமிழ்நீர் முதலியவைகளாகும்.

தீரும்நோய் : குளிர்சுரம், இருமல், இரத்தமூலம், வெப்புப்பாவை, நீராம்பல், சோகை, சன்னிவாதம் பிளவை, அரையாப்புச் சிலந்தி, முலைச்சிலந்தி, குன்மம் முதலிய நோய்கள் தீரும்.

கும்மட்டிக் குழம்பு

அளவு : வழலங்காயளவு.

துணைமருந்து : பனைவெல்லம்.

தீரும்நோய் : நன்றாக வயிறு கழியும், வாதநோய்க் கூட்டங்கள் ஒழியும் நோய் வன்மைக்கும் உடல் வன்மைக்கும் தக்க 3 அல்லது 5 நாள் கொடுக்கலாம். பத்தியம் பெண் சேர்க்கை நீக்கவும்.

நவவுப்பு மெழுகு

அளவு: மிளகளவு.

துணைமருந்து : கருப்பட்டி.

தீரும்நோய் : மலம்கழிந்து சூலை, மகோதரம், வலிகுன்மம், கிரந்திமேகம், நீர்க்கோவை, உதரவாய்வு விஷவாதம், அண்டவாதம், வலிவாதம், முடக்குவாதம், திமிர்வாதம், தந்திவாதம், சூதக வாய்வு, எட்டுக் குன்மம், பாரிசவாய்வு இவைகள் தீரும்.

நவரசத் துவையல்

தீரும்நோய்: வாந்தி.

நாயுருவி உப்பாதிக் குழம்பு

அளவு : அரை கழஞ்சு.

தீரும் நோய் : தாம்பிர செந்தூரம் ஒரு பணவெடை சேர்த்து வெள்ளைச் சர்க்கரையில் கொடுக்க எண்வகை குன்மம், வாய்வு முதலியவைகள் தீரும்.

விஷக்குழம்பு

அளவு : குன்றிமணி அளவு.

தீரும்நோய் : விஷங்கட்குக் குன்றிமணி அளவு கொடுக்க வாந்தியும் பேதியும் ஆகும். விஷம் நீங்கும்.

குன்ம குடோரி

அளவு : சுண்டைக்கயளவு.

தீரும்நோய் : ருது காலத்தில் உண்டாகும் சூதகவாயுவின் வலி, குன்மம், பித்த வாயு, மந்தம், அசீரணம் தீரும்.

கௌசிகர் குழம்பு

துணைமருந்தும், தீரும்நோய்களும் :

1. வெள்ளை, அக்கரம், தோடம், சினப்புகள், இவைகளை குன்றிமணி அளவு நாக்கில் தேய்த்து, வெந்நீர் குடித்திட தீரும்.
2. சன்னிதோடம், எல்லாவகைச் சுரங்கட்கு வெந்நீரிலும், கடுக்காய்க் குடிநீரில் உட்கொள்ள ஈளை, இருமலும், நடுக்கம், சுரம், குளிர்சுரம் இவைகட்கு சுக்கு குடிநீரிலும், சீதேவி செங்கழுநீர், சீரகம் இவை சேர்ந்த குடிநீரில் கொடுக்க உட்சுரமும், எண்வகைச் சுரங்கட்கு ஏலம், மிளகுடனும் கொடுக்க குணமாகும்.
3. அத்திசுரத்திற்குக் கொன்றைக் கொழுந்திலும், கடுக்காய்ப்பொடி, எண்ணெய் இவை சேர்ந்த கலவையில் கொடுக்க ஏங்கல் உப்பிசமும், சன்னி, இருமல், சத்தி, உளமாந்தை இவைகட்கு மோரும் உசிர்ப்பட்டையும் சேர்ந்த கலவையிலும் கொடுக்க குணமாகும்.
4. குடல்வலி, சூலை நோய், குவளை விப்புருதி, இவைகட்கு ஆடாதோடை, அரத்தை இவை சேர்ந்த பொடியுடன் வெண்ணெயிலும் கொடுக்க குணமாகும்.
5. அண்டவாய்வுக்கு வெள்ளாட்டு பாலிலும், வெள்ளாட்டு நெய்யில் கொள்ளப் பொருமலும், பக்கசூலையும், பசு நெய், பசும்பால், சர்க்கரை இவைகளில்

கொள்ளக் குலைவலி எரிச்சலும், ஆவின்பாலும் சர்க்கரையும் சேர்ந்ததில் கொடுக்க குட்டமும் குணமாகும்.

6. மூலக்கடுப்பு, முளைகள் வீழ, தாமரைக்காய் போன்ற முளைவீழ அம்முளைகள் கரைய இம்மெழுகைத் துணியில் தடவித் திரியாகத் திரித்துக் கொளுத்தி அதனின்று எழும்பும் புகையைக் காட்டத்தீரும்.
7. பாண்டுக்குத் திரிபலைத் தூளிலும், வலிப்பு சன்னி, மரண வாதம், இவைகளுக்கு தழுதாழைச் சாற்றிலும், சர்வாங்க வாதம் சந்துசூலைக்கு சிறு கழுதைச் சிறுநீரிலும் வழங்கலாம்.
8. கழுதைப் பாலில் கொடுக்க 80 வாதமும் குணமாகும்.
9. சன்னி 13-க்கு இஞ்சிச்சாற்றில் கொடுக்க குணமாகும்.
10. சோளப் பயிர் தின்று மயங்கிய மாட்டுக்கு, ஒரு வராகனெடை கௌசிகர் குழம்பை வேலிப்பருத்திச் சாற்றில் கொடுக்கத் தீரும்.
11. விரிதலை நாகக்கடிக்கு வேலிப்பருத்தியிலைச் சாற்றில் உள்ளுக்குக் கொடுத்துக் கண்ணிலும் கலிக்கமிடத் தீரும்.

சிவனார் வேம்புச் சூரணம்

அளவு : வெருகடித்தூள்.

துணை மருந்து : சிவன் வேம்புத்தயிலம் காசு எடை.

தீரும் நோய் : சூலை 18, குட்டம், குறைநோய் தீரும்.

தயிர்ச் சுண்டிச் சூரணம்

அளவு : மூன்றுவிரல் அளவு.

துணைமருந்து : வெந்நீர்.

தீரும்நோய் : அசீரணபேதி தீரும்.

பிரண்டைச் சூரணம்

அளவு : நெல்லிக்காய் அளவு.

தீரும்நோய் : கபசன்னி, பித்தவாதம், உடம்புவலி, உன்மத்தம் தீரும்.

பாகற்கடுக்காய்

தீரும்நோய்:

ஒரு துண்டு உணவுக்கு முன்னும் பின்னும் உண்ண இருமல், மந்தம், வயிற்றுநோய், வாந்தி இவைகள் தீரும்.

இதை ஒரு மண்டலம் உட்கெண்டால் சூலை, வாய்வு, குன்மம், மூலம், இரைப்பு, அரோசகம், பீலீகம், துர்நாற்றம் வீசுகின்ற பீநசம், வாந்திபேதி, நாவில் சுவையின்மை, பாண்டு, பித்தநோய், இரத்தபித்தம் இவைகள் தீரும்.

உலோக மண்டூரச் செந்தூரம்

துணைமருந்து : மகோதரம், சோபை, பாண்டு, காமாலை இவைகள் தீரும்.

கரவாலவயிரவம்

அளவு : குன்றியளவு மாத்திரை.

துணைமருந்து : இளநீர்.

தீரும்நோய் : அபிநியாச சன்னி.

மதனவயிரவம்

அளவு : சணல் வித்துப் பிரமாணம் மாத்திரை.

துணைமருந்து : திரிகடுகுக் குடிநீர்.

தீரும்நோய் : சித்தப்பிரமை, சன்னி தீரும்.

வெங்கார மாத்திரை

அளவு: தேற்றான் விதைப் பிரமாணம்.

துணைமருந்தும் தீரும்நோய்களும்: இம்மாத்திரையை எண்ணெயில் தோய்த்து அருந்த மலம் கழியும். நல்ல தண்ணீரில் அனுபானித்திடகால், கை, வாய், முகம் இவ்வுறுப்புகளில் ஏற்படுகின்ற நோய்களும், எண்வகைக் குன்மம், பல வகை சூலை, வாதம், அண்டவாதம், நீராம்பல், விப்புருதி, பாண்டு, மகோதரம், இவைகளும் தீரும். இதற்குப் பத்தியம் காடை, கவுதாரி, காளான், மீன், சம்மங்கோழி.

ஜலோதாரிமணி

அளவு : இலவம் விதை அளவு.

துணைமருந்து : தேன், பால்.

தீரும்நோய் : அந்தரவாயு, சுரவாயு, இருமல், நீரடைப்பு, சதையடைப்புத் தீரும்.

பஞ்சலவண பற்பம்

அளவு : 1 முதல் 2 குன்றியளவு.

தீரும்நோய்: குன்மம், வாய்வு தீரும்.

அயவத்திச் சூரணம்

அளவு : 1 முதல் 1/2 வராகன்எடை.

துணைமருந்து : சர்க்கரை அல்லது தேன்.

தீரும்நோய் : எல்லா வகை வாயுக்கள், வாதம், பித்தம், கபம் ஆகியவை சம்பந்தமான நோய்கள் முதலிய பல நோய்கள் தீரும்.

செந்தூரத்திராவகம்

இது லோகாதி தாதுப் பொருள்களைச் செந்தூரிக்க உதவும்.

சங்கத் திராவகம்

இதனால் உலோகங்களும் உபரசங்களும் நீராகும். இதனை நீரில் கலந்து துளிக்கணக்கில் கொடுக்க மார்பு வலி, வாயு, குன்மவலி நீங்கும்.

அயகாந்தசெந்தூரம்

தீரும் நோய் : பாண்டு.

மண்டூர மாத்திரை

அளவு : காசளவு.

துணை மருந்து : தேன்.

தீரும் நோய் : பித்தப்பாண்டும், விஷப்பாண்டும் குணமாகும்.

எருக்கெண்ணெய்

காதில் மூன்று துளி விட்டு வர காது சீழ் நிற்கும்.

எவட்சாரம் உபயோகம்

எவட்சாரம், இந்துப்பு, சுக்குத்தூள் வகைக்கு 5 பங்கு, கடுக்காய்த்தூள் 10 பங்கு இலைகளை ஒன்றுபடக் கலந்து, 5 குன்றி எடை வீதம் மோர், பால் முறித்து வடித்த நீர், கஞ்சி இவற்றிலொன்றில் கையாள மூலம், இரத்த சீதபேதி, வயிற்றிலுண்டாம் வலி முதலியன நீங்கும்.

கணவாய் ஓடு உபயோகம்

கணவாய் ஓடு, இந்துப்பு இவையிரண்டையும் பன்னீர் விட்டு அரைத்து அதைக் கண்ணிலிட்டு வரக் கண்ணோய் நீங்கும்.

3.2 MODERN ASPECTS

INDHUPPU

(ROCK SALT - IMPURA SODIUM CHLORIDE)

ORGANOLEPTIC CHARACTERS

Taste: Uvarppu (Saline)

Potency: Veppam (Heat)

Pirivu: Inippu (Sweet)

THERAPEUTIC ACTIONS

Laxative, Diuretic & Carminative

OTHER NAME OF INDHUPPU IN SIDDHA LITERATURES

During the review process, we have came across several books and found few literatures contains of Synonyms for indhuppu.

As per *Bogar Nigandu*, Sindhuratham, Sainthavam, Chandhiravuppu, Mathikoormai, Panikoormai, Mathi uppu, Silalam, Poorathin Mithru, Paandathirku Samaitha Vuppu.

As per ***Panjakaviya Nigandu,*** Vaani, Maaksasm, Saindhalavanam, Santhilagam, Naaganei, Vithagam, Mathilavanam, Kadimaasam, Kaara kanjaragam

VERNACULAR NAMES OF INDHUPPU :

Tamil	: Indhuppu, Sainthavum
English	: Rock Salt, Halite
Hindi	: Khanji namka, Saindhava, Lahori namak
Mar	: Mitha
Gujarat	: Mitha
Bengali	: Nimok, Num

This is taken out from earth specially in the north west regions of Punjab and sind (pakisthan). The out surface is greyish yellow which its innercore is white in colour, saline taste.

FORMATION OF ROCK SALT:-

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 estuaries in and regions of the world.

SYNTHETIC PREPARATION OF ROCK SALT:

INGREDIENTS:

1. Potassium nitrate - 175 gm
2. Alum - 175 gm
3. Fuller's earth - 105 gm
4. Sea water - 200 litre

PREAPARATION:

The raw materials are made into powder. Sea water is boiled in a new earthen pot till the water content are completely evaporates and salt is obtained. The salt 3.800kg is placed in a thick bottomed earthen pot and heated with big fire over a sugarcane press hearth, when the slat melts the above salt powders are sprinkled in it and kindled well. After the pot cools the product hardens. This product is called as rocksalt. If it split it shines like diamond.

The crude camphor puts into the rocksalt destroys pooram (subchloride of mercury) turns into muppu (three salts). The salt is a form of earth element.

1. Rock salt is kept soaked in vinegar (old rice fomented water) for three days and insolated to get purified and detoxified form.
2. The rock salt is kept soaked in Goat's urine for three naazhigai and insolated to get purified form.

ACTIONS:

It has got laxative property. It's laxative property is superior than "Cream of Tartar". This is given in doses of 4.2 gram or 8.4 gram as alaxative. When given in doses of 16.8 gram or 21 gram, it produces watery diarrhoea. It is rarely given alone. It is often given along with powder of seed of Clitoria ternatea (kaakkarattan) . It has also get flatulent, diuretic and appetite stimulant properties.

1. Laxative – dosage : 4.2 to 8.4 gm
2. Purgative – dosage : 16.8 to 21 gm
3. Carminative
4. Diuretic
5. Stomachic

   It is given along with clitoria seeds (clitoria ternatea) powder.

GENERAL PROPERTIES:

Rock salt cures eight types of gastric ulcer (gunmam) , indigestion, blood diseases, kaphapitha, kapathikam, nerves syphilis , derangement of three humours, constipation, poisons bite, spermatorhea, head, eye, tongue, tooth, skin, trunk, vagina diseases, delirium, cataract, polydipsia, asthma (dyspnoea) , haemorrhoids, abscess, rat bite , scorpion bite, vatha pain, throbbing pain etc.,

USES:

1. Rock salt is made into a paste and applied in case of sprain.
2. Hot fomentation of the rock salt can be taken for curing the painful swellings.
3. Rock salt is dissolved in warm water and administered to induce vomiting.

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.

DISTRIBUTION:

Most of the rock salt are getting from mandi Himachal Pradesh (% basis). 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.

PITHA KASHAYAM:

1. Cassia senna (nilaavaarai) – 6 gm
2. Pimpinella anisum (sombu) – 6 gm
3. Dried ginger (Zingiber officinarum) – 6 gm
4. Coriander seeds (Coriandrum sativum) – 6 gm
5. Water - 325ml

PREPARATION:

The above drugs are pounded and added with water boiled. A decoction is prepared by reducing it into 160ml. The boiled material are kindled well and filtered.

ADJUVANT:

Rock salt powder 8.4 to 21gm

INDICATION:

Indigestion, eye diseases, venereal ulcer, kapha pitham, rat poison. It is administered for inducing purgation.

INDHUPPU CHOORANAM

INGREDIENTS:

1. Rock salt – 1part
2. Cumin seeds (Cuminum cyminum) – 1 part
3. Bishop's weed (Carum copticum) - 4 part
4. Long pepper (Piper longum) – 8 part
5. Dried ginger (Zingiber officinalis) – 16 part
6. Chebulic myrobalan (Terminalia chebula) - 32 part

PREPARATION:

The above drugs are powdered individually and mixed together.

DOSAGE:

12 gm

INDICATIONS:

Indigestion, vomiting, ascites.

TENKAI CHAARAM
(COCONUT SHELL)

Rock salt is filled in a waterfall coconut by making a hole. The hole is closed and sealed with mud packed coth, dried and put to puda and the salt is taken out. This salt is effective in the treatment of abdominal pain and indigestion.

Rock salt is added in the Uppu mandooram, Sanga thiravagam which is used in the treatment of anasarca, ascites.

1. Cassia senna (nila avarai) – 1 part
2. Dried ginger (Zingiber officinalis) – ¼ part
3. Black pepper (Piper nigrum) – ¼ part
4. Bishop's weed (carum copticum) – ¼ part
5. Embelia ribes - ¼ part
6. Rock salt - ¼ part
7. Sugar - 2 ¼ part.

PREPARATION:

The above raw drugs are powdered individually and mixed together well.

DOSAGE:

4.2 to 8.4 gm

INDICATIONS:

Indigestion, Abdominal pain, Constipation.

TABLE.1 MEDICINE FORMULATIONS WITH THE DRUG INDHUPPU

Forms	Medicine name	Medicinal uses
Chooranam	1. Indhuppu chooranam 2. Karum Kozhi Chooranam 3. Deepakini Chooranam 4. Abipathyathi chooranam 5. Saamuthrara chooranam	- Indigestion, Vomiting - Asta gunmam, Sogai Magodharam, Pandu, Veppu -Seetha kattu, Vadharogam, Asta gunmam, Pandu, Kamalai -Kirani, Swasam, Moolam

		-Gunmam 8, Vayitru vali, Aseeranam, Vatham 80, Kirani 11, Moolam, Paandu 5, Mahodaram
Mathirai(Tablet)	1. Kaalakkini Mathirai 2. Saathilinga Kuligai	-Paandu, Mahodaram, Sogai, Sanni 13, Irumal, Ratha moolam -Pandu, Kamalai, Moolam, Peruvayiru, Gunmam, Suram, Bethi, Sanni
Kulambu	1. Sinjathi Kulambu	-Erikamalai, Suzhal Kamalai, Pandu, Manjal Kamalai, Azhal Kamalai
Vadagam	1. Arapodiyadhi Vadagam 2. Mandoora vadagam	-Pitha pandu -Mahodaram, Kamalai, Pitha pandu, Gunmam, Kasam, Vayitru katti, Peru vayiru, Ushnam
Leghiyam	1. Elumichanpala leghiyam 2. Vilvathi Lehiyam	-Erumal, Pandu, Kamalai, Vaandhi, Kai kal asathi, Athisaram, suram, Rathaminmai, VishangalVeekam, Karappan -Vikkal, Kirani, Payithiyam, Irumal, Seelai, Veekam

ROCK SALT

Rock salt (NaCl) is an ionic compound that occurs naturally as white crystals. It is extracted from the mineral form halite or evaporation of seawater. The structure of NaCl is formed by repeating the face centred cubic unit cell. It has 1:1 stoichiometry ratio of Na:Cl with a molar mass of 58.4 g/mol. Compounds with the sodium chloride structure include alkali halides and metal oxides and transition-metal compounds. An important role to many important applications is structure and dynamics of water. Some applications include crystallization of proteins and conformational behaviour of peptides and nucleic acids.**Himalayan salt** is rock salt (halite) mined from the Punjab region of Pakistan. The salt, which often has a pinkish tint due to trace minerals, is primarily used as a food additive to replace refined table salt but is also used for cooking and food presentation, decorative lamps and spa treatments. The product is often promoted with groundless claims that it has health benefits.

GEOLOGY :

Himalayan salt is mined from the Salt Range mountains,[1] the southern edge of a fold-and-thrust belt that underlies the Pothohar Plateau south of the Himalayas in Pakistan. Himalayan salt comes from a thick layer of Ediacaran to early Cambrian evaporates of the *Salt Range Formation*. This geological formation consists of crystalline halite intercalated with potash salts, overlain by gypsiferous marl and interlayered with beds of gypsum and dolomite with infrequent seams of oil shale that accumulated between 600 and 540 million years ago. These strata and the overlying Cambrian to Eocene sedimentary rocks were thrust southward over younger sedimentary rocks, and eroded to create the Salt Range.

HISTORY :

Local legend traces the discovery of the Himalayan salt deposits to the army of Alexander the Great. However, the first records of mining are from the Janjua people in the 1200s. The salt is mostly mined at the Khewra Salt Mine in Khewra, Jhelum District, Punjab, Pakistan, which is situated in the foothills of the Salt Range hill system between the Indus River and the Punjab Plain. It is primarily exported in bulk, and processed in other countries for the consumer market.

