A TOXICITY STUDY ON

PADIKARA CHENDRUM

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CERTIFICATE

Certified that I have gone through the dissertation submitted by **Dr. A. Dhanalakshmi** , a student of final M.D.(S) BranchVI- Nanju Noolum Maruthuva Neethi Noolum of this college and the dissertation work has been carried out by the individual only. This dissertation does not represent or reproduce the dissertation submitted and approved earlier.

Place : Palayamkottai

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CONTENTS

INTRODUCTION

The siddha system of medicine is one of the ancient systems of medicine developed by siddhars in Tamilnadu.

The aim and intention of all the siddhars were not only to cure the disease but also to show the way of retaining the soul to reach the eternal power through various steps including Ashtanga yogam.

The fore most principles of our system of medicine is the **"pancha bootha theory"**. It is said that this universe is composed of pancha bootham viz. **mann, neer, thee, vayu and aagayam.** Our human body is also made up of these pancha boothas.

Sattamuni siddhar says as follows,

"அண்டத்தில் உள்ளதே பிண்டம்
பிண்டத்தில் உள்ளதே அண்டம்
அண்டமும் பிண்டமும் ஒன்றே
அறிந்துதான் பார்க்கும் போதே".

So the changes that occur in the universe will affect the physical body also.Pancha boothas are combined with one another and form the three vital humour **Vatham, Pitham, Kabam**. They are called Mukkutram (Thridosha)theory.

Vatham is formed by **Akasa and vayu** – Motor and sensory function of nervous system, co-ordination and reflex action are the functions of vatham.

Pitham is formed by **thee (fire**)-body temperature, digestion of food, colouring of the blood and skin, vision, sweat etc. are the functions of pitham.

Kabam is formed by **mann and neer**. Kapha gives strength, buildup the body, gives strength for joints and lustre to skin, moistens food and hence aids digestion, cools the eye etc.

These functions are normally carried out in every cell of the body by three dhosa and health is maintained.

"வாதமாய்ப் படைத்துப் பித்தவன்னியாய்க் காத்துச் சேட்ப
சீதமாய்த் துடைத்துப் பாராந் தேகத்திற்குடியா மைந்து
பூதவிந்தியாமைவர் பூசை கொண்டவர் பால்விந்து
நாதமாங் கிருட்டிண மூர்த்தி நாமக்கென்றும் துணையா வாரே".

- தேரையர் மருத்துவ பாரதம்

Hence any alteration in pacha boothas causes the derangement in mukkutram ending in a disease.

The disease was set right by siddhars through medicines derived from three main groups namely **Mooligai, Thathu, Jeevam**. The class Thathu consists of mineral products which bear the medicinal values in abundance.

According to siddha literatures thathu poral is divided in to four main divisions. There are ulogam