FIGURE 1 - ROCK SALT

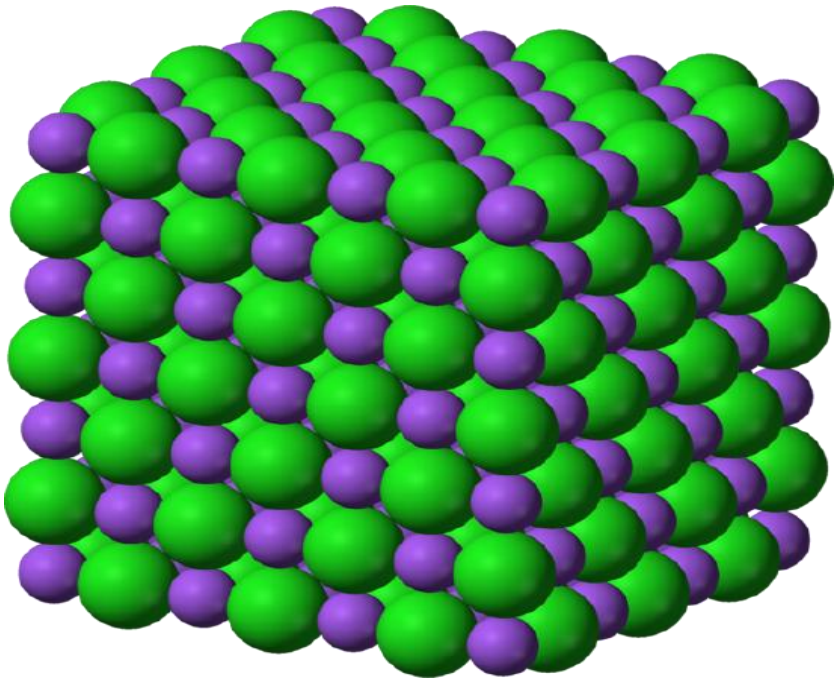

FIGURE 2 - ROCK SALT STRUCTURE

The above figure shows how the Na^+ and Cl^- ions occupy the space. The smaller ions are the Na^+ with has an atomic radius of 102 pm, and the larger ions are the Cl^- with an atomic radium of 181 pm. Since NaCl are one to one ratio as a compound, the coordination numbers of Na and Cl are equal. The larger green ions represent Cl^- and the smaller purple ions represent Na^+. However, the structure of this

molecule allows their positions to be switched since the coordination numbers are equivalent.

Examples of compounds with this structure include sodium chloride itself, along with almost all other alkali halides, and "many divalent metal oxides, sulfides, selenides, and tellurides".According to the radius ratio rule, this structure is more likely to be formed if the cation is somewhat smaller than the anion (a cation/anion radius ratio of 0.414 to 0.732).

Most of the alkali metal hydrides and halides have the rock salt structure, though a few have the caesium chloride structure instead.

HALITE :

Halite commonly known as **rock salt**, is a type of salt, the mineral (natural) form of sodium chloride (NaCl). Halite forms isometric crystals. The mineral is typically colourless or white, but may also be light blue, dark blue, purple, pink, red, orange, yellow or grey depending on inclusion of other materials, impurities, and structural or isotopic abnormalities in the crystals. It commonly occurs with other evaporate deposit minerals such as several of the sulfates, halides, and borates.

FIGURE - 3- HALIDE MINERAL

CATEGORY : **HALIDE MINERAL**

FORMULA : **Nacl**

CRYSTAL SYSTEM: **Cubic**

CRYSTAL CLASS : **Hexoctahedral (m^3m).**

COLOUR :

Colorless or white when pure. Impurities produce any color but usually yellow, gray, black, brown, red (Depends on isotopes and purity for various colours).

CRYSTAL HABIT :

Predominantly cubes and in massive sedimentary beds, but also granular, fibrous and compact.

CLEAVAGE :

Perfect {001}, three directions cubic.

FRACTURE :

Conchoidal.

TENACITY :

Brittle.

MOHS SCALE :

2.0 – 2.5.

LUSTER :

Vitreous.

STREAK :

White.

DIAPHANEITY :

Transparent to translucent.

SPECIFIC GRAVITY :

2.17.

OPTICAL PROPERTIES :

Isotropic.

REFRACTIVE INDEX :

n = 1.544

MELTING POINT :

800.7°C

SOLUBILITY :

Water – soluble.

OTHER CHARACTERISTICS :

Salty flavour, fluorescent.

MINERAL COMPOSITION:

Himalayan salt is a table salt. Analysis of a range of Khewra salt samples showed them to be between 96% and 99% sodium chloride, with varying amounts of trace minerals such as calcium, iron, zinc, chromium, magnesium, and sulfate, all at safe levels below 1%. Some salts mined in Pakistan are not suitable for food or industrial use without purification due to impurities. Some salt crystals from this region have an off-white to transparent color, while the trace minerals in some veins of salt give it a pink, reddish, or beet-red color.

Nutritionally, Himalayan salt is similar to common table salt, except with regard to the essential mineral iodine. The commercial table salt in many countries is supplemented with iodine, and this has significantly reduced disorders of iodine deficiency. Himalayan salt lacks these beneficial effects of iodine supplementation.

NUTRITIONAL VALUE OF PINK HIMALAYAN SALT:

Pink Himalayan salt has many essential minerals and elements. However, many of these minerals are present in very small amounts and might not contribute to any health benefits.

TABLE 2

NUTRITIONAL VALUE OF PINK HIMALAYAN SALT

Calcium	1.6 mg
Potassium	2.8 mg
Iron	0.0369 mg
Magnesium	1.06 mg
Sodium	368 mg

OCCURRENCE:

Halite dominantly occurs within sedimentary rocks where it has formed from the evaporation of seawater or salty lake water. Vast beds of sedimentary evaporite minerals, including halite, can result from the drying up of enclosed lakes, and restricted seas. Such salt beds may be hundreds of meters thick and underlie broad

areas. Halite occurs at the surface today in playas in regions where evaporation exceeds precipitation such as in the salt flats of Badwater Basin in Death Valley National Park.

In the United States and Canada extensive underground beds extend from the Appalachian basin of western New York through parts of Ontario and under much of the Michigan Basin. Other deposits are in Ohio, Kansas, New Mexico, Nova Scotia and Saskatchewan. The Khewra salt mine is a massive deposit of halite near Islamabad, Pakistan.

Salt domes are vertical diapirs or pipe-like masses of salt that have been essentially "squeezed up" from underlying salt beds by mobilization due to the weight of overlying rock. Salt domes contain anhydrite, gypsum, and native sulphur, in addition to halite and sylvite. They are common along the Gulf coasts of Texas and Louisiana and are often associated with petroleum deposits. Germany, Spain, the Netherlands, Denmark, Romania and Iran also have salt domes. Salt glaciers exist in arid Iran where the salt has broken through the surface at high elevation and flows downhill. In all of these cases, halite is said to be behaving in the manner of a rheid.

Unusual, purple, fibrous vein filling halite is found in France and a few other localities. Halite crystals termed *hopper crystals* appear to be "skeletons" of the typical cubes, with the edges present and stairstep depressions on, or rather in, each crystal face. In a rapidly crystallizing environment, the edges of the cubes simply grow faster than the centers. Halite crystals form very quickly in some rapidly evaporating lakes resulting in modern artifacts with a coating or encrustation of halite crystals. *Halite flowers* are rare stalactites of curling fibers of halite that are found in certain arid caves of Australia's Nullarbor Plain. Halite stalactites and encrustations are also reported in the Quincy native copper mine of Hancock, Michigan.

USES :

Himalayan salt is used to flavour food. Due mainly to marketing costs, pink Himalayan salt is up to 20 times more expensive than table salt or sea salt. The impurities giving it its distinctive pink hue, as well as its unprocessed state and lack of anti-caking agents, have given rise to the unsupported belief that it is healthier than common table salt. There is no scientific basis for such claimed health benefits. In the United States, the Food and Drug Administration warned a manufacturer of dietary

supplements, including one consisting of Himalayan salt, to discontinue marketing the products using unproven claims of health benefits.

Slabs of salt are used as serving dishes, baking stones, and griddlesand it is also used to make tequila shot glasses. In such uses, small amounts of salt transfer to the food or drink and alter its flavour profile.

SALT LAMP :

It is also used to make "**salt lamps**" that radiate a pinkish or orangish hue, manufactured by placing a light source within the hollowed-out interior of a block of Himalayan salt. Claims that their use results in the release of ions that benefit health are without foundation. Similar scientifically-unsupported claims underlie use of Himalayan salt to line the walls of spas, along with its use for salt-inhalation spa treatments.] Salt lamps can be a danger to pets, who may suffer salt poisoning after licking them

Salt is used extensively in cooking as a flavor enhancer, and to cure a wide variety of foods such as bacon and fish. It is frequently used in food preservation methods across various cultures. Larger pieces can be ground in a salt mill or dusted over food from a shaker as finishing salt.

Halite is also often used both residentially and municipally for managing ice. Because brine (a solution of water and salt) has a lower freezing point than pure water, putting salt or saltwater on ice that is below 0 °C (32 °F) will cause it to melt - this effect is called freezing-point depression. It is common for homeowners in cold climates to spread salt on their sidewalks and driveways after a snow storm to melt the ice. It is not necessary to use so much salt that the ice is completely melted; rather, a small amount of salt will weaken the ice so that it can be easily removed by other means. Also, many cities will spread a mixture of sand and salt on roads during and after a snowstorm to improve traction. Using salt brine is more effective than spreading dry salt because moisture is necessary for the freezing-point depression to work and wet salt sticks to the roads better. Otherwise the salt can be wiped away by traffic.

In addition to de-icing, rock salt is occasionally used in agriculture. An example of this would be inducing salt stress to suppress the growth of annual

meadow grass in turf production. Other examples involve exposing weeds to salt water to dehydrate and kill them preventing them from affecting other plants. Salt is also used as a household cleaning product. Its coarse nature allows for its use in various cleaning scenarios including grease/oil removal, stain removal, dries out and hardens sticky spills for an easier clean.

Some cultures, especially in Africa and Brazil, prefer a wide variety of different rock salts for different dishes. Pure salt is avoided as particular colors of salt indicates the presence of different impurities. Many recipes call for particular kinds of rock salt, and imported pure salt often has impurities added to adapt to local tastes. Historically, salt was used as a form of currency in barter systems and was exclusively controlled by authorities and their appointees. In some ancient civilizations the practice of salting the earth was done to make conquered land of an enemy infertile and inhospitable as an act of domination or spite. One biblical reference to this practice is in Judges 9:45: "he killed the people in it, pulled the wall down and sowed the site with salt."

Polyhalite, a mineral fertiliser, is not an NaCl-polymer, but hydrated K_2Ca_2Mg-sulfate.

Benefits of Pink Himalyan Salt

Benefits of Pink Himalayan Salt for Respiratory Diseases:

1. Pink Himalayan salt is the purest variety of salt as it contains no chemicals or toxins.
2. It possesses about 84 minerals that can be absorbed easily by the body due to their small molecular size.
3. Pink Himalayan salt was used by ancient Greeks for clearing airways and improving breathing.
4. Himalayan salt lamps are being used to remove dust, pollen, smoke, and other contaminants that could increase the risk of respiratory problems.
5. Himalayan salt inhalers can help cleanse the respiratory system and may relieve symptoms of asthma, hay fever, and allergies.
6. Pink Himalayan salt reduces symptoms of conditions like sinus infections and asthma.

Benefits of Pink Himalayan Salt for Stress:

1. Pink Himalayan salt may enhance serotonin levels in your body. This chemical helps reduce stress, boost energy and relieve depression.
2. Pink Himalayan salt helps restore energy in your body.

Benefits of Pink Himalayan Salt for Sound Sleep:

1. Due to its high mineral content, Himalayan pink salt may help you get sound sleep.
2. A diet low in sodium can lead to irregular and disturbed sleep patterns.
3. A hormone called cortisol is produced in response to stress. Cortisol can obstruct the flow of melatonin which is the sleep hormone. Pink Himalayan salt lamps and inhalers might promote peaceful sleep by reducing stress.

Benefits of Pink Himalayan Salt for Digestion:

1. Pink Himalayan salt contains deepan (appetizing) and pachan (digestive) properties. These help in solving digestive problems and prevent gas accumulation.
2. Pink Himalayan salt is also known to promote peristalsis (muscle contraction that moves food through the digestive tract).
3. It helps regulate metabolism and promotes acid-alkaline balance.

Benefits of Pink Himalayan Salt for Skin:

1. Pink Himalayan salt contains detoxifying properties and helps remove toxins from the skin, promoting clean and soft skin.
2. It keeps the skin hydrated and makes it appear young and fresh.
3. One of the reasons for acne is an imbalance in the skin pH. Pink Himalayan salt can balance the pH level of the skin and give acne-free skin.
4. Pink Himalayan salt is also used to treat skin conditions like eczema.

Benefits of Pink Himalayan Salt for Weight Loss:

1. Himalayan pink salt can aid in weight loss without producing any side effects. Using Himalayan salt soles is a popular way to promote weight loss.
2. The salt sole contains the essence of the salt. This sole can be prepared by leaving a handful of pink salt granules in a jug filled with water overnight and letting it dissolve.
3. Excess salt intake causes water retention inside the cells of our body. This makes our body appear swollen and fat. Unlike table salt, Himalayan salt crystals expel extra water from the cells.
4. Pink himalayan salt enriches the body with minerals and nutrients.

Benefits of Pink Himalayan Salt for Muscle Cramps:

1. Muscle cramps commonly occur due to magnesium deficiency.
2. Pink Himalayan salt contains a adequate amount of magnesium and is effective in the management of muscle cramps.

Benefits of Pink Himalayan Salt for the Heart:

1. Pink Himalayan salt enhances blood circulation in the body.
2. It regulates blood pressure levels and decreases the risk of heart attack.

How to Take Pink Himalayan Salt:

Himalayan salt is used in different ways depending on its use:

1. For cooking
2. For seasoning
3. For preserving food

Many people also use Himalayan pink salt as a substitute for bath salts.

Side Effects of Pink Himalayan Salt:

Consuming too much salt can result in side effects. It is essential to keep all the possible risks in mind and take salt in moderation.

Kidney Disease

Excess salt intake can lead to high blood pressure and increase the risk of chronic kidney disease (CKD).

Bone Disorders

Consuming excess salt can result in excessive flushing out of calcium through urine. This might lead to osteoporosis.

Heart Diseases

High blood pressure is the most common cause of heart disease. Excess salt intake leads to hypertension.

Hypernatremia

This is a condition in which the sodium levels in the blood are too high. Hypernatremia produces serious health issues, out of which dehydration is a significant one. When the sodium content in the blood is very high, the body tries to set it right by moving water out of the cells into the bloodstream. Excess water is flushed out via urine along with other essential salts, leading to dehydration.

Fluids may accumulate in the lungs leading to difficulty in breathing. Symptoms such as nausea, weakness, vomiting, and intense thirst might also occur.

Trace minerals

It’s a common misconception that salt and sodium are the same thing.

Although all salts contain sodium, sodium is only one part of a salt crystal.

In fact, table salt is also called sodium chloride because of the chloride compounds it contains. Your body requires both of these minerals for optimal health .

Notably, rock salt offers trace levels of several other minerals, including iron, zinc, nickel, cobalt, manganese, and copper .

These minerals give rock salt its various colors.

Reduce your risk of low sodium levels

You may know that too much salt can harm your health, but too little sodium can be detrimental as well.

Too little sodium may cause poor sleep, mental problems, seizures, and convulsions - and in severe cases, coma and even death

In addition, low sodium levels have been linked to falls, unsteadiness, and attention disorders

A study in 122 people hospitalized for low sodium levels found that 21.3% had experienced falls, compared with only 5.3% of patients with normal blood sodium levels.

As such, consuming even small amounts of rock salt with your meals may keep your levels in check.

Improve muscle cramps

Salt and electrolyte imbalances have long been linked to muscle cramps.

Electrolytes are essential minerals that your body needs for proper nerve and muscle function.

In particular, imbalances of the electrolyte potassium are believed to be a risk factor for muscle cramps.

RECENT STUDIES IN INDHUPPU:

AN ANALYSIS OF THE MINERAL COMPOSITION OF PINK SALT AVAILABLE IN AUSTRALIA

Abstract

Little is known about the mineral composition of pink salt. The aim of this study was to evaluate for the first time the mineral composition of pink salt available for purchase in Australia and its implications for public health. Pink salt samples were purchased from retail outlets in two metropolitan Australian cities and one regional town. Color intensity, salt form, and country of origin were coded. A mass spectrometry scan in solids was used to determine the amount of 25 nutrients and non-nutritive minerals in pink salt (n = 31) and an iodized white table salt control (n = 1). A wide variation in the type and range of nutrients and non-nutritive minerals across pink salt samples were observed. One pink salt sample contained a level of lead (>2 mg/kg) that exceeded the national maximum contaminant level set by Food Standards Australia New Zealand. Pink salt in flake form, pink salt originating from the Himalayas, and darker colored pink salt were generally found to contain higher levels of minerals (p < 0.05). Despite pink salt containing nutrients, >30 g per day (approximately 6 teaspoons) would be required to make any meaningful contribution to nutrient intake, a level that would provide excessive sodium and potential harmful effects. The risk to public health from potentially harmful non-nutritive minerals should be addressed by Australian food regulations. Pink salt consumption should not exceed the nutrient reference values for Australia and New Zealand guidelines of < 5 g of salt per day.

Keywords: pink salt, salts, sodium chloride, minerals, heavy metals, lead poisoning.

INDHUPPU *(ROCK SALT)* IN SIDDHA MEDICINE- A COMPREHENSIVE REVIEW

Abstract

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. Nowadays

indhuppu has also been used in a kitchen culinary as salt, because of its anti-ulcer and slow laxative properties in siddha system of medicine, Indhuppu which is known as rock salt have been extensively used. Among thathu sarakkugal (mineral drugs), Indhuppu is considered as a major drug under 25 Karasam(twenty five types of therapeutic salts) 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 vitreous luster. It is colourless when pure but often tinged gray, blue, and brown pink because of associated impurities. In this paper, organoleptic characters, therapeutic characters, Geographical names of indhuppu, crystal natures, synthetic preparation, biological importance were discussed.

Keywords : Indhuppu, Siddha Medicine, Karasaram, Siddha minerals.

SAFETY AND PHARMACOLOGICAL PROFILE OF INDHUPPU BHAVANAI

Abstract

The current research was on Indhuppu bhavanai to evaluate the safety and pharmacological activities in animal models. The drug Indhuppu bhavanai wasindicated for Pitha Gunmam (Hyperacidity) which was selected from the Siddha literature“Kadukkai vallaraiin thani maanbu” third edition-1992, pg.no: 84, authored by Hakkim P. Mohammed Abdulla sayub. All the ingredients were identified and authenticated by the experts and the test drug was prepared by the given procedure. Review of literature in various categories were carried out.Siddha aspect, botanical aspect and mineralogical aspect disclosed about the drug and the disease, which strongly supports that it possesses anti- ulcer (Hyperacidity),anti-inflammatory and analgesic activities, for that purpose it has been selected for this study The drug was subjected to analysis such as physicochemical, phytochemical,chemical and also instrumental analysis which provided the key ingredients present in the drug thus it accounts the efficacy of the drug,From the literature evidence, Physico chemical analysis, chemical analysis,Toxicological evaluation and Pharmacological studies, the drug Indhuppu bhavanai have anti-ulcer, anti-inflammtory and analgesic activity. It was concluded that the Indhuppu bhavanai can be used in the management of Pitha gunmam Hyperacidity.

Keywords: Safety; Pharmacological Profile; Indhuppu Bhavanai

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MICROBIAL SCREENING OF SIDDHA DRUG "INDHUPPU CHOORANAM"

Abstract

Siddha system of medicine is one of the Indian system of medicine which is practiced in southern part of India. There are many herbo-mineral medicines in Siddha system for various diseases. Of which "*Indhuppu Chooranam*" is one of the herbo - mineral preparation which is used for treating *agnimantham, vanthi* (vomiting) *and magotharam*. And contamination of herbal drugs by microbes is a very common phenomenon which may lead a toxic effect instead of its medicinal property or may be ineffective. This paper is intended to scientifically validate its efficacy through preliminary microbial contamination and anti-microbial activity of the drug. This study concluded that the *Indhuppu chooranam* was screened for their antimicrobial activities against both bacterial and fungal pathogens (0.5 MCF) using agar well diffusion method along with a standard broad-spectrum antibiotics Chloramphenicol (30mcg) for bacterial pathogens and Ketoconazole (30mcg) for fungal pathogen. After incubation, the zone production on the plates were read as per the standard method and correlated with the result of Chloramphenicol and Ketoconazole. The results illustrated that the given samples have no antibacterial against the tested pathogens.

Keywords: Siddha, Indhuppu Chooranam, microbial contamination, anti-microbial activity.

ANTIHELMINTIC ACTIVITY OF SAARANAI CHOORANAM (SC) – A SIDDHA HERBOMINERAL FORMULATION

Abstract:

Helminthiasis is a worldwide and one of the common disease of all age groups. The most common infection is through contaminated vegetables, drinking water and raw or undercooked meat. These contaminated foods may contain eggs of nematodes. Aim of my study: To evaluate the anthelmintic activity of Saaranai Chooranam (SC), a siddha herbomineral formulation, which having the plant material Saaranai – Trianthema portulacastrum and Indhuppu – Sodium Chloride Impura. Indhuppu also having the property of anthelmintic & commonly used in worm

infestations. The extract showed significant activity than the standard drug albendazole. Materials and Methods: Worms collection Indian earthworms Pheretima posthuma of nearly equal size (8 to 10 cm) were collected from the water-logged areas. Procedure: Samples for in vitro study were prepared by dissolving and suspending (0.12, 0.25, 0.5, 1.25 and 2.5g) of hydro alcoholic extract in 50ml of distilled water at different concentrations ranging from 25, 50, 100, 250 and 500mg/ml. Study Type: In Vitro: Pheretima posthuma was placed in Petri dish containing 10ml of the extract. Each Petri dish was placed with six worms and observed for paralysis and death. The results were expressed in comparison to the standard drug Albendazole (20 mg/ml). Results: The data were statistically analysed by one-way ANOVA followed by Dennet's test, and significant p value was considered as <0.05.

Keywords: Saaranai chooranam, Siddha medicine, Pheritima posthuma, Anthelmintic activity.

THE AMBROSIAL MEDICINE OF SIDDHA-"BRAHMI KARPAM"

Abstract:

Kayakarpam is one of the techniques carried out by siddhars to protect our body from death and decay. It is a restorative, constrictive agents which arrest morbific tendencies and decays. Kayakarpam which means anti-oxidant, is an ambrosial medicines taken by the Siddhars for the prevention of death. According to studies on life expectancy, it is revealed that in recent days, it is reduced to the senior age (51-70) due to our lifestyle. This made us to work on this topic to prevent the aging process and diseases. The formulation of "brahmi karpam" was prepared as per the Siddha literature and studied to total antioxidant activity, nitric oxide radical scavenging and hydroxyl radical scavenging. The outcomes of the above assays are furnished in the results.

Keywords: Brahmi Karpam, Rejuvenating herbs, In-vitro, Anti-oxidant Study, Siddha system.

FTIR ANALYSIS OF SIDDHA MINERAL DRUG SEENA LAVANA PARPAM

Abstract

The Siddha system of medicine is one among part of the AYUSH system. The Siddha medicine is used to treat various diseases, especially in Genito-urinary tract diseases. In siddha system medicines were prepared from Herbals, Minerals, salts and Metals as well as the marine and animals products also used in the system. The drug Seena lavana Parpam is basically salt in taste and crystal powder in nature which is widely used in Siddha medicine for Genito-urinary tract disorders.

Keywords: Siddha Medicine, Seena lavana Parpam ,Genito urinary tract disorder.

REVIEW ON SIDDHA DRUG: PANCHALAVANA PARPAM.

Abstract

In Siddha system, medicine includes the herbal products, inorganic substances and animal products that lead to different formulations ranging from low shelf life drug to high shelf life drug. Parpam is the powdered substance generally obtained by calcification of purified metals, minerals and animal products by specific process. The current review aims to explore about Siddha formulation “Panchalavana Parpam” for the management of Kiraani and associated symptom. The details about the Siddha formulation “Panchalavana Parpam” was acquired from Siddha text Boghar 700: Pg. No: 49 and the details of each ingredients of above drug were collected from various Siddha texts. According to the results, all five ingredient of this preparation having the potency of relieving Soolai, Kiraani, gunmam, like gastero intestinal tract diseases. This preliminary literature review related research provides useful documentary evidences for medicinal ingredients those are commonly using to prepare the medicine for health management.

Key Words: Panchalavana Parpam, gunmam, Kiraani Siddha system.

THERAPEUTIC EFFECTIVENESS OF A SIDDHA FORMULATION NILAVAAGAI CHOORANAM: A REVIEW

Abstract

Siddha system of medicine is one of the ancient systems of medicine practiced among Tamil speaking community particularly in southern parts of India. The medicine in this system prepared from raw drugs which is obtained from herbals, mineral, metals and animal products. "*Nilavaagaichooranam*" is one of the Sastric Siddha herbo-mineral preparation with ingredients of 18 herbal and one mineral ingredient. It is used to treat the skin disorders particularly for "*Karappan* (Eczema)". This review is aimed to bring out scientific evidence for the therapeutic usuage of "*Nilavaagaichooranam"* in skin disorders particularly in *Karappan* (Eczema) and focused on the pharmacological activity responsible for the curative nature of the drug in *Karappan* (Eczema). Most of the raw drugs used for the preparation of *Nilavaagai chooranam* have antihistamine activity, anti-inflammatory activity, immunomodulatory activity hence justifying its usage in *Karappan* (Eczema).

Keywords: Siddha Medicine, Nilavaagaichooranam, Karappan, Pharmacological activity.

EVALUATION OF PHYSICOCHEMICAL PROPERTIES OF A POLYHERBOMINERAL SIDDHA FORMULATION SAMUTHRA CHOORANAM

Abstract:

The ancient Siddha system of medicine is unique in its way of healing diseases. A widespread evidences on herbs (Mooligai), minerals (Thaathu) and animal products (Jeevam). However as per WHO guidelines, for any medical formulation standardization plays an inevitable role before marketing. This study is to analyse the physicochemical properties of a polyherbomineral Siddha formulation Saamuthra Chooranam for Eri gunmam (Acid Peptic ulcer Disease). Aim and Objectives: The aim of this study is to determine the physicochemical properties of a poly herbomineral formulation Saamuthra Chooranam (SAC). Materials and Methods: The drugs of Saamuthra Chooranam were authenticated by the Department of Medicinal Botany, Government Siddha Medical College, Palayamkottai. Further those drugs

were purified as mentioned in classical Siddha literatures. The drugs were finely powdered and analysed for the physicochemical parameters including the percentages of total ash, acid insoluble ash, water soluble ash and sulphated ash, water soluble extractive, alcohol soluble extractive, pH value, Swelling index, Foaming index, Volatile oil percentage and total fat percentage. Results and Discussion: The Saamuthra Chooranam (SAC) showed a pH value of 4.58% that indicates the slight acidic nature. 4.5% of volatile oil content was found from the studies. Conclusion: The physicochemical parameters are evaluated for Saamuthra Chooranam that would be helpful for further preclinical studies on it.

Keywords: Eri gunmam, Saamuthra chooranam, Physico chemical parameters, Peptic Ulcer Disease.

STANDARDIZATION AND QUALITY CONTROL PARAMETERS OF SIDDHA POLY-MINERAL

Abstract:

According to the traditional Siddha literature Kannusamiyam Ennum Vaidhiya Saegaram, the Siddha poly-mineral formulation of the tested drug Dhasalavana Dhravagam has unique properties being a specialized liquid form of medicine indicated for Poly Cystic Ovarian Syndrome. The aim of this present study was to standardize the purity, quality and safety of the tested drug Dhasalavana Dhravagam. The physico-chemical characterization of the tested drug was revealed by qualitative biochemical analysis and modern instrumental techniques such as Fourier Transformation Infrared Spectroscopy (FT-IR), Scanning Electron Microscopy (SEM). Physico-chemical parameters revealed that the tested drug is a clear colourless liquid with no characteristic odour and specific gravity at 25˚C is 1.214, acidic (pH 5.7) in nature. The qualitative biochemical analysis revealed that the presence of Sulphate, Chloride, Phosphate, Calcium, Sodium, Potassium, Magnesium, Ammonium, Iron, Zinc and Copper. The FT-IR study revealed the presence of functional groups like phenols and alcohols, amine, primary amines, nitro groups, nitro methane, alkyl halides in Dhasalavana Dhravagam. The SEM analysis showed that the size of the particles to be 119nm, 122nm, 150nm, 159nm, 166nm in the tested drug. So it was concluded that the Dhasalavana Dhravagam contains essential

elements which are responsible for curing PCOS. Also the drug possesses no toxic metals which ensures its safety in therapeutic usage.

Keywords: Dhasalavana Dhravagam, Siddha, PCOS, Physico-chemical, instrumental analysis, poly-mineral formulation.

URINE

In this modern era people have tried many ways to solve disease problem and findnew cure that is more effective than the conventional medication. Some medication way is maybe seems weird for certain people but some others believed that those ways are effective to be done.

One of unique healing method that human ever experienced is urine therapy or also known as urotherapy. Maybe its sound unbelievable but yes, its happen and being used by several person to overcome several health problem.

HISTORY

Though urine has been used for diagnostic and therapeutic purposes in several traditional systems, and mentioned in some medical texts, auto-urine therapy as a system of alternative medicine was popularized by British naturopath John W. Armstrong in early 20th century. Armstrong was inspired by his family's practice of using urine to treat minor stings and toothaches, by a metaphorical reading of the Biblical Proverb 5:15 "Drink waters out of thine own cistern, and running waters out of thine own well", and his own experience with ill-health that he treated with a 45-day fast "on nothing but urine and tap water".

Starting in 1918, Armstrong prescribed urine-therapy regimens that he devised tomany thousands of patients, and in 1944 he published The Water of Life: A treatise on urine therapy, which became a founding document of the field.

MEDICINAL PROPERTIES OF URINE

It may sound strange but urine’s medicinal properties were discovered by our ancient stages. Charak samhita has described the role of urine in anointing, pasting, enema, purgatives, fomentation and abdominal distension.

1. Urine is used in poisoning also.
2. Urine endowed with properties of being sharp, pungent, saline and non unctuous is useful in diseases
3. Urine promotes appetites and digestion.
4. Urine acts as anti poison and kills worms in the body.
5. Urine gives appreciable results in anemia. Ayurvedic texts have described properties of eight types of urine.
6. Urine is used in the form of internal application by drinking and through its external application by mixing it with some powered drugs.

MODERN ASPECT OF GOAT URINE

Animal urine and dung actually have quite long histories as medicinal. In fact, urine was probably one of the few truly sterlile liquids available during the golden age of piracy (although the need for sterility was not actually understood at this time.

Some people claim that urine is actually a wonderful natural medicine As Martha Christy details, a person's "Urine is an enormous source of vital nutrients, vitamins, hormones, enzymes and critical antibodies that cannot be duplicated or derived from any other source.

URINARY PARAMETERS IN GOAT URINE

Colour	: Pale yellow, dark brown
URINE VOLUME	: 10-40ml/kg
SPECIFIC GRAVITY	: 1.020-1.040
ODOUR	: clear indifferent aromatic
PH	: 7.5 -8.5
PROTEIN	: Negative

USES OF GOAT URINE

1. Healing cancer
2. Heart disease
3. Allergies
4. Auto-immune disease
5. Diabetes
6. Asthma

7. Infertility
8. Infections, wounds and on and on.

The usually staid Robert James has the most to say on this particular topic. Headvises his readers that goat's urine "is recommended above say on this particular topic.

He advises his readers that goat's urine "is recommended above that of all otherAnimals for dissolving the Stone [kidney and urinary tract stones], and promoting a discharge of Urine; for which Reason it is proper in a Dropsy. (Dropsy – anaccumulation of fluid under the skin – is often accompanied by poor urine flow.) He goes on to suggest using the goat's urinary bladder can be "dry'd and reduced to a Powder "because" it is said to be a medicine of peculiar Efficacy in an Incontinence of Urine".

OTHER USES OF GOAT'S URINE

The goat's urine is gently heated and filtered, when it is given at the doses of 1 – 1½ oz. in Nardostachys grandiflora (sodamanjil), it controls epilepsy.

GOAT URINE IN AYURVEDA

Goat urine is used for its medicinal benefits in Ayurveda. It is used both for oral consumption and external application in itchy skin disorders, Tinea infection etc.

Urine of the goat is astringent, sweet, whole some and balances all the threeDoshas

Goat urine is used as liquid binding agent in Vilwadi Gulika. It is used in treatingscorpin bite, rhodent bite etc.

Goat urine for external application:

Goat urine is applied externally for, itching skin diseases, ringworm, dermatophytosis or tinea infection, Herpes, spreading skin diseases

Mustard oil cooked with 4 times of goat urine is useful for massage for a patient sufferingfrom epilepsy.

USAGE IN UTERINE DISORDERS

Medicated bougie is prepared of Saussurea lappa, Piper longum, buds of Calotropis gigantea and rock salt by triturating with goat's urine. It is kept inserted into the vagina which cures Karnini type of uterine diseases. All the therapeutic measures prescribed for the treatment of diseases caused by kapha are also beneficial for the cure of this ailment.

RECENT RESEARCH

P-ETHYLPHENYLSULPHURIC ACID IN GOAT URINE

Abstract:

Although it was suggested by Baumann in 1879 that p-ethylphenol might beformed in the animal body by the degradation of tyrosine, the presence of this substance was not reported until 1927, when Walbaum & Rosenthal (1927) and Pfau (1927), isolated it from the dried scent glands of the beaver.More recently, Lederer (1943, 1946) isolatedp-ethylphenol from an extract of acid-hydrolyzed pregnant mare urine. In the presentwork the isolation ofp-ethylphenylsulphuric acid from urine as the potassium salt is reported for the first time. This substance was initially obtained from the urine of an ovariectomized goat, which had received large doses of progesterone and hexoestrol. Subsequently it was also isolated from the urine of a normal goat. In view of the belief (Williams, 1947) that p-cresol is quantitatively the most important phenol in the urine of vertebrates, it is noteworthy that no clearcut evidence has been obtained for the presence of p-cresyl sulphuric acid in the urine exanmined. The fact that the derivatives of p- ethylphenol, prepared from the hydrolysis product of the sulphate, required frequent recrystallization before constant melting points could be obtained, might suggest that the isolated substance was contaminated with appreciable amounts of the sulphate of p-cresol or of other phenols. Nevertheless, the present work indicates that in the goat p-ethylphenylsulphuric acid is excreted in larger amount than p-cresylsulphuricacid.

CEREBRAL SODIUM/ANGIOTENSIN INTERACTION STUDIED BY RIA-

Abstract:

Radioimmunoassay determination of urinary arginine vasopressin (AVP) was employed to study quantitatively cerebral Na+/angiotensin II (A II) interaction in the hydrated goat. The solutions infused for 30 min at 0.02 ml/min into the lateral cerebral ventricle were: a) Hypertonic (0.25 M) NaCl, b) AII (0.3 ng/kg min) in isotonic (0.15 M) NaCl, and c) A II (doses as in b) in 0.25 M NaCl. The mean amounts of AVP detected in the urine in response to the various infusions were: a) 2.8 ng, b) 3.6 ng, and c) 13.3 ng. Thus, the A II/NaCl stimulation induced a detected renal excretion of AVP that was two times as large as the sum of the effects recorded in response to separate stimuli. Infusion c) invariably induced a pronounced, long-lasting inhibition of the water diuresis, intense thirst, and natriuresis. The corresponding effects of infusions a) and b) were much weaker and, as regards thirst and natriuresis, inconsistent. The determinations of renal AVP excretion provide additional and rather direct evidence for the concept of a synergistic action of elevated cerebrospinal fluid [Na+] and A II as concerns cerebral control of fluid balance. With regard to this kind of interaction, the observed dipsogenic and natriuretic effects mainly confirm earlier observations.

BIOCHEMICAL ANALYSIS OF NORMAL GOAT URINE

Abstract:

A total of one hundred 24-hour samples of normal male goat urine was investigated, fifty from each of the two recognised Egyptian breeds - Zaraibi and Beladi goats.

A study was made of the general characteristics of goat urine, including the volume, colour, aspect, odour, pH, specific gravity, and total solids.

Quantitative chemical analysis was carried out on goat urine to establish the normal contents of certain physiological constituents which are of diagnostic value. Nitrogenous constituents included the determination of total nitrogen, urea, uric acid, allantoin, creatinine, creatine, and ammonia. Nonnitrogenous constituents involved the determination of carbonates and bicarbonates; total phosphates and sulphates; chlorides, calcium and magnesium.

NITROGENOUS CONSTITUENTS IN THE URINE OF CATTLE, SHEEP AND GOATS

Abstract:

Ten samples of urine from dairy cows, five from sheep and four from goats were analysed to assess the distribution of urinary nitrogen (N) among various chemical constituents in order to gain a better understanding of the reactions undergone by urinary N in soil. Total N in the cow urine ranged from 6.8 to 21.6 g N litre^{-1}, of which an average of 69% was present as urea, 7.3% as allantoin, 5.8% as hippuric acid, 3.7% as creatinine, 2.5% as creatine, 1.3% as uric acid, 0.5% as xanthine plus hypoxanthine, 1.3% as free amino acid N and 2.8% as ammonia. In the sheep urine, total N ranged from 3.0 to 13.7 g litre^{-1} of which an average of 83 % was present as urea; creatine accounted for 5.3% of the N; hippuric acid and allantoin both accounted for 4.3%, while each of the other constituents amounted to less than 1% of the total N. The goat urine was similar to the sheep urine but with a lower ratio of creatine to creatinine and a somewhat higher proportion (2.0 %) of the total N as amino acid.

EVALUATION OF IN VITRO ANTI-MICROBIAL ACTIVITY OF GOAT URINE PEPTIDES

Abstract:

Indiscriminate uses of antibiotics have caused microbial resistance and also lead to many side effects. To overcome from such situation plants and animal materials are widely used the treating various ailments having antimicrobial properties. In Ayurveda, goat urine has been used to improve general health of an individual. Therefore, present study was undertaken to study in vitro antibacterial potential of urinary peptides of goat against S. aureus and E. coli. The method employed extraction of urinary peptides from goat urine and subsequently antibacterial activity of extracted urinary peptides was studied by radial diffusion assay technique and microtiter broth dilution method. The results showed good antibacterial activity of goat urinary cationic antimicrobial proteins against test bacterial strains by exhibiting significant zone of inhibition. Thus it can be concluded

that cationic urinary peptides of goat possess good inhibitory activities against bacterial strains and can be used to control infectious diseases.

APPLICATION OF COW AND GOAT URINE IN TRADITIONAL SYSTEMS OF MEDICINES: A BRIEF REVIEW

Abstract:

In spite of the progresses in science and technology, India is well-known for its traditional system of medicine. Traditional use of medicine is practiced since the era of vedic. The Indian traditional system of medicine such as Ayurveda, Siddha, and Unani has a very rich history of their effectiveness. As India is a rich repository of herbal and medicinal plants, these traditional systems of medicine use herbal plants and minerals as the vital source for drugs. Along with the use of herbal plants, the Indian traditional system of medicine, especially Ayurvedic system, uses animal urine as a source of drug. In Ayurveda, the properties of the urine of eight different animals along with the human urine and also its uses are described. Basically, cow's urine (CU) is used mainly for the treatment of various diseases in Ayurveda. Apart from CU, urine of the other animals such as goat, sheep, buffalo, elephant, horse, camel, and donkey were also used as remedies for the treatment of different diseases. An attempt has been made in this article to bring forth the traditional and therapeutic use of cow and goat urine (GU) and also highlights its efficacy. This article will provide brief information on cow and GU and their application in traditional practice of medicine which may help people working in this area.

GREEN EXTRACTION USING GOAT URINE AS MENSTRUUM AND EVALUATION FOR IN VITRO ANTIMYCOBACTERIAL ACTIVITY OF CURCUMA ZEDOARIA AND CURCUMA CAESIA RHIZOMES COLLECTED FROM ASSAM

Abstract:

Background: In Indian traditional system of medicine, goat urine is believed to have therapeutic value and is also reported its use in the treatment of tuberculosis (TB). On the basis of reported traditional uses for the treatment of TB and/or leprosy, Curcuma caesia and Curcuma zedoaria rhizomes were selected. Aim: It was aimed to

study the antimycobacterial activity of goat urine and extracts of the rhizome of the two plants obtained using goat urine as menstruum. Materials and Methods: The rhizomes were amassed from in and around Dibrugarh. The clean sliced rhizomes were dried at room temperature. The dried rhizomes of both the plant species were extracted using raw and photoactivated goat urine as menstruum by maceration process. In vitro antimycobacterial activity of the rhizome extracts was carried out by disc diffusion method. Results and Discussion: Crude photoactivated goat urine extracts of both the plants C. caesia (paGuCc) and C. zedoaria were found to have higher antimycobacterial activity against Mycobacterium smegmatis than that of raw goat urine extracts of both the plants C. caesia and C.zedoaria. Among all paGUCc extracts were found to exhibit highest antimycobacterial activity. Conclusion: The extracts obtained using photoactivated goat urine showed higher activity than the extracts obtained using raw goat urine. Goat urine also exhibited antimycobacterial activity, but not as much as the extracts. Thus, it is proved that the extracts and goat urine have antimycobacterial activity and extracting with goat urine and thus have improved activity.

RESPONSE OF FERTILIZATION WITH GOAT URINE FERMENTATION AGAINST THE GROWTH OF LEGUMINOSA INDIGOFERA (INDIGOFERA ZOLLINGERIANA) AND TURI (SESBANIA GRANDIFLORA) AS ANIMAL FEED INGREDIENTS IN SAMOSIR REGENCY

Abstract:

The need for animal feed in Pangururan District, Samosir Regency is very lacking, and livestock waste is also a problem in the community environment, so the utilization of EM4 goat's urine waste is expected to increase the growth of Indigofera (Indigofera zollingeriana) and Turi (Sesbania grandiflora) legumes in appropriate doses. This research was conducted in Pangururan Subdistrict, Samosir Regency, North Sumatra from April to August 2018. The research design used in this research was factorial randomized block design (RBD) which was divided into 2 treatment groups and 3 replications. The first factor is the type of plant (L), L1 = Indigofera zollingeriana and L2 = Sesbania grandiflora and the second factor is the dose of fertilization (P), P0 = without fertilization (Control), P1 = 200 ml / polybag, P2 = 250

ml / polybag, P3 = 300 ml / polybag, and P4 = 350 ml / polybag). Parameters observed were plant height, number of stalks, number of leaves, and stem diameter. The results showed that respons of liquid organic fertilizer of goat urine fermented by EM4 with various doses of fertilization had a significant effect on the parameters of the study, namely plant height, number of stalks, number of leaves, and stem diameter. The conclusion of this study is that fertilization with a dose of 200 ml / polybag gives optimal results in the growth of Indigofera (Indigofera zollingeriana) and Turi (Sesbania grandiflora) legumes.

SIDDHA ASPECTS OF GOAT URINE

சிறுநீர்

வேறு பெயர் :

நீர், அமுரி, மூத்திரம்

இதனை,

“.....நீர் சிறு நீரமூரி
மூத்திரமென் றேபெயரோர் மூன்று”

என்ற அடிகளால் உணரலாம்.

பல மிருகங்களின் சிறுநீர் மருந்துகளில் சேருகின்றது. இவைகளின் குணங்கள் பதார்த்தகுண சிந்தாமணியில் விளக்கமாக கூறப்பட்டிருக்கின்றது.

வெள்ளாடு மூத்திர குணம்,

“ சோபையொடு பாண்டுவைத்து ரத்தும் பலவீச்சு
தாபமகற் றும்முதிரத் தைப்போக்கும் - கோபமுடன்
உள்ளாட்டுத் துர்ச்சதையோ டோங்குதர நோயகற்றும்
வெள்ளாடு மூத்திரம்வி ரைந்து ”

வெள்ளாட்டு மூத்திரம் சோபை, பாண்டு, பற்பல வீக்கத்தினெரிச்சல், இரத்தப்போக்கு, துர்மாமிசம், மகோதரம் இவைகளை நீக்கும்.

4. MATERIALS AND METHODS

General:

1. Medium porcelain pot - 1
2. Measuring jar - 1
3. Weighing machine (electronic)
4. Fine cloth
5. Vessel - 1

These are basic things for purification of mineral and metals, handling with care into minimum standard operating procedure.

Porcelain pot is used to prevent chemical changes.

PURIFICATION OF INDHUPPU :

First of all I will collect the raw drug and then getting authentication. I will go for purification procedure as per literature. After that subjected to standardization procedures as per PLIM guidelines.

METHOD:

Required materials :

1. Indhuppu
2. Goat urine

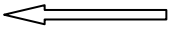
Method of purification :

The Rock salt is kept soaked in goat's urine for three naazhigai and kept in sunlight to obtain dried and purified form.

Ref: Gunapadam - Thathu jeeva vaguppu part II and III - by Dr.R.Thiyagarajan. page no 370.

+

UNPURIFIED INDHUPPU GOAT URINE



AFTER ONE NAAZHIGAI IMMEDIATELY AFTER MIXING

AFTER TWO NAAZHIGAI	AFTER THREE NAAZHIGAI

COVERED WITH FINE CLOTH	IN PORCELAIN VESSEL

Then it is kept in sunlight until it is dried

AFTER 1O DAYS OF DRYING IN SUN

AFTER 20 DAYS OF DRYING IN SUN

FIGURE-4- PURIFICATION PROCESS OF INDHUPPU

RESEARCH TYPE: Analytical Study Research

RESEARCH PERIOD: 24 months

WORK PLAN:

1. TEXT REFERENCE OF RESEARCH DRUG
2. PROCUREMENT AND AUNTHENTICATION OF RAW DRUGS
3. PURIFICATION OF RAW DRUGS
4. BIOLOGICAL SCREENING
5. CHARACTERIZATION OF DRUGS
    - 5.1 PHYSIOCO CHEMICAL ANALYSIS
    - 5.2 BIO CHEMICAL ANLYSIS
    - 5.3 ELECTRO CHEMICAL ANALYSIS
        - 5.3.1 FTIR
        - 5.3.2 ICPOES
        - 5.3.3 XRD

ANALYTICAL STUDY OF INDHUPPU

(Sodium chloride *impura – Rock Salt)*

The Indhuppu was subjected to the following analytical studies like Biological screening, physico- chemical analysis and quantitative analysis by using sophisticated instruments.

BIOLOGICAL SCREENING

The Unpurified Indhuppu and Purified Indhuppu were subjected to Biological screening by Sterility test by pour plate method and Test for Aflatoxin .This study was done at Noble Research Solutions, Chennai.

STERILITY TEST BY POUR PLATE METHOD:

OBJECTIVE

The pour plate techniques were adopted to determine the sterility of the product. Contaminated / unsterile sample (formulation) when come in contact with the nutrition rich medium it promotes the growth of the organism and after stipulated period of incubation the growth of the organism was identified by characteristic pattern of colonies. The colonies are referred to as Colony Forming Units (CFUs).

METHODOLOGY

Test sample was inoculated in sterile petri dish to which about 15 mL of molten agar 45oC were added. Agar and sample were mixed thoroughly by tilting and swirling the dish. Agar was allowed to completely gel without disturbing it. (about 10 minutes). Plates were then inverted and incubated at 37o C for 24-48 hours and further extended for 72 hrs for fungal growth observation. Grown colonies of organism was then counted and calculated for CFU.

MICROBIAL LIMIT TESTS OF INDHUPPU (*Rock salt*):

The following tests are designed for the estimation of the number of viable aerobicmicro-organisms present and for detecting the presence of designated microbial species in pharmaceutical substances. The term ‘growth’ is used to designate the presence and presumed proliferation of viablemicro-organisms.

In preparing media by the formulas given below, dissolve the soluble solids in the water, using heat if necessary, to effect complete solution and add solutions of hydrochloric acid or sodiumhydroxide in quantities sufficient to yield the required pH in the medium when it is ready for use. Determine the pH at 25º ± 2º.

Casein Soyabean Digest Agar Medium:

Pancreatic digest of casein - 15.0 g

Papaic digest of soyabean meal - 5.0 g

Sodium chloride - 5.0 g

Agar - 15.0 g

Water to 1000 ml Adjust the pH after sterilization to 7.3±0.2.

Sabouraud Dextrose Agar Medium (SDA medium):

Dextrose - 40 g

Mixtures of equal parts of peptic digest of animal tissue and pancreatic digest of casein 10 g

Agar - 15 g

Water to 1000 ml Mix, and boil to effect solution.

Adjust the pH after sterilisation to 5.6±0.2.

Sampling: Use 10 ml or 10 g specimens for each of the tests specified in the individual monograph.

Precautions:

The microbial limit tests should be carried out under conditions designed to avoid accidental contamination during the test. The precautions taken to avoid contamination must be such that they do not adversely affect any micro-organisms that should be revealed in the test.

TOTAL AEROBIC MICROBIAL COUNT:

Pretreat the sample of the product being examined as described below.

Products insoluble in water (non-fatty):

Suspend 10 g or 10 ml of the preparation being examined, unless otherwise specified,in buffered sodium chloride-peptone solution pH 7.0 or any other suitable

medium shown notto have antimicrobial activity under the conditions of the test and dilute to 100 ml with thesame medium. If necessary, divide the preparation being examined and homogenize thesuspension mechanically.

A suitable surface-active agent such as 0.1% w/v of polysorbate 80 may be added to assist the suspension of poorly wettable substances. If necessary, adjust the pH of the suspension to about 7.

Examination of the sample:

Determine the total aerobic microbial count in the substance being examined by any of the standard methods.

PLATE COUNT:

For Bacteria

Using Petri dishes 9 to 10 cm in diameter, add to each dish a mixture of 1 ml of the pretreated preparation and about 15 ml of liquefied casein soyabean digest agar at not more than 45º. Alternatively, spread the pretreated preparation on the surface of the solidified medium in a Petri dish of the same diameter. If necessary, dilute the pretreated preparation as described above so that a colony count of not more than 300 may be expected. Prepare at least two such Petri dishes using the same dilution and incubate at 30º to 35º for 5 days, unless a more reliable count is obtained in a shorter time. Count the number of colonies that are formed. Calculate the results using plates with the greatest number of colonies but taking 300 colonies per plate as the maximum consistent with good evaluation.

For Fungi :

Proceed as described in the test for bacteria but use Sabouraud dextrose agar withantibiotics in place of casein soyabean digest agar and incubate the plates at 20º to 25º for 5days, unless a more reliable count is obtained in a shorter time. Calculate the results using plates with not more than 100 colonies.

TEST FOR AFLATOXINS

Caution – Aflatoxins are highly dangerous and extreme care should be exercised in handling aflatoxin materials. This test is provided to detect the possible

presence of aflatoxins B1, B2, G1 and G2 in any material of plant origin. Unless otherwise specified in the individual monograph, use the following method.

Zinc Acetate – Aluminum Chloride Reagent – Dissolve 20 g of zinc acetate and 5 g of aluminum chloride in sufficient water to make 100 ml.

Sodium Chloride Solution – Dissolve 5 g of sodium chloride in 50 ml of water.

Solvent:

Standard samples was dissolved in a mixture of chloroform and acetonitrile (9.8 : 0.2) to obtain a solution having concentrations of 0.5 µg per ml each of aflatoxin B1 and aflatoxin G1 and 0.1 µg per ml each of aflatoxin B2 and aflatoxin G2.

Procedure:

Standard aflatoxin was applied on to the surface to pre coated TLC plate in the volume of 2.5 µL, 5 µL, 7.5 µL and 10 µL. Similarly, the test sample was placed and allow the spots to dry and develop the chromatogram in an unsaturated chamber containing a solvent system consisting of a mixture of chloroform, acetone and isopropyl alcohol (85: 10: 5) until the solvent front has moved not less than 15 cm from the origin. Remove the plate from the developing chamber, mark the solvent from and allow the plate to air-dry. Locate the spots on the plate by examination under UV light at 365 nm.

The four applications of the Aflatoxin Solution appear as four clearly separated blue fluorescent spots; the spot obtained from the Test Solution that was superimposed on the Aflatoxin Solution is no more intense than that of the corresponding Aflatoxin Solution; and no spot from any of the other Test Solutions corresponds to any of the spots obtained from the applications of the Aflatoxin Solution.

If any spot of aflatoxins is obtained in the Test Solution, match the position of each fluorescent spot of the Test Solution with those of the Aflatoxin Solution to identify the type of aflatoxin present. The intensity of the aflatoxin spot, if present in the Test Solution, when compared with that of the corresponding aflatoxin in the Aflatoxin Solution will give an approximate concentration of aflatoxin in the Test Solution.

LIMITS FOR ASU PRODUCTS

Table 3 - Standard Limits of Aflatoxins

PARAMETER	SPECIFICATIONS
AFLATOXIN	
B1	0.5 ppm
B2	0.1 ppm
G1	0.5 ppm
G2	0.1 ppm

CHARACTERIZATION OF DRUGS

PHYSIOCO-CHEMICAL ANALYSIS:

The Physico-chemical parameters of Unpurified Indhuppu and Purified Indhuppu were studied by the following Proceduces.

QUANTITATIVE ANALYSIS:

PHYSICO CHEMICAL EVALUATION OF DRUG:

Loss on Drying: 10gm of test samples of both U.I & P.I drug was accurately weighed in an evaporating dish and was air dried at 105^{o}C for 5 hours and then weighed.

Determination of Total Ash:3 g of test drug U.I & P.I was accurately weighed in silicadish and incinerated at the furnace a temperature 400 ºC until it turns white in color which indicates the absence of carbon. Total ash will be calculated with reference to the weight of the air-dried drug.

Total Ash = Weight of Ash/Wt of the Crude drug taken

Determination of Acid Insoluble Ash: The ash obtained by total ash test will be boiled with 25 ml of dilute Hydrochloric acid for 6mins. Then the insoluble matter is collected in a crucible and will be washed with hot water and ignited to constant

weight. Acid insoluble ash will be calculated with reference to the weight of air-dried ash.

Acid-insoluble Ash = Weight of Ash/Wt of the Crude drug taken

Determination of Water Soluble Ash: The ash obtained by total ash test will be boiled with 25 ml of water for 5 mins. The insoluble matter is collected in a crucible and will be washed with hot water, and ignite for 15mins at a temperature not exceeding 450ºC. The weight of the insoluble matter will be subtracted from the weight of the ash; the difference in weight represents the water-soluble ash. Calculate water-soluble ash with reference to the air-dried drug.

Water Soluble Ash = Weight of Ash/Wt of the Crude drug taken

Determination of pH : About 5 g of test samples U.I & P.I will be dissolved in 25ml of distilled water and filtered the resultant solution is allowed to stand for 30 mins and then subjected to pH evaluation.

BIOCHEMICAL ANLYSIS

The Biochemical analysis were carried out in the samples of Unpurified Indhuppu and Purified Indhuppu. The study was done at Biochemistry Lab, Department of Bio-chemistry, Govt. Siddha Medical College, Palayamkottai, Tirunelveli.

PREPARATION OF THE EXTRACT:

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

TEST FOR CALCIUM:

2ml of the prepared extract taken in a clean test tube. To this add 2ml of 4% ammonium oxalate solution and appearance of white precipitate was checked.

TEST FOR SULPHATE:

2ml of the extract was added to 5% barium chloride solution in a test tube and appearance of white precipitate was checked.

TEST FOR CHLORIDE:

The extract was treated with silver nitrate solution and appearance of white precipitate was checked.

TEST FOR CARBONATE:

The substance was treated with concentrated HCL and formation of effervescence of white precipitate was checked.

TEST FOR STARCH:

The extract was added with weak iodine solution and appearance of blue was checked.

TEST FOR FERRIC IRON:

The extract was acidified with glacial acetic acid and potassium ferrocyanide. Then appearance of blue colour was checked.

TEST FOR FERROUS IRON:

The extract was treated with concentrated nitric acid and Ammonium Thiocyanide solution.Appearance of blood red colour was checked.

TEST FOR PHOSPHATE:

The extract was treated with ammonium molybdate and concentrated nitric acid. Appearance of yellow precipitate was checked.

TEST FOR ALBUMIN:

The extract was treated with esbach's reagent and appearance of yellow precipitate was checked.

TEST FOR TANNIC ACID:

The extract was treated with ferric chloride and appearance of black precipitate was checked.

TEST FOR UNSATURATION:

Potassium permanganate solution was added to the extract and discolouration was checked.

TEST FOR THE REDUCING SUGAR:

5ml of Benedict's qualitative solution was taken in a test tube and allowed to boil for 2 minutes and add 8 to10 drops of the extract and again boil it for 2 minutes. Colour change was checked.

TEST FOR AMINO ACID:

One or two drops of the extract was placed on a filter paper and dried well. After drying, 1% Ninhydrin is sprayed over the same and dried it well. Appearance of Violet Colour was checked.

TEST FOR ZINC:

The extract was treated with potassium ferro cyanide and appearance of white precipitate was checked.

ELECTRO CHEMICAL ANALYSIS

FOURIER TRANSFORM INFRA RED (FTIR)

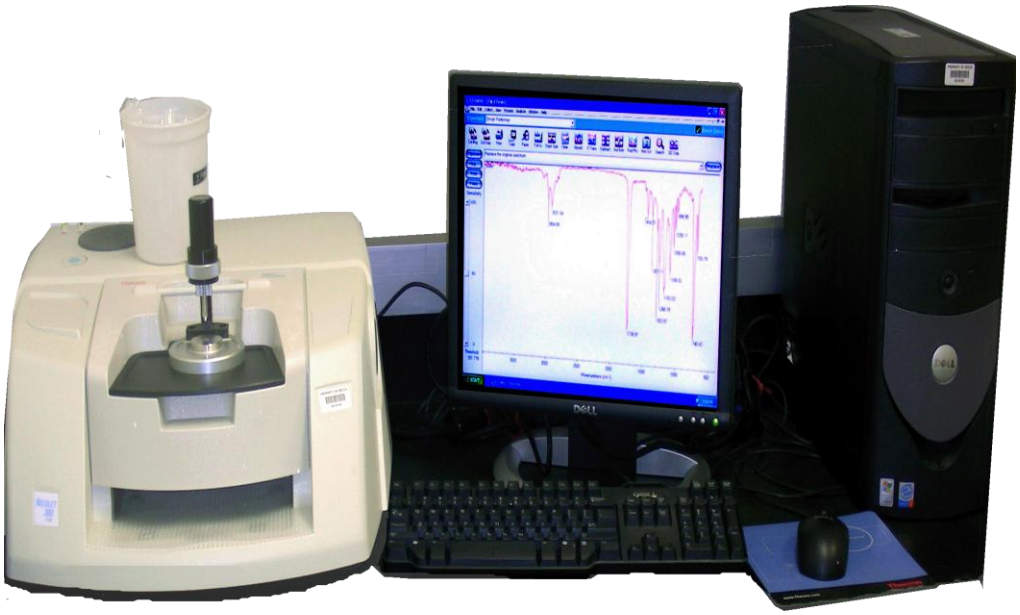


FIGURE-5 - FOURIER TRANSFORM INFRA RED (FTIR)

FTIR was done at SAIF, IITM, Chennai.

The FTIR analysis were carried out in the samples of Unpurified Indhuppu and Purified Indhuppu.

Infrared spectroscopy has been a work horse technique for materials analysis in the laboratory for over seventy years. An infrared spectrum represents a fingerprint of a sample with absorption peaks which correspond to the frequencies of vibrations between the bonds of the atoms making up the material. Because each different material is a unique combination of atoms, no two compounds produce the exact same infrared spectrum. Therefore, infrared spectroscopy can result in a positive identification (qualitative analysis) of every different kind of material. In addition, the size of the peaks in the spectrum is a direct indication of the amount of material present. With modern software algorithms, infrared is an excellent tool for quantitative analysis.

PROCEDURE:

The Perkine Elmer Spectrum One Fourier Transform Infrared (FTIR) Spectrometer was used to derive the FTIR Spectrum of test sample placed in Potassium Bromide (KBr) discs with scan rate of 5 scan per minute at the resolution 4cm-1 in the wave number were recorded 4000-500 the FT-IR Spectrum under Standard condition . FT-IR Spectra were used to determine the presence of the functional groups and bands in the samples of Unpurified Indhuppu and Purified Indhuppu.

ICP-OES (INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROMETRY)

ICP-OES was done at SAIF, IITM, Chennai.

FIGURE-6 - INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROMETRY

The ICP-OES analysis were carried out in the samples of Unpurified Indhuppu and Purified Indhuppu.

ICP Optical Emission Spectrometry Principle:

ICP, abbreviation for Inductively Coupled Plasma, is one method of optical emission spectrometry. When plasma energy is given to an analysis sample from outside, the component elements (atoms) are excited. When the excited atoms return to low energy position, emission rays (spectrum rays) are released and the emission rays that correspond to the photon wavelength are measured. The element type is

determined based on the position of the photon rays, and the content of each element is determined based on the rays intensity.

To generate plasma, first, argon gas is supplied to torch coil, and high frequency electric current is applied to the work coil at the tip of the torch tube. Using the electromagnetic field created in the torch tube by the high frequency current, argon gas is ionized and plasma is generated. This plasma has high electron density and temperature (10000K) and this energy is used in the excitation-emission of the sample. Solution samples are introduced into the plasma in an atomized state through the narrow tube in the center of the torch tube.

Equipment

Equipment for ICP optical emission spectrometry consists of a light source unit, a spectrophotometer, a detector and a data processing unit. There are several types of equipment based on differences in the Spectrophotometer and the detector. The most common type is shown in the Figure.

1. **Sequential type**

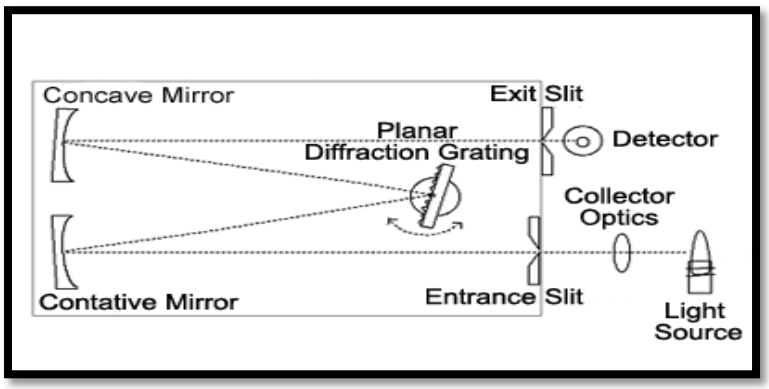


Figure 7 : Sequential Type ICP-OES

A spectrophotometer with a Czerny-Turner monochrometor and a detector with a photomultiplier is most common for this type. With this equipment, programmed wavelength of the spectrophotometer is consecutively varied to measure multiple elements. This causes rather long measuring time, however, with its high resolution spectrophotometers, it is favorable for measurement of high-matrix samples.

2. Simultaneous Type

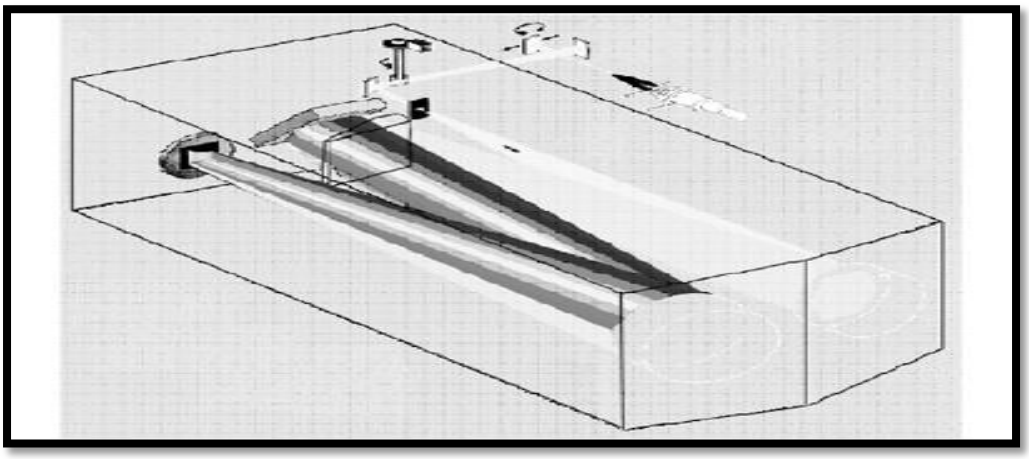


Figure 8 : Simultaneous ICP-OES

This type typically uses an echelle cross disperser in spectrophotometers and semi-conductor detector such as CCD for the detector. Echelle cross disperser disperses light of measurable wavelength range two-dimensionally by combining prism and echelle diffraction grating. Combination of echelle cross disperser and a CCD detector enables multi-element measurement at any wavelength. The most notable feature of this equipment is the high-speed measurement, providing information on all 72 measurable elements in measurements of 1 to 2 minutes normally.

Equipment: Simultaneous ICP-OES, **PERKIN ELMER OPTIMA 5300 DV**

Sample preparation: 0.5g of test sample Unpurified Indhuppu and Purified Indhuppu drug is measured, and then dissolved in a decomposition vessel with nitric acid into 10ml solution.

XRD

XRD was done at SAIF, IITM, Chennai.

The XRD analyses were carried out in the samples of Unpurified Indhuppu and Purified Indhuppu.

Fig-9 - X-Ray Diffraction (XRD) Analysis:

X-Ray Diffraction (XRD) Analysis:

XRD is a compact advanced instrument. When X-rays falls over a crystal, it diffracts in a pattern characteristic to its structure. A diffraction pattern plots Intensity against the angle of detector, 2. Diffraction occurs when light is scattered by a periodic array with the range of order, producing constructive interference at specific angles. The pattern contains information about the atomic arrangement in crystal. Amorphous materials like glass do not have periodic array with long range order, so they do not produce any significant diffraction pattern.

Benefits:

It serves a major role in all stage of drug development, testing and production.It is an essential part of analytical research and development, quality

control of the active ingredients, excipients and final products. It helps in elucidation of the relevant polymorphic and pseudo-polymorphic forms in pharmaceutical development.

Advantage:

The XRD analysis of crystalline compounds gives a diffraction pattern consisting of a well-defined, narrow, sharp and significant peak while amorphous materials do not give clear peaks rather the pattern has noise signals, smeared peak or it can have some short order bumps. Powder XRD is used to determine the crystallinity by comparing the integrated intensity of the background pattern to that of the sharp peaks

The XRD powder diffraction pattern of RS DRUG can be recorded on X-ray diffractometer (Siemens D5005 Diffractometer) using CuKaradiation,Lamda = 1.5406 Angstrom] over the range 10.0-80.0[degrees].

5. RESULTS

5.1PHYSICO CHEMICAL ANALYSIS

Table 4 - Physicochemical analysis of sample – A unpurified rock salt

[Values are mean of three determinations ±SEM]

Parameters		**Values**
Ash value	Water soluble ash	8.90±0.050
	Acid insoluble ash	7.80±0.020
	Total ash	90.30 %
Extractive Value	Water soluble extractive value	8.90±0.500
Loss on drying	Loss on drying at 105° C	1.50±0.500
Colour, pH		White,8.80

SEM- singularity **expansion** method

Table 5 - Physicochemical analysis of Sample-B-Purified Rock salt

[Values are mean of three determinations ±SEM]

Parameters		**Values**
Ash value	Water soluble ash	4.60±0.028
	Acid insoluble ash	2.60±0.040
	Total ash	93.45%
Extractive Value	Water soluble extractive value	10.10±0.500
Loss on drying	Loss on drying at 105° C	8.10±0.500
Colour, pH		White, 8.70

SEM-singularity **expansion** method.

5.2 BIO CHEMICAL ANALYSIS

QUALITATIVE ANALYSIS:

Sample A: Unpurified indhuppu (Table 6)

S.No	EXPERIMENT	OBSERVATION	INFERENCE
01	**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	No white precipitate is formed	Absence of calcium
02	**TEST FOR SULPHATE** 2ml of the extract is added to 5% Barium chloride solution.	A white precipitate is formed	Indicates the presence of sulphate
03	**TEST FOR CHLORIDE** The extract is treated with silver nitrate solution	A white precipitate is formed	Indicates the Presence of chloride
04	**TEST FOR CARBONATE** The substance is treated with concentrated HCL.	No brisk effervescence is formed	Absence of carbonate
05	**TEST FOR STARCH** The extract is added with weak iodine solution	No Blue color is formed	Absence of starch

06	**TEST FOR FERRIC IRON** The extract is acidified with Glacial acetic acid and potassium Ferro cyanide.	No blue color is formed	Absence of ferric iron
07	**TEST FOR FERROUS IRON** The extract is treated with concentrated Nitric acid and Ammonium thiocyanate solution	No blood red color is formed	Absence of ferrous iron
08	**TEST FOR PHOSPHATE** The extract is treated with Ammonium Molybdate and concentrated nitric acid	No yellow precipitate is formed	Absence of phosphate
09	**TEST FOR ALBUMIN** The extract is treated with Eshbach's reagent	No yellow precipitate is formed	Absence of albumin
10	**TEST FOR TANNIC ACID** The extract is treated with ferric chloride.	No Blue black precipitate is formed	Absence of Tannic acid
11	**TEST FOR UNSATURATION** Potassium permanganate solution is added to the extract	It does not get decolorized	Absence 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 minutes and add 8-10 drops of the extract and again boil it for 2 minutes.	No Color change occurs	Absence of reducing sugar

13	**TEST FOR AMINO ACID** One or two drops of the extract is placed on a filter paper and dried well. After drying, 1% Ninhydrin is sprayed over the same and dried it well.	No Violet color is formed	Absence of Amino acid
14	**TEST FOR ZINC** The extract is treated with Potassium Ferro cyanide.	No white precipitate is formed	Absence of zinc

Sample B. Purified indhuppu (Table 7)

S.No	EXPERIMENT	OBSERVATION	INFERENCE
01	**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
02	**TEST FOR SULPHATE** 2ml of the extract is added to 5% Barium chloride solution.	A white precipitate is formed	Indicates the presence of sulphate
03	**TEST FOR CHLORIDE** The extract is treated with silver nitrate solution	A white precipitate is formed	Indicates the Presence of chloride
04	**TEST FOR CARBONATE** The substance is treated with concentrated HCL.	No brisk effervescence is formed	Absence of carbonate

05	**TEST FOR STARCH** The extract is added with weak iodine solution	No Blue color is formed	Absence of starch
06	**TEST FOR FERRIC IRON** The extract is acidified with Glacial acetic acid and potassium Ferro cyanide.	No blue color is formed	Absence of ferric iron
07	**TEST FOR FERROUS IRON** The extract is treated with concentrated Nitric acid and Ammonium thiocyanate solution	Blood red color is formed	Indicates the presence of ferrous iron
08	**TEST FOR PHOSPHATE** The extract is treated with Ammonium Molybdate and concentrated nitric acid	No yellow precipitate is formed	Absence of phosphate
09	**TEST FOR ALBUMIN** The extract is treated with Eshbach's reagent	No yellow precipitate is formed	Absence of albumin
10	**TEST FOR TANNIC ACID** The extract is treated with ferric chloride.	No Blue black precipitate is formed	Absence of Tannic acid
11	**TEST FOR UNSATURATION** Potassium permanganate solution is added to the extract	It does not get decolorized	Absence 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 minutes and add 8-10 drops of the extract and again boil it for 2 minutes.	No Color change occurs	Absence of reducing sugar
13	**TEST FOR AMINO ACID** One or two drops of the extract is placed on a filter paper and dried well. After drying, 1% Ninhydrin is sprayed over the same and dried it well.	Violet color is formed	Indicates the Presence of Amino acid
14	**TEST FOR ZINC** The extract is treated with Potassium Ferro cyanide.	No white precipitate is formed	Absence of zinc

5.3 ICP – OES

Table 8 - SAMPLE A – UNPURIFIED INDHUPPU

S.No	Elements symbol	Wavelength (nm)	Concentration (mg/l)
1.	As	188.979	BDL
2.	C	193.030	BDL
3.	Ca	315.807	15.700
4.	Cd	228.802	BDL
5.	Cu	327.393	BDL
6.	Fe	238.204	BDL
7.	Hg	253.652	BDL
8.	K	766.491	BDL
9.	Mg	285.213	BDL
10.	Na	589.592	850.210
11.	Pb	220.353	BDL
12.	P	213.617	02.350
13.	S	180.731	02.300
14.	Zn	206.200	BDL

BDL – BELOW DETECTION LIMIT

TABLE 9 - SAMPLE B – PURIFIED INDHUPPU

S.No	Elements symbol	Wavelength (nm)	Concentration (mg/l)
1.	As	188.979	BDL
2.	C	193.030	105.210
3.	Ca	315.807	00.760
4.	Cd	228.802	BDL
5.	Cu	327.393	BDL
6.	Fe	238.204	BDL
7.	Hg	253.652	BDL
8.	K	766.491	BDL
9.	Mg	285.213	BDL
10.	Na	589.592	750.200
11.	Pb	220.353	BDL
12.	P	213.617	126.300
13.	S	180.731	00.334
14.	Zn	206.200	BDL

BDL – BELOW DETECTION LEVEL

5.4 XRD

The XRD powder diffraction pattern of RS DRUG can be recorded on X-ray diffractometer (Siemens D5005 Diffractometer) using CuKa radiation,Lamda = 1.5406 Angstrom] over the range 10.0- 80.0[degrees].

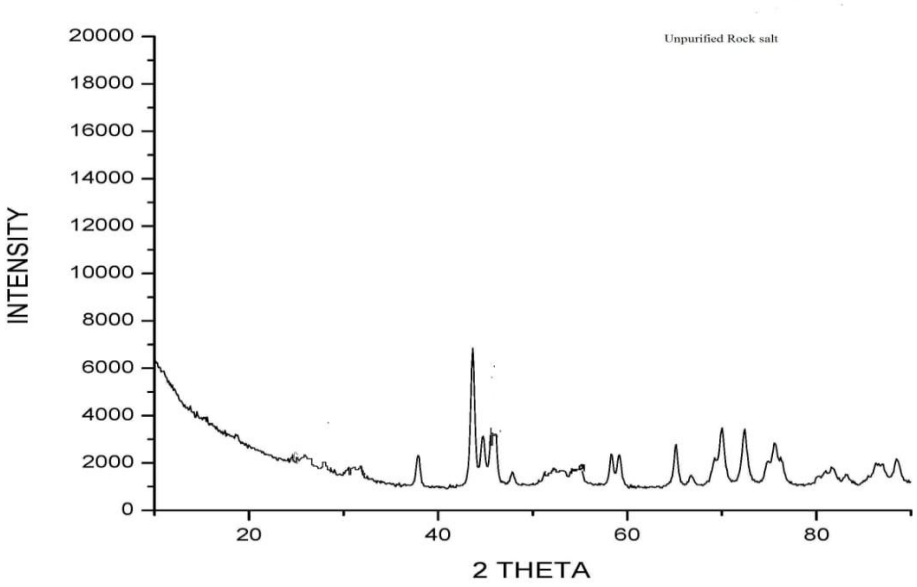


Fig – 10 – XRD Analysis of UPID

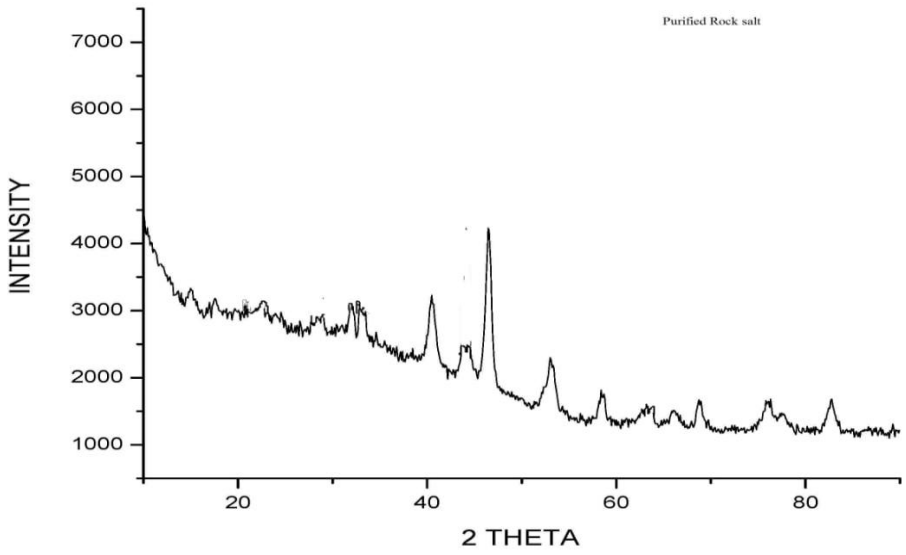


Fig – 11 – XRD Analysis of PID

Table - 10 - Sample-A-Unpurified Indhuppu

2 theta	Orientation	Crystalline size (nm)	Lattice Constant (Angstram)	Cell Volume (Angstram cube)
38.32	(111)	19.15	4.0895	68.3928
44.42	(200)	11.39	4.0980	68.8201
64.35	(220)	13.90	4.0877	68.3025
77.50	(311)	16.64	4.0875	68.2925

Table - 11 - Sample-B-Purified Indhuppu

2 theta	Orientation	Crystalline size (nm)	Lattice Constant (Angstram)	Cell Volume (Angstram cube)
38.30	(111)	20.45	4.0870	68.2674
44.12	(200)	12.79	4.0820	68.0172
64.40	(220)	10.90	4.0854	68.1873
77.45	(311)	16.60	4.0877	68.3025

5.5 STERILITY TEST BY POUR PLATE METHOD

SAMPLE A - UNPURIFIED INDHUPPU

Objective

The pour plate techniques were adopted to determine the sterility of the product. Contaminated / un sterile sample (formulation) when come in contact with the nutrition rich medium it promotes the growth of the organism and after stipulated period of incubation the growth of the organism was identified by characteristic pattern of colonies. The colonies are referred to as Colony Forming Units (CFUs).

Methodology

Test sample was inoculated in sterile petri dish to which about 15 mL of molten agar 45^{o}C were added. Agar and sample were mixed thoroughly by tilting and swirling the dish. Agar was allowed to completely gel without disturbing it. (about 10 minutes). Plates were then inverted and incubated at 37^{o} C for 24-48 hours and further extended for 72 hrs for fungal growth observation. Grown colonies of organism was then counted and calculated for CFU.

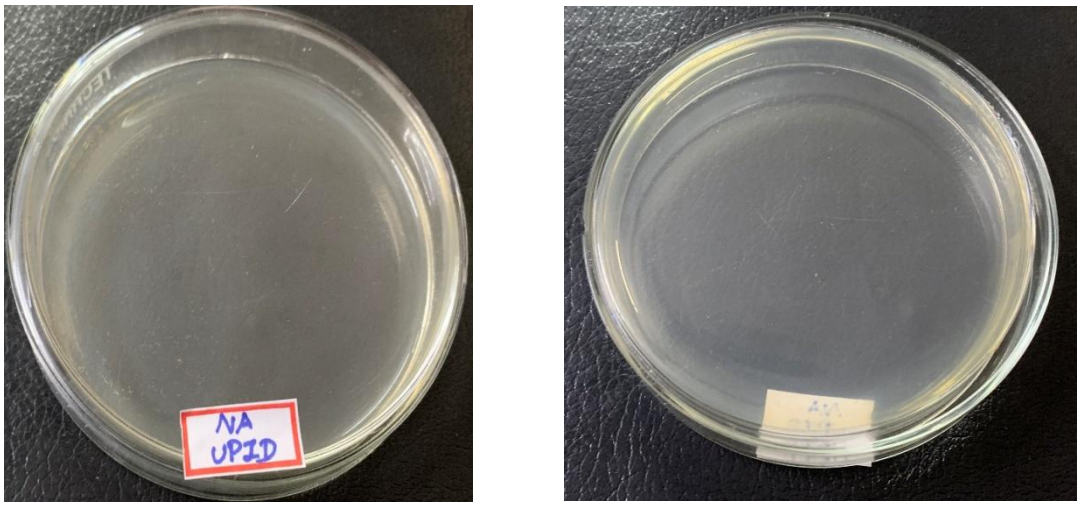


Fig-12- STERILITY TEST OF UNPURIFIED INDHUPPU

Observation

No growth was observed after incubation period. Reveals the absence of specific pathogen

Result

No growth / colonies was observed in any of the plates inoculates with the test sample.

Test	Result	Specification	As per AYUSH/WHO
Total Bacterial Count	Absent	NMT 10^5CFU/g	As per AYUSH specification
Total Fungal Count	Absent	NMT 10^3CFU/g	

TABLE-12 - STERLITY TEST OF UNPURIFIED INDHUPPU

STERILITY TEST BY POUR PLATE METOD

SAMPLE B - PURIFIED INDHUPPU

Objective

The pour plate techniques were adopted to determine the sterility of the product. Contaminated / un sterile sample (formulation) when come in contact with the nutrition rich medium it promotes the growth of the organism and after stipulated period of incubation the growth of the organism was identified by characteristic pattern of colonies. The colonies are referred to as Colony Forming Units (CFUs).

Methodology

Test sample was inoculated in sterile petri dish to which about 15 mL of molten agar 45^{o}C were added. Agar and sample were mixed thoroughly by tilting and swirling the dish. Agar was allowed to completely gel without disturbing it. (about 10 minutes). Plates were then inverted and incubated at 37^o C for 24-48 hours and further extended for 72 hrs for fungal growth observation. Grown colonies of organism was then counted and calculated for CFU.

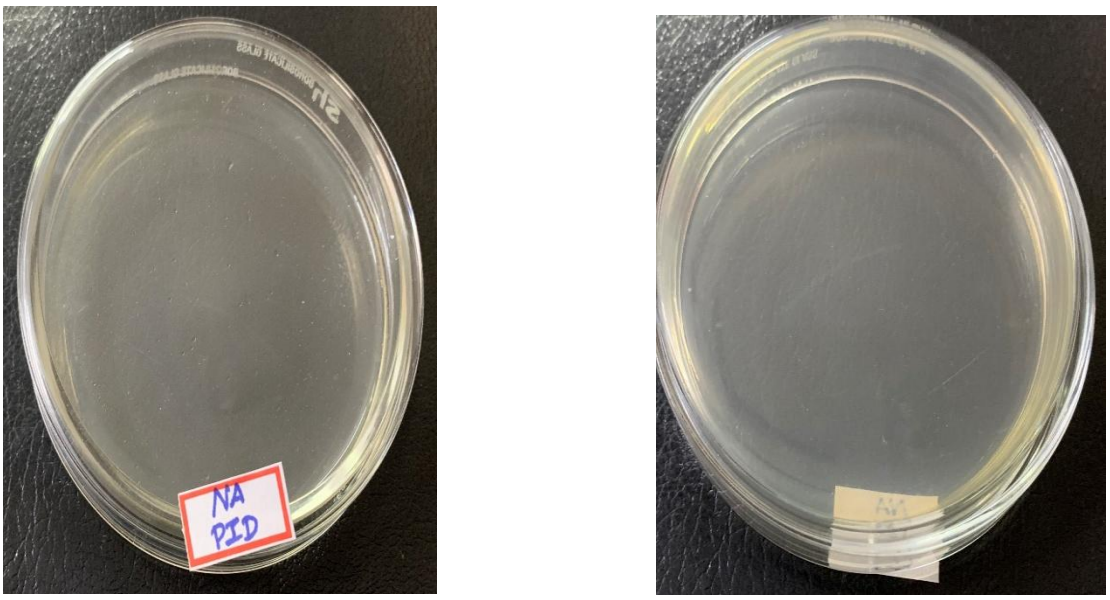


Fig-13- STERILITY TEST OF PURIFIED INDHUPPU

Observation

No growth was observed after incubation period. Reveals the absence of specific pathogen

Result

No growth / colonies was observed in any of the plates inoculates with the test sample.

Test	Result	Specification	As per AYUSH/WHO
Total Bacterial Count	Absent	NMT 10^5CFU/g	As per AYUSH specification
Total Fungal Count	Absent	NMT 10^3CFU/g	

Table 13 -Sterlity test of purified indhuppu

Parameter	Aflatoxin Assay By TLC (B1,B2,G1,G2)
Sample –ID	Unpurified Indhuppu – UPID

Procedure

Standard aflatoxin was applied on to the surface to pre coated TLC plate in the volume of 2.5 µL, 5 µL, 7.5 µL and 10 µL. Similarly, the test sample was placed and Allow the spots to dry and develop the chromatogram in an unsaturated chamber containing a solvent system consisting of a mixture of chloroform, acetone and isopropyl alcohol (85: 10: 5) until the solvent front has moved not less than 15 cm from the origin. Remove the plate from the developing chamber, mark the solvent from and allow the plate to air-dry. Locate the spots on the plate by examination under UV light at 365 nm.

Aflatoxin	Sample UPID	AYUSH Specification Limit
B1	Not Detected - Absent	0.5 ppm
B2	Not Detected - Absent	0.1 ppm
G1	Not Detected - Absent	0.5 ppm
G2	Not Detected - Absent	0.1 ppm

Table 14 -Aflatoxin test of unpurified indhuppu

Result: The results shown that there were no spots were being identified in the test sample loaded on TLC plates when compare to the standard which indicates that the sample were free from Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2.

Reference

Luciana de CASTRO. Determining Aflatoxins B1, B2, G1 and G2 in Maize Using Florisil Clean Up with Thin Layer Chromatography and Visual and Densitometric Quantification. Ciênc. Tecnol. Aliment. vol.21 no.1 Campinas. 2001.

Parameter	Aflatoxin Assay By TLC (B1,B2,G1,G2)
Sample –ID	Purified Indhuppu – PID

Procedure

Standard aflatoxin was applied on to the surface to pre coated TLC plate in the volume of 2.5 µL, 5 µL, 7.5 µL and 10 µL. Similarly, the test sample was placed and Allow the spots to dry and develop the chromatogram in an unsaturated chamber containing a solvent system consisting of a mixture of chloroform, acetone and isopropyl alcohol (85: 10: 5) until the solvent front has moved not less than 15 cm from the origin. Remove the plate from the developing chamber, mark the solvent from and allow the plate to air-dry. Locate the spots on the plate by examination under UV light at 365 nm.

Result: The results shown that there were no spots were being identified in the test sample loaded on TLC plates when compare to the standard which indicates that the sample were free from Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2.

Table 15 -Aflatoxin test of purified indhuppu

Aflatoxin	**Sample PID**	**AYUSH Specification Limit**
B1	Not Detected - Absent	0.5 ppm
B2	Not Detected – Absent	0.1 ppm
G1	Not Detected – Absent	0.5 ppm
G2	Not Detected – Absent	0.1 ppm

5.6 FTIR ANALYSIS

SAMPLE A - UNPURIFIED INDHUPPU

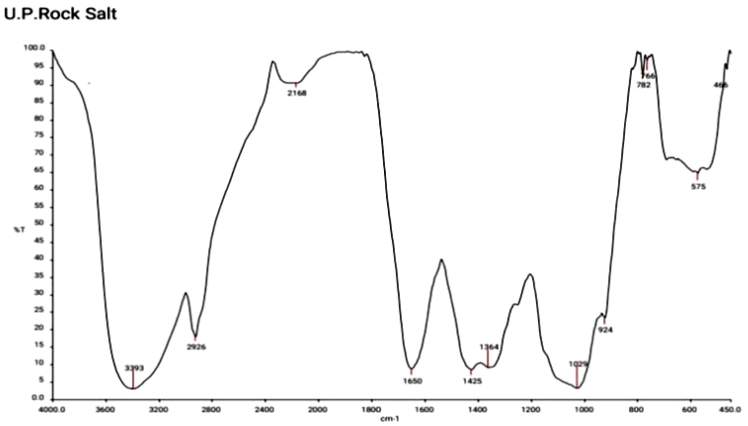


Fig.14 - FTIR - Graph for Unpurified Indhuppu

FREQUENCY cm^{-1}	BOND	FUNCTIONAL GROUP	INTENSITY
3393	N – H STRETCH	AMINES	BROAD, MEDIUM
2926	C – H STRETCH	ALKANES	MEDIUM TO STRONG
2168	C ≡ C STRETCH	ALKYNES	MEDIUM TO WEAK
1650	C = C STRETCH	ALKENES	WEAK TO MEDIUM
1425	NO_2 STRETCH	NITRO COMPOUNDS	STRONG
1364	C – F STRETCH	ALKYL AND ARYL HALIDES	-
1029	C – F STRETCH	ALKYL AND ARYL HALIDES	-
924	= C – H BEND	ALKENES	STRONG
782	= C – H BEND	ALKENES	STRONG
766	C – CL STRETCH	ALKYL AND ARYL HALIDES	-
575	C – L STRETCH	ALKYL AND ARYL HALIDES	-
466	C – L STRETCH	ALKYL AND ARYL HALIDES	-

Table 16 - FTIR Analysis of Unpurified Indhuppu

SAMPLE B - PURIFIED INDHUPPU

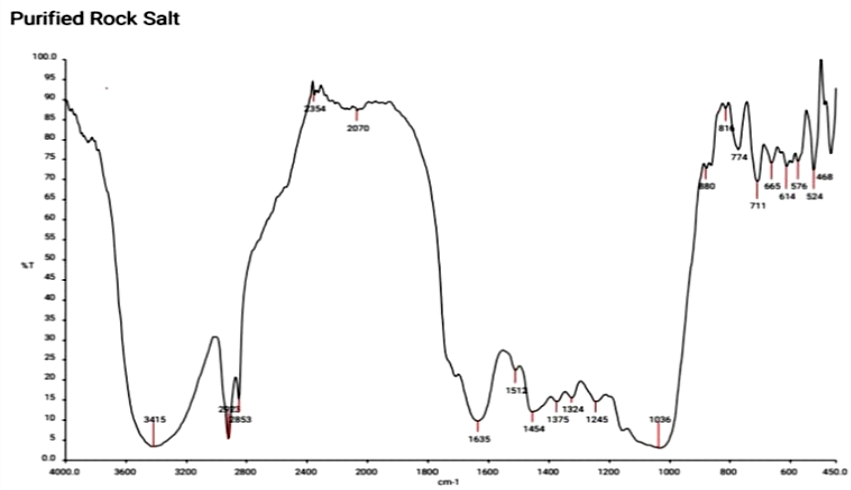


Fig-15 - FTIR - Graph for purified Indhuppu

FREQUENCY cm^{-1}	BOND	FUNCTIONAL GROUP	INTENSITY
3415	O – H STRETCH	ALCOHOL	BROAD, STRONG
2923	C – H STRETCH	ALKANES	MEDIUM TO STRONG
2853	C – H STRETCH	ALKANES	MEDIUM TO STRONG
1635	C = C STRETCH	ALKENES	WEAK TO MEDIUM
1512	C = C STRETCH	AROMATIC COMPOUNDS	MEDIUM TO WEAK
1454	C = C STRETCH	AROMATIC COMPOUNDS	MEDIUM TO WEAK
1375	NO_2 STRETCH	NITRO COMPOUNDS	STRONG
1324	NO_2 STRETCH	NITRO COMPOUNDS	STRONG
1245	C – F STRETCH	ALKYL AND ARYL HALIDES	-
1036	C – F STRETCH	ALKYL AND ARYL HALIDES	-

880	= C – H BEND	ALKENES	STRONG
816	C – H BEND	AROMATIC COMPOUNDS	MEDIUM TO WEAK
774	C – H BEND	AROMATIC COMPOUNDS	MEDIUM TO WEAK
711	C – H BEND	AROMATIC COMPOUNDS	MEDIUM TO WEAK
665	C – Cl STRETCH	ALKYL AND ARYL HALIDES	-
614	C – Cl STRETCH	ALKYL AND ARYL HALIDES	-
576	C – Br STRETCH	ALKYL AND ARYL HALIDES	-
524	C – Br STRETCH	ALKYL AND ARYL HALIDES	-
468	C – Br STRETCH	ALKYL AND ARYL HALIDES	-

Table 17- FTIR Analysis of purified Indhuppu

6. DISCUSSION

The drug indhuppu of salt origin "karasaram" was selected for standardization of purification. The method of purification of indhuppu was selected from siddha literature gunapadam – thathu – jeeva vaguppu part II and III by Dr.R.Thiyagarajan, page no. 370. The suddhi process helps raw material / crude drug to lose their undesirable or toxic effect and by aid better dosage efficacy. Metals, minerals and salts are widely used in siddha pharmaceuticals with a suitable as well as various process of purification. Indhuppu contains large number of essential minerals and unwanted substance in it and it is also a main ingredient in many medical preparations and has the action of laxative in dose 4.22 and 8.4 gm , purgative in dose of 16.8 – 21 gm, carminative , diuretic, stomachic for the purpose of standardization, samples of unpurified indhuppu and purified indhuppu were taken and labelled, then the following analysis were performed.

PHYSICO - CHEMICAL ANAYSIS

UNPURIFIED ROCKSALT :

The colour and ph was white , 8.80 respectively. Unpurified indhuppu is alkaline in nature. Water soluble ash value is 8.90±0.050, the acid insoluble ash value is 7.80±0.020 and the total ash value is 90.30%. The water soluble extractive value is 8.90±0.500, the loss on drying at 110ºc is 1.50±0.500.

PURIFIED INDHUPPU :

The colour and ph was white , 8.70 respectively. purified indhuppu is alkaline in nature. Water soluble ash value is 4.60±0.028, the acid insoluble ash value is 2.60±0.040 and the total ash value is 93.45%. The water soluble extractive value is 10.10±0.500, the loss on drying at 110ºc is 8.10±0.500.

BIO CHEMICAL ANALYSIS :

UNPURIFIED INDHUPPU :

Biochemical analysis of unpurified indhuppu indicates the presence of sulphate and chloride and absence of calcium, carbonate, starch, ferric iron, ferrous iron, phosphate, albumin, tannic acid, reducing sugar, unsaturated compound,amino acid and zinc.

PURIFIED INDHUPPU

Biochemical analysis of purified indhuppu indicates the presence of calcium, chloride, sulphate, ferrous iron and amino acids and the absence of carbonate, starch, ferric iron, phosphate, albumin, tannic acid, reducing sugar, unsaturated compound and zinc.

ICP – OES :

UNPURIFIED INDHUPPU :

ICP – OES Analysis of Unpurifed indhuppu indicates the presence of concentration of elements Ca – 15.700 mg / l, Na – 850.210 mg / l, P – 02.350 mg/l, S – 02.300 mg / l, and other elements like As, C, Cd, Cu, Fe, Hg, K, Mg, Pb and Zn is in below detection level.

PURIFIED INDHUPPU :

ICP – OES Analysis of purifed indhuppu indicates the presence of concentration of elements C- 105.210 mg / l, Ca – 00.760 mg / l, Na – 750.200 mg/l, P – 126.300 mg / l, S – 00.334 mg / l, and other elements like As, Cd, Cu, Fe, Hg, K, Mg, Pb and Zn is in below detection level.

Concentration of Carbon and phosphorus is increased in purified indhuppu.

XRD ANALYSIS :

Although the particle sizes of different batches showed similarity, it seems that these particles are aggregates of much smaller particles. When dispersed in an aqueous medium, these preparations form a negatively charged hydrophobic particle suspension. This hydrophobicity gives these particles a tendency to aggregate together to form larger particles. crystalline size calculated from XRD was much smaller. Therefore, the comparatively larger size may be due to the agglomeration of the particles by repeated cycles of calcinations involved in preparation. Particles with a high positive surface charge like chitosan are usually attracted by the intestinal mucosa which helps in increasing the intestinal absorption of the encapsulated drug. However, the strong electrostatic interaction between the positively charged particles and the negatively charged glycocalix may slow down

the progression and penetration of these particles towards the epithelial cell surface reducing their uptake. Also it has been show

That non-ionized particles have a greater affinity for M cells than for ionized particles and positively charged particles

The high intensity of XRD lines in the XRD pattern suggests its crystalline nature. It has been reported that nano particles exhibited a size dependent uptake from the intestine, and its passage via the mesentery lymph supply and lymph nodes to the liver with significant absorption for particles less than 200nm. Therefore, uptake of RS with a crystallite size of less than 200 nm through the intestine can be expected.

The 2Ɵ value of unpurified indhuppu and purified indhuppu are quite similar. The 2Ɵ value of unpurified indhuppu is 38.32 2Ɵ , 44.42 2Ɵ, 64.35 2Ɵ, 77.50 2Ɵ. The 2Ɵ value of purified indhuppu is 38.30 2Ɵ, 44.42 2Ɵ, 64.40 2Ɵ, 77.45 2Ɵ.

STERILITY TEST FOR UNPURIFIED INDHUPPU BY POUR PLATE METHOD

Absence of total bacterial count and the absence of total fungal count is noted in sterility test for unpurified indhuppu.

STERILITY TEST FOR PURIFIED INDHUPPU BY POUR PLATE METHOD

Absence of total bacterial count and the absence of total fungal count is noted in sterility test for purified indhuppu.

AFLATOXIN TEST FOR UNPURIFIED INDHUPPU

The results shown that there were no spots were being identified in the test sample loaded on TLC plates when compare to the standard which indicates that the sample were free from Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2.

AFLATOXIN TEST FOR PURIFIED INDHUPPU

The results shown that there were no spots were being identified in the test sample loaded on TLC plates when compare to the standard which indicates that the sample were free from Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2.

FTIR ANALYSIS OF UNPURIFIED INDHUPPU

FTIR analysis is used for characterization of organic, inorganic and biological compounds, the band intensities are proportional to the concentration of the compound and hence qualitative estimations possible.

The unpurified indhuppu shows the following values was the peak of 3393 to the class of amines with N – H Stretch.

The unpurified indhuppu shows the following values was the peak of 2926 to the class of alkanes with C – H Stretch.

The unpurified indhuppu shows the following values was the peak of 2168 to the class of alkynes with C ≡ C Stretch.

The unpurified indhuppu shows the following values was the peak of 1650 to the class of alkenes with C = C Stretch.

The unpurified indhuppu shows the following values was the peak of 1425 to the class of nitro compounds with NO_2 Stretch.

The unpurified indhuppu shows the following values was the peak of 1364 to the class of alkyl and aryl halide with C – H Stretch.

The unpurified indhuppu shows the following values was the peak of 1029 to the class of alkyl and aryl halide with C – H Stretch.

The unpurified indhuppu shows the following values was the peak of 1029 to the class of alkyl and aryl halide with C – H Stretch.

The unpurified indhuppu shows the following values was the peak of 924 to the class of alkenes with = C - H Bend.

The unpurified indhuppu shows the following values was the peak of 782 to the class of alkenes with = C – H Bend.

The unpurified indhuppu shows the following values was the peak of 766 to the class of alkyl and aryl halide with C – Cl Stretch.

The unpurified indhuppu shows the following values was the peak of 573 to the class of alkyl and aryl halide with C – Cl Stretch.

The unpurified indhuppu shows the following values was the peak of 466 to the class of alkyl and aryl halide with C – Cl Stretch.

FTIR ANALYSIS OF PURIFIED INDHUPPU

FTIR analysis is used for characterization of organic, inorganic and biological compounds, the band intensities are proportional to the concentration of the compound and hence qualitative estimations possible.

The purified indhuppu shows the following values was the peak of 3415 to the class of alcohol with O – H Stretch.

The purified indhuppu shows the following values was the peak of 2923 to the class of alkanes with C – H Stretch.

The purified indhuppu shows the following values was the peak of 2853 to the class of alkanes with C – H Stretch.

The purified indhuppu shows the following values was the peak of 1635 to the class of alkenes with C = C Stretch.

The purified indhuppu shows the following values was the peak of 1512 to the class of aromatic compunds with C = C Stretch.

The purified indhuppu shows the following values was the peak of 1454 to the class of aromatic compounds with C = C Stretch.

The purified indhuppu shows the following values was the peak of 1375 to the class of nitro compounds with NO_2 Stretch.

The purified indhuppu shows the following values was the peak of 1324 to the class of nitro compounds with NO_2 Stretch.

The purified indhuppu shows the following values was the peak of 1245 to the class of alkyl and aryl halides with C - F Stretch.

The purified indhuppu shows the following values was the peak of 1036 to the class of alkyl and aryl halides with C - F Stretch.

The purified indhuppu shows the following values was the peak of 880 to the class of alkenes with = C – H Stretch.

The purified indhuppu shows the following values was the peak of 816 to the class of aromatic compounds with C - H Bend.

The purified indhuppu shows the following values was the peak of 774 to the class of aromatic compounds with C - H Bend.

The purified indhuppu shows the following values was the peak of 711 to the class of aromatic compounds with C - H Bend.

The purified indhuppu shows the following values was the peak of 665 to the class of alkyl an aryl halides with C - Cl Stretch.

The purified indhuppu shows the following values was the peak of 614 to the class of alkyl an aryl halides with C - Cl Stretch.

The purified indhuppu shows the following values was the peak of 576 to the class of alkyl an aryl halides with C - Br Stretch.

The purified indhuppu shows the following values was the peak of 468 to the class of alkyl an aryl halides with C - Br Stretch.

7. SUMMARY

Siddha system of medicine is one of the oldest and foremost of all other medical system of the world. The word siddha comes fro the word siddhi which means an object to attain perfection or heavenly bliss. Health as the perfect state of physical, psychological, social and spiritual component of human being.

The system of medicine has a basic principle of " unave marunthu , marunthe unavu " along with concepts of vali, azhal and iyyam. The siddhars are well versed in preparing thr higher level of medicines using ulogangal and kanimangal drugs. These processes of high level medicine to attain high quality through alchemy. For this first they have to purify the raw drug, it not only removes the impurities, but also enhance the property of drugs. Standardization ensures the availability of the uniform product in all part of the world and encourage opportunities for siddha formulations in pharmaceuticals , the present study was carried out with an ain to standardize the purification of indhuppu (sodium chloride impure) based on qualitative and quantitative analysis as per PLIM guidelines.

Purification process of indhuppu is more important to remove toxins, to increase its efficacy and change to easily acceptable form. Sodium chloride impura are traditionally used for laxative property . Its laxative property is superior than cream of tartar . Rock salt also got flatulent, diuretic and appetite stimulant properties.

Rock salt cures eight types of gastric ulcer (gunmam), indigestion, blood diseases, kaphapitha, kapathikkam, nerves syphilis, derangement of three humours, constipation, poisonous bite, spermatorrhoea, head, eye, tongue, tooth, skin, trunk, vagina diseases, delirium, cataract, polydypsia, asthma (dysponea), haemorrhoids, abscess, rat bite, scorpion bite, vatha pain, throbbing pain etc.,

Siddha system recommended that before going to every siddha medicine preparation, the ingredient should be purified properly.The concept of suddhi (purification) in siddha is not only a process of purification or detoxification , but also a process to enhance the potency and efficacy of the drug.

The raw material is purchased from raw drug store in Thakalay, then it is splited into two equal halves of 500gm. For purification I choose the method in Gunapadam – Thathu jeeva vaguppu part 2 and 3 by Dr.R.Thiyarajan page no. 370.

For purification, the rock salt is kept soaked in goat's urine for 3 naazhigai, and kept in sunlight until it is dried to get the purified form. The qualitative and quantitative analysis were done.

By the pysico chemical analysis of purified indhuppu, the colour and ph was white , 8.70, tha total ash value is 93.45%.

Biochemical analysis of purified indhuppu indicates the presence of calcium, chloride, sulphate, ferrous iron and amino acids.

ICP – OES Analysis of purifed indhuppu indicates the presence of concentration of elements C- 105.210 mg / l, Ca – 00.760 mg / l, Na – 750.200 mg / l, P – 126.300 mg / l, S – 00.334 mg / l, and other elements like As, Cd, Cu, Fe, Hg, K, Mg, Pb and Zn is in below detection level.

The 2Ɵ value of purified indhuppu is 38.30 2Ɵ, 44.42 2Ɵ, 64.40 2Ɵ, 77.45 2Ɵ.

Absence of total bacterial count and the absence of total fungal count is noted in sterility test for purified indhuppu.

The aflatoxin test of purified indhuppu shows that there were no spots were being identified in the test sample loaded on TLC plates when compare to the standard which indicates that the sample were free from Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2.

The FTIR analysis of purified indhuppu shows the presence of alcohol, alkanes, alkenes, aromatic compounds, nitro compounds, alkyl and aryl halides.

Thus it can be postulate that the purification procedures as mentioned in siddha literature help to remove the toxic effect without interfering its therapeutic efficacy. It may reduce the effect of toxic substance in the drug.

The study stresses the need of purification process of the drug before going to preparation of medicines with strong evidence , information obtained from these studies can be used as markers in the identification and standardization of the compound.

8. CONCLUSION

Standardization of siddha medicine is a need to be in the present world, even though our medicine has the efficacy, potential, long back indigenous the quality of a drug should be defined as the status of a drug that is determined by identity, purity, content and other chemical , physical or biological properties here the purification of sodium chloride impura was done. The present study is an attempt to establish the scientific basis of the raw drug.

From the data's of the present investigation it was concluded that the siddha drug indhuppu (sodium chloride impura) was purified and analyzed. There were notable changes found between unpurified and purified form of indhuppu. Hence the concept of purification procedure as mentioned in siddha text provides contemporary evidence with a good scientific background. These explorations will definitely help to set a standard procedure for purification of indhuppu in future.

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10. ANNEXURE

1. INSTRUMENTAL ANALYSIS REPORTS
2. PUBLISHED JOURNAL ARTICLE-1
3. PUBLISHED JOURNAL ARTICLE-2

GOVERNMENT SIDDHA MEDICAL COLLEGE

PALAYAMKOTTAI, TIRUNELVELI 627002

CERTIFICATE OF MINERAL AUTHENTICITY

Certified that the following mineral used in Siddha, for the " ***Standardization of Purification of Inthuppu (Sodium chloride Impura) - A Comparative Analysis"*** taken up for the post graduate dissertation study by Dr.D.Samuvel, PG Scholar (Reg. No 321916008) Post Graduate Department of Nanju Maruthuvam, are correctly identified and authenticated through Visual inspection/ Experience, Education and training / Organoleptic character/ Morphology/ Micromorphology/Taxonomical/ Microscopic method.

Tamil Name	English Name	Chemical Name
Inthuppu	Rock salt	Sodium chloride Impura

Date :- 23.08.21

Station :- Palayamkottai

Authorized Signature 23/08/21

DR.A.KINGSLY, M.D(s)
Professor & HOD
PG Gunapadam
Govt. Siddha Medical College
Palayamkottai, Tirunelveli Dist.

GOVERNMENT SIDDHA MEDICAL COLLEGE

PALAYAMKOTTAI, TIRUNELVELI 627002

CERTIFICATE OF ZOOLOGICAL AUTHENTICITY

Certified that the following zoological used in Siddha, for the " ***Standardization of Purification of Inthuppu (Sodium chloride Impura) - A Comparative Analysis"*** taken up for the post graduate dissertation study by Dr. D. Samuvel, PG Scholar (Reg. No 321916008) Post Graduate Department of Nanju Maruthuvam, are correctly identified and authenticated through Visual inspection/ Experience, Education and training / Organoleptic character/ Morphology/ Micromorphology/Taxonomical/ Microscopic method.

Tamil Name	English Name	Scientific Name	Family
Vellattu neer	Goat urine	*Capra aegagrus hircus urine*	Bovidae

Date :- 23.08.21

Station :- Palayamkottai

Authorized Signature 23/08/21

DR.A.KINGSLY, M.D(s)
Professor & HOD
PG Gunapadam
Govt. Siddha Medical College
Palayamkottai, Tirunelveli Dist.

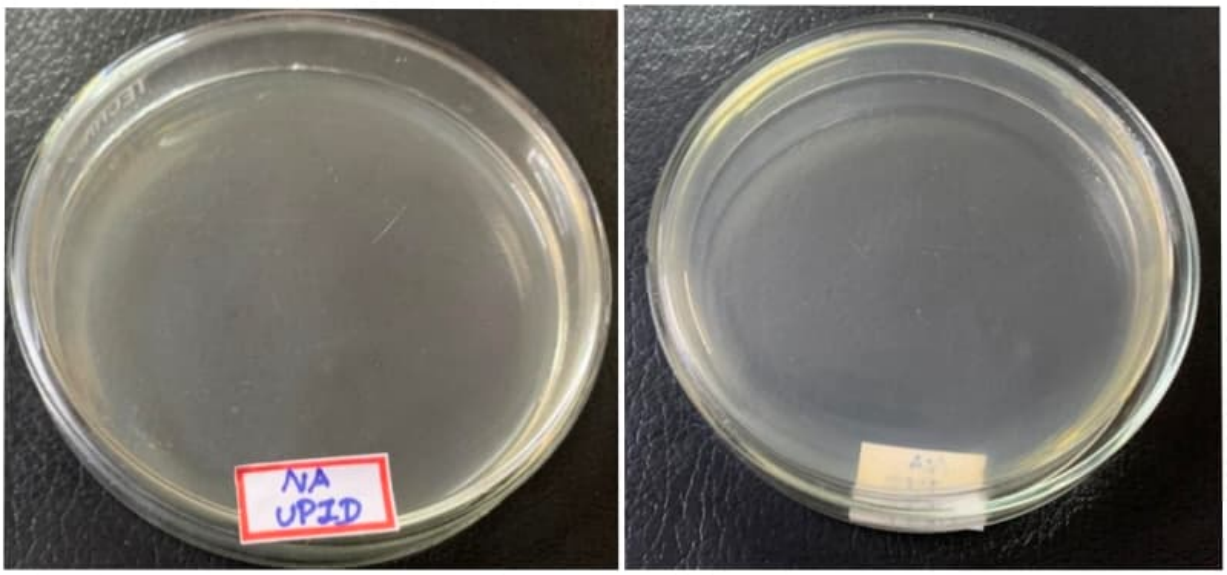
STERILITY TEST BY POUR PLATE METOD

Objective

The pour plate techniques were adopted to determine the sterility of the product. Contaminated / un sterile sample (formulation) when come in contact with the nutrition rich medium it promotes the growth of the organism and after stipulated period of incubation the growth of the organism was identified by characteristic pattern of colonies. The colonies are referred to as Colony Forming Units (CFUs).

Methodology

Test sample was inoculated in sterile petri dish to which about 15 mL of molten agar 45°C were added. Agar and sample were mixed thoroughly by tilting and swirling the dish. Agar was allowed to completely gel without disturbing it. (about 10 minutes). Plates were then inverted and incubated at 37° C for 24-48 hours and further extended for 72 hrs for fungal growth observation. Grown colonies of organism was then counted and calculated for CFU.



Observation

No growth was observed after incubation period. Reveals the absence of specific pathogen

Result

No growth / colonies was observed in any of the plates inoculates with the test sample.

Test	Result	Specification	As per AYUSH/WHO
Total Bacterial Count	Absent	NMT 10^5CFU/g	As per AYUSH specification
Total Fungal Count	Absent	NMT 10^3CFU/g	

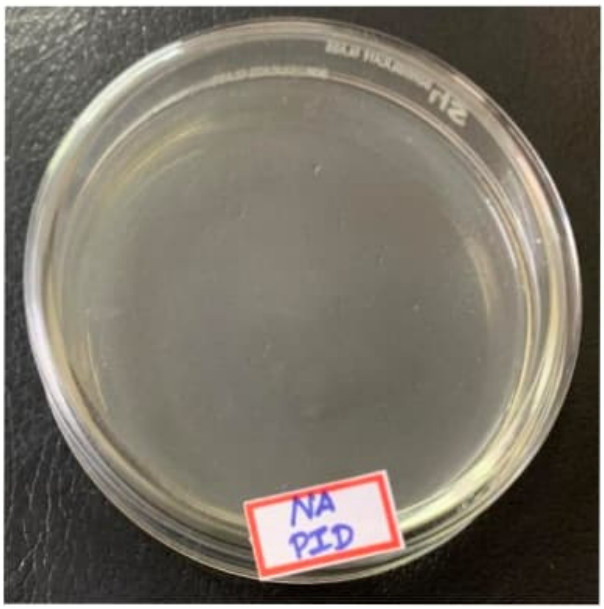
STERILITY TEST BY POUR PLATE METOD

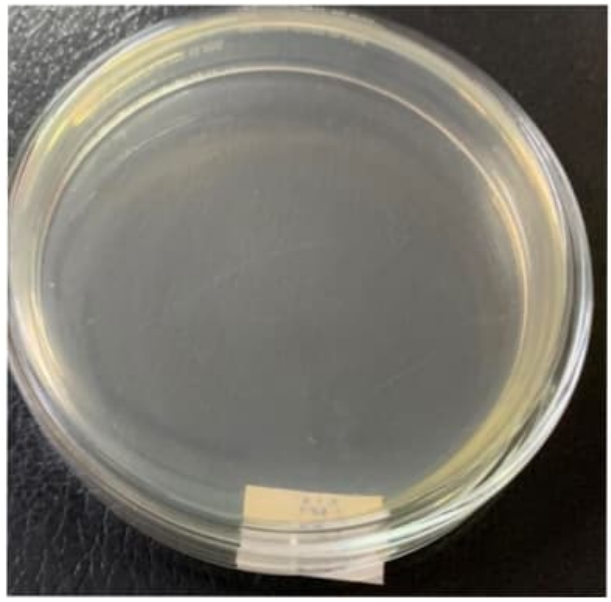
Objective

The pour plate techniques were adopted to determine the sterility of the product. Contaminated / un sterile sample (formulation) when come in contact with the nutrition rich medium it promotes the growth of the organism and after stipulated period of incubation the growth of the organism was identified by characteristic pattern of colonies. The colonies are referred to as Colony Forming Units (CFUs).

Methodology

Test sample was inoculated in sterile petri dish to which about 15 mL of molten agar 45°C were added. Agar and sample were mixed thoroughly by tilting and swirling the dish. Agar was allowed to completely gel without disturbing it. (about 10 minutes). Plates were then inverted and incubated at 37° C for 24-48 hours and further extended for 72 hrs for fungal growth observation. Grown colonies of organism was then counted and calculated for CFU.





Observation

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Test	**Result**	**Specification**	**As per AYUSH/WHO**
Total Bacterial Count	Absent	NMT 10^5CFU/g	As per AYUSH specification
Total Fungal Count	Absent	NMT 10^3CFU/g	

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Contact: 9710437419, Admin: 044 – 42691289
Website: www. nobleresearchsolutions.com

Project ID	**NRS/AS/0800/01/2022**
Name and Address of the Researcher	Dr.D.SAMUVEL Govt Siddha Medical College, Palayamkottai, Tamil Nadu, India
Parameter Requested by the Customer for Analysis	Aflatoxin Assay By TLC (B1,B2,G1,G2)
Sample Received	Courier
Sample –ID	Unpurified Indhuppu - UPID
Analysis Type	Third Party Analysis
Date of Analysis	18/02/2022
Result of Analysis	Test Report Attached

Standard

Aflatoxin B1

Aflatoxin B2

Aflatoxin G1

Aflatoxin G2

Solvent

Standard samples was dissolved in a mixture of chloroform and acetonitrile (9.8 : 0.2) to obtain a solution having concentrations of 0.5 µg per ml each of aflatoxin B1 and aflatoxin G1 and 0.1 µg per ml each of aflatoxin B2 and aflatoxin G2.

E-mail: nobleresearchsolutions@gmail.com
Contact: 9710437419, Admin: 044 – 42691289
Website: www. nobleresearchsolutions.com

Procedure

Standard aflatoxin was applied on to the surface to pre coated TLC plate in the volume of 2.5 µL, 5 µL, 7.5 µL and 10 µL. Similarly, the test sample was placed and Allow the spots to dry and develop the chromatogram in an unsaturated chamber containing a solvent system consisting of a mixture of chloroform, acetone and isopropyl alcohol (85: 10: 5) until the solvent front has moved not less than 15 cm from the origin. Remove the plate from the developing chamber, mark the solvent from and allow the plate to air-dry. Locate the spots on the plate by examination under UV light at 365 nm.

Aflatoxin	Sample UPID	AYUSH Specification Limit
B1	Not Detected - Absent	0.5 ppm
B2	Not Detected - Absent	0.1 ppm
G1	Not Detected - Absent	0.5 ppm
G2	Not Detected - Absent	0.1 ppm

Result: The results shown that there were no spots were being identified in the test sample loaded on TLC plates when compare to the standard which indicates that the sample were free from Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2.

Reference

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Website: www. nobleresearchsolutions.com

Project ID	**NRS/AS/0799/01/2022**
Name and Address of the Researcher	Dr.D.SAMUVEL Govt Siddha Medical College, Palayamkottai, Tamil Nadu, India
Parameter Requested by the Customer for Analysis	Aflatoxin Assay By TLC (B1,B2,G1,G2)
Sample Received	Courier
Sample –ID	Purified Indhuppu - PID
Analysis Type	Third Party Analysis
Date of Analysis	18/02/2022
Result of Analysis	Test Report Attached

Standard

Aflatoxin B1

Aflatoxin B2

Aflatoxin G1

Aflatoxin G2

Solvent

Standard samples was dissolved in a mixture of chloroform and acetonitrile (9.8 : 0.2) to obtain a solution having concentrations of 0.5 µg per ml each of aflatoxin B1 and aflatoxin G1 and 0.1 µg per ml each of aflatoxin B2 and aflatoxin G2.

E-mail: nobleresearchsolutions@gmail.com
Contact: 9710437419, Admin: 044 – 42691289
Website: www. nobleresearchsolutions.com

Procedure

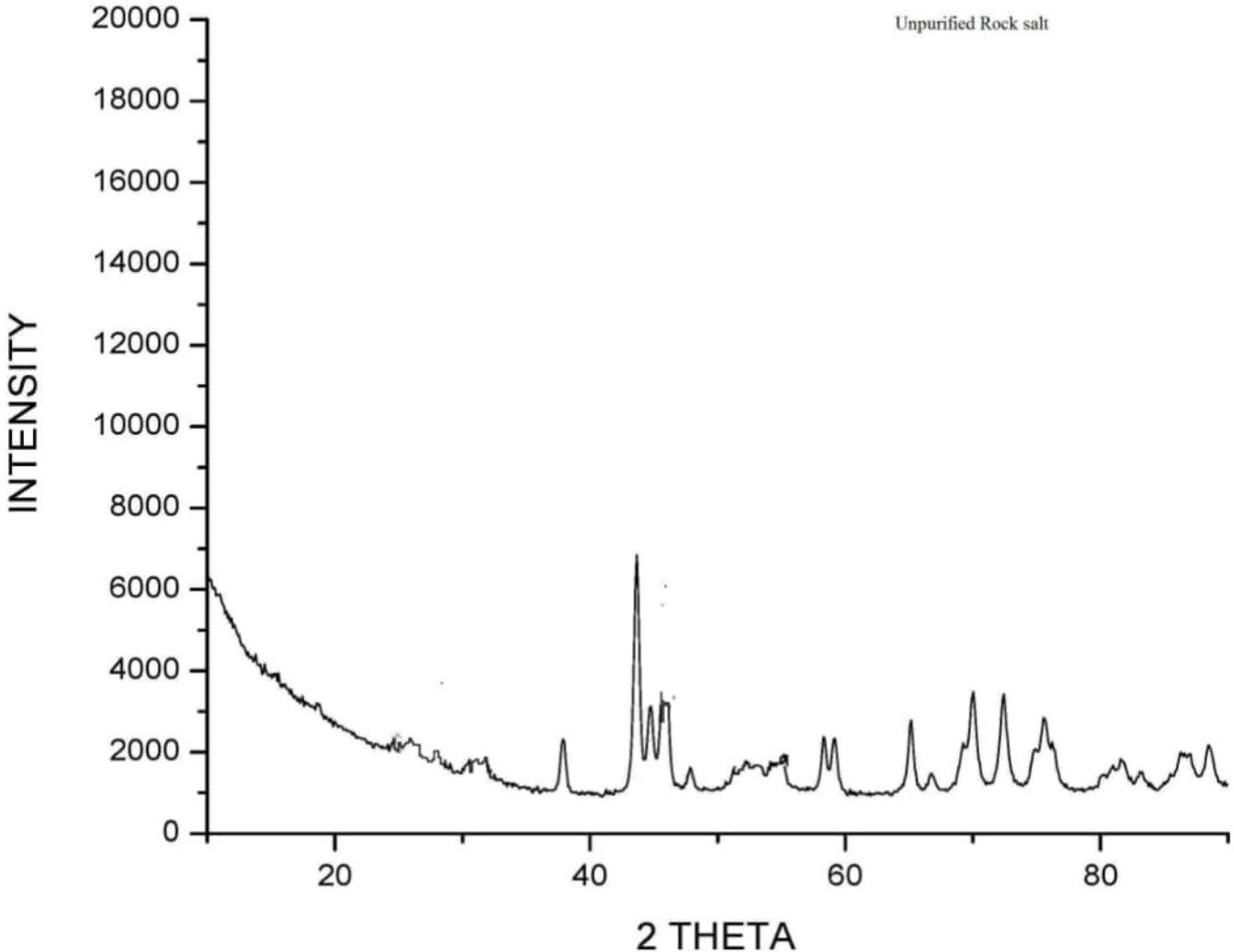
Standard aflatoxin was applied on to the surface to pre coated TLC plate in the volume of 2.5 µL, 5 µL, 7.5 µL and 10 µL. Similarly, the test sample was placed and Allow the spots to dry and develop the chromatogram in an unsaturated chamber containing a solvent system consisting of a mixture of chloroform, acetone and isopropyl alcohol (85: 10: 5) until the solvent front has moved not less than 15 cm from the origin. Remove the plate from the developing chamber, mark the solvent from and allow the plate to air-dry. Locate the spots on the plate by examination under UV light at 365 nm.

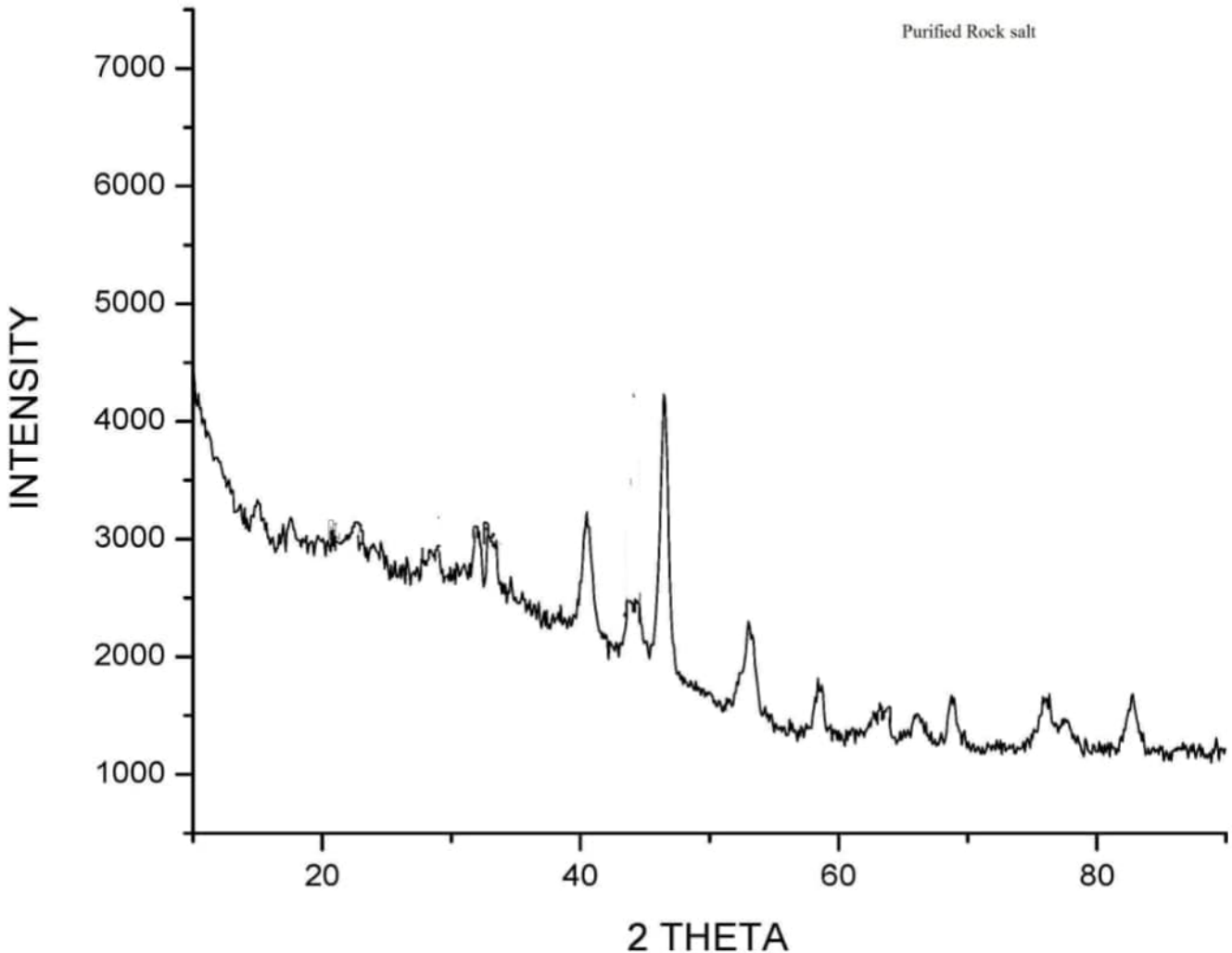
Aflatoxin	Sample PID	AYUSH Specification Limit
B1	Not Detected - Absent	0.5 ppm
B2	Not Detected - Absent	0.1 ppm
G1	Not Detected - Absent	0.5 ppm
G2	Not Detected - Absent	0.1 ppm

Result: The results shown that there were no spots were being identified in the test sample loaded on TLC plates when compare to the standard which indicates that the sample were free from Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2.

Reference

Luciana de CASTRO. Determining Aflatoxins B1, B2, G1 and G2 in Maize Using Florisil Clean Up with Thin Layer Chromatography and Visual and Densitometric Quantification. Ciênc. Tecnol. Aliment. vol.21 no.1 Campinas. 2001.


Unpurified Rock salt
INTENSITY
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
20
40
60
80
2 THETA


Purified Rock salt
INTENSITY
7000
6000
5000
4000
3000
2000
1000
20
40
60
80
2 THETA

SOPHISTICATED ANALYTICAL INSTRUMENT FACILITY
IITM, CHENNAI-36
PERKIN ELMER OPTIMA 5300 DV ICP-OES

Sample ID	Elements Symbol Wavelength (nm)	Concentration
U.P.Rock Salt (wt:0.470120g)		
As 188.979		BDL
C 193.030		BDL
Ca 315.807		15.700mg/L
Cd 228.802		BDL
Cu 327.393		BDL
Fe 238.204		BDL
Hg 253.652		BDL
K 766.491		BDL
Mg 285.213		BDL
Na 589.592		850.210 mg/L
Pb 220.353		BDL
P 213.617		02.350 mg/L
S 180.731		02.300mg/L
Zn 206.200		BDL

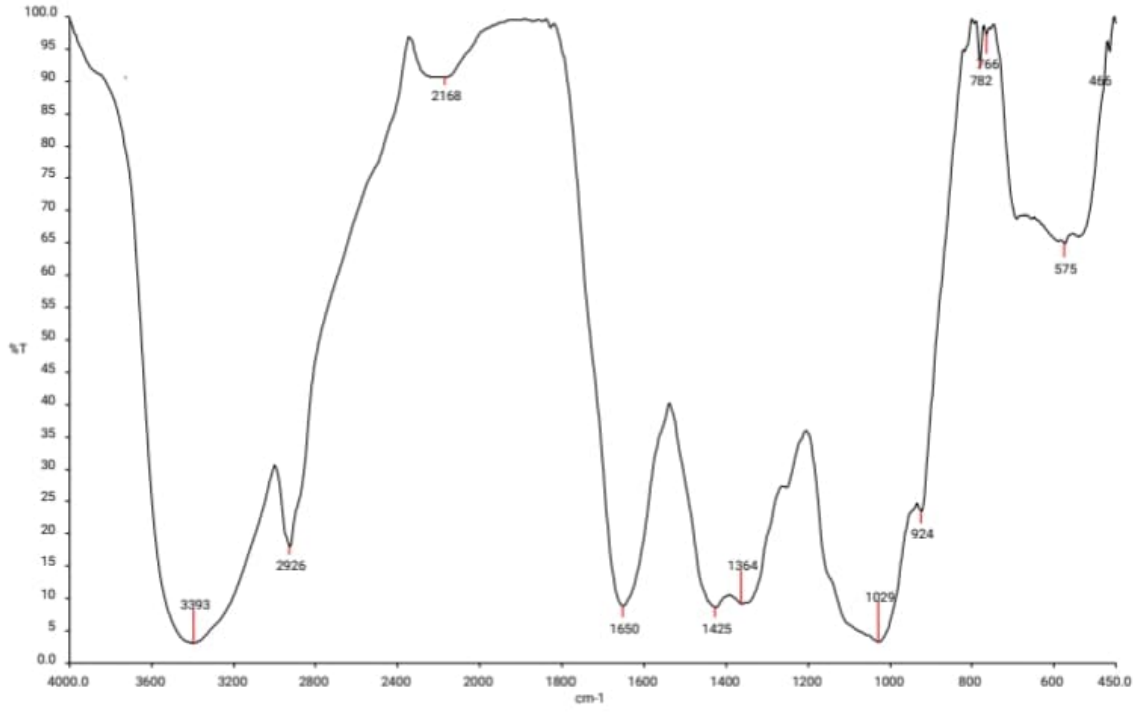
BDL- Below detection level

SOPHISTICATED ANALYTICAL INSTRUMENT FACILITY
IITM, CHENNAI-36
PERKIN ELMER OPTIMA 5300 DV ICP-OES

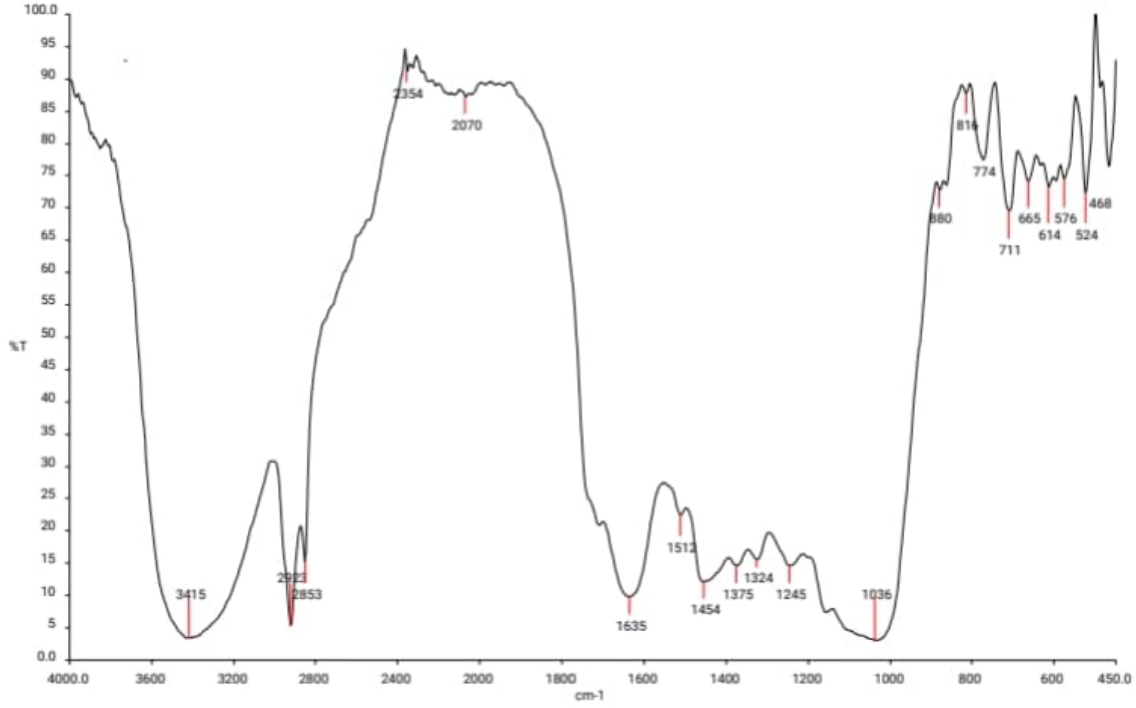
Sample ID	Elements Symbol Wavelength (nm)	Concentration
Purified Rock Salt (wt:0.490030g)		
	As 188.979	BDL
	C 193.030	105.210 mg/L
	Ca 315.807	00.760mg/L
	Cd 228.802	BDL
	Cu 327.393	BDL
	Fe 238.204	BDL
	Hg 253.652	BDL
	K 766.491	BDL
	Mg 285.213	BDL
	Na 589.592	750.200 mg/L
	Pb 220.353	BDL
	P 213.617	126.300 mg/L
	S 180.731	00.334 mg/L
	Zn 206.200	BDL

BDL- Below detection level

U.P.Rock Salt



Purified Rock Salt



Dr. D. SAMUVEL .

BIO-CHEMICAL ANALYSIS OF " INTHUPPU *(Rock salt)* "

PREPARATION OF THE EXTRACT:

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

QUALITATIVE ANALYSIS

Sample 1: Unpurified Inthuppu

S.No.	EXPERIMENT	OBSERVATION	INFERENCE
01	TEST FOR CALCIUM 2 ml of the above prepared extract is taken in a clean test tube. To this add 2 ml of 4% Ammonium oxalate solution.	No white precipetate is formed	Absence of Calcium
02	TEST FOR SULPHATE 2 ml of the extract is added to 5% Barium chloride solution.	A white precipetate is formed	Indicates the presence of Sulphate
03	TEST FOR CHLORIDE The extract is treated with silver nitrate solution.	A white precipetate is formed	Indicates the presence of chloride
04	TEST FOR CARBONATE The substance is treated with concentrated HCl.	No brisk effervessence is formed	Absence of Carbonate
05	TEST FOR STARCH The extract is added with weak iodine solution.	No blue colour is formed	Absence of Starch
06	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

07	TEST FOR FERROUS IRON The extract is treated with concentrated Nitric acid and Ammonium thiocyanate solution.	No blood red colour is formed	Absence of ferrous Iron.
08	TEST FOR PHOSPHATE The extract is treated with Ammonium Molybdate and concentrated nitric acid.	No yellow precipitate is formed	Absence of phosphate
09	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 chloride.	No blue black precipitate is formed	Absence of Tannic acid
11	TEST FOR UNSATURATION Potassium permanganate solution is added to the extract.	It doesnot get decolourised	Absence of unsaturated compounds
12	TEST FOR THE REDUCING SUGAR 5 ml of Benedict's qualitative solution is taken in a test tube and allowed to boil for 2 minutes and add 8-10 drops of the extract and again boil it for 2 minutes.	No colour change occurs	Absence of Reducing Sugar.
13	TEST FOR AMINO ACID One or two drops of the extract is placed on a filter paper and dried well. After drying, 1% Ninhydrin is sprayed over the same and dried it well.	No violet colour is formed	Absence of Amino acid
14	TEST FOR ZINC The extract is treated with Potassium Ferro cyanide.	No white precipitate is formed	Absence of Zinc

Dr. D. SAMUVEL BIO-CHEMICAL ANALYSIS OF 'INTHUPPU'

PREPARATION OF THE EXTRACT.

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

Sample 2 : Purified Inthuppu

S.No.	EXPERIMENT	OBSERVATION	INFERENCE
01	TEST FOR CALCIUM 2 ml of the above prepared extract is taken in a clean test tube. To this add 2 ml of 4% Ammonium oxalate solution.	A white precipitate is formed	Indicates the presence of Calcium
02	TEST FOR SULPHATE 2 ml of the extract is added to 5% Barium chloride solution.	A white precipetate is formed	Indicates the presence of Sulphate
03	TEST FOR CHLORIDE The extract is treated with silver nitrate solution.	A white precipetate is formed	Indicates the presence of chloride
04	TEST FOR CARBONATE The substance is treated with concentrated HCl.	No brisk effervescence is formed	Absence of Carbonate
05	TEST FOR STARCH The extract is added with weak iodine solution.	No blue colour is formed	Absence of Starch
06	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
07	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
08	TEST FOR PHOSPHATE The extract is treated with Ammonium Molybdate and concentrated nitric acid.	No yellow precipetate is formed	Absence of Phosphate
09	TEST FOR ALBUMIN The extract is treated with Esbach's reagent.	No yellow precipitate is formed	Absence of Albumen

10	TEST FOR TANNIC ACID The extract is treated with ferric chloride.	No blue black precipitate is formed	Absence of Tannic acid
11	TEST FOR UNSATURATION Potassium permanganate solution is added to the extract.	It doesnot get decolourised	Absence of unsaturated compound.
12	TEST FOR THE REDUCING SUGAR 5 ml of Benedict's qualitative solution is taken in a test tube and allowed to boil for 2 minutes and add 8-10 drops of the extract and again boil it for 2 minutes.	No colour change occurs.	Absence of Reducing Sugar.
13	TEST FOR AMINO ACID One or two drops of the extract is placed on a filter paper and dried well. After drying, 1% Ninhydrin is sprayed over the same and dried it well.	Violet colour is formed	Indicates the presence of Amino acid
14	TEST FOR ZINC The extract is treated with Potassium Ferro cyanide.	No white precipitate is formed	Absence of Zinc

Table 1— Physicochemical analysis of *sample-A-U.P.Rock Salt*

[Values are mean of three determinations ±SEM]

Parameters	Total ash	Values
Ash value	Water soluble ash	8.90±0.050
	Acid insoluble ash	7.80±0.020
	Total ash	90.30%
Extractive value	Water soluble extractive value	8.90±0.500
Loss on drying	Loss on drying at 110°C	1.50±0.500
Colour, pH		White,8.80

SEM- singularity **expansion** method

Table 1— Physicochemical analysis of Sample-B-Purified Rock salt

[Values are mean of three determinations ±SEM]

Parameters		Total ash Values
Ash value	Water soluble ash	4.60±0.028
	Acid insoluble ash	2.60±0.040
	Total ash	93.45%
Extractive value	Water soluble extractive value	10.10±0.500
Loss on drying	Loss on drying at 110°C	8.10±0.500
Colour & pH		White, 8.70

SEM-singularity **expansion** method

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COMPARATIVE BIOCHEMICAL ANALYSIS OF UNPURIFIED AND PURIFIED INDHUPPU *(Sodium chloride Impura)* ROCK SALT

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ABSTRACT

Siddha system is an ancient medical system mainly practiced in Southern part of India. In Siddha system medicines are mainly prepared from three origins such as plants, minerals and animals. Before the preparation of medicine each raw drug will undergoes into a purification process called "Suththi". The concept of "Suththi" is not only for purification / detoxification, it also enhances the potency and efficacy of the drug. The objective of the study is to evaluate the compounds present in the Unpurified indhuppu and Purified indhuppu. The biochemical analysis of the Unpurified indhuppu reveals the presence of sulphate and chloride, and the Purified indhuppu reveals the presence of amino acids, chloride, sulphate, ferrous iron and calcium. The compounds present in the purified indhuppu enchances the therapeutic action of the drug.

KEYWORDS: Siddha medicine, karasaram, indhuppu, purification.

INTRODUCTION

Siddha medicine, traditional system of healing that originated in South India and is considered to be one of India's oldest systems of medicine. The Siddha system is based on a combination of ancient medicinal practices and spiritual disciplines as well as alchemy and mysticism. Siddha system is the holistic and unique medical system based on principles for providing preventive, promotive, curative, rehabilitative and rejuvenative health needs.

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ICP-OES Analysis of Siddha Formulation Kabangusa Chooranam

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***Abstract*: *Background:* The Kabangusa Chooranam *(KBC)* is a polyherbal formulation used for treating all types of respiratory diseases. *Objective:* The objective of the present study is to detect heavy metals (arsenic, lead, cadmium, mercury) and other elements within the permissible limits as per WHO guidelines present in the Siddha polyherbal formulation "*Kabangusa Chooranam*". *Materials and Methods:* The ingredients were collected and purified and the drug was prepared as per Siddha literature "*ChikichaRathna Deepam VaiththiyaSinthamani part-2*" by *Kannusamypillai*. Here, the drug was subjected to standardization by simultaneous ICP-OES analysis equipment (PERKIN ELMER OPTIMA 5300 DV). *Result:* This paper revealed the therapeutic safer level of heavy metals and other elements present in *Kabangusa chooranam*, as per WHO guidelines with the help of simultaneous ICP- OES analysis equipment (PERKIN ELMER OPTIMA 5300 DV). *Conclusion:* From the ICP-OES analysis reveals that Kabangusa chooranam are free from toxicity there by proving the safety of its utilization in siddha system. This study forms the base for the pharmaceutical analysis of *Kabangusa Chooranam (KBC)* which will be followed by safe and efficacy studies later.**

***Keywords*: Kabangusa chooranam, Siddha medicine, ICP-OES, Respiratory diseases.**

1. Introduction

Siddha medicine is the traditional system of medicine that originated in South India and is considered to be one of India's oldest systems of medicine. The Siddha system is based on a combination of ancient medicinal practices and spiritual disciplines as well as alchemy and mysticism. Siddha system is the holistic and unique medical system based on principles for providing preventive, promotive, curative, rehabilitative and rejuvenative health needs.

It has been almost more than 2year since from 2019 the world is struggling with COVID-19 pandemic. India too has suffered with more than 11,733,369 cases till March 24, 2021. Overall mortality with this outbreak in India is 1.54%. On the other hand, morbidity and mortality because of common chronic respiratory diseases in India vary with the diagnosis. Chronic obstructive pulmonary disease (COPD) is responsible for 4.55% of total disability-adjusted life years (DALYs) while asthma accounts for 1.25% of it. Interstitial lung diseases (ILDs) and sarcoidosis contribute to 0.28% of total DALYs. At the same time, COPD accounts for 9.57% of total deaths in India. Asthma and ILDs contribute to 2.12% and 0.61% of total deaths, respectively.

The polyherbal formulation Kabangusa chooranam (KBC) is a classic Siddha drug internal medicine used to treat Kapha rogam (respiratory diseases). Kabangusa chooranam is used to treat acute respiratoty diseases to chronic respiratory diseases such as Common cold, Cough, Asthma, COPD, Tuberculosis etc. which are recorded with higher prevalence and incidence with rates, most commonly in developing countries like India.

For the development of a new drug the standardization of the traditional Siddha formulations is much more important. In Siddha system most of the medicines are effective but they lack of standardization. Many herbal based formulations also have presence of toxic elements, so there is a need to subject it with standardization for safety profile of drug and therapeutic utility. Here the drug was subjected to standardization by simultaneous ICP-OES analysis equipment (PERKIN ELMER OPTIMA 5300 DV) to detect heavy metals (arsenic, lead, cadmium, mercury) and other elements within the permissible limits as per WHO guidelines present in the Siddha polyherbal drug

Table 1
Ingredients of *Kabangusa chooranam*

S.No.	Drug	Botanical Name	Parts Used	Quantity
1	Purified chukka	*Zingiber officinale*	Rhizome	35 gram
2	Purified Milagu	*Piper nigrum*	Fruit	35 gram
3	Purified Thippili	*Piper longum*	Fruit	35 gram
4	Purified Chittaratai	*Alpinia officinarum*	Rhizome	35 gram
5	Purified Akkarakaram	*Anacyclus pyrethrum*	Root	35 gram
6	Purified Omam	*Trachyspermum ammi*	Seed	35 gram
7	Purified Desavaram (thippili ver)	*Piper longum*	Root	35 gram
8	Purified Kadukkai	*Terminalia chebula*	Dried fruit	35 gram
9	Naatu sarkarai	*Sacchrum officinarum*	Jaggery	280 gram

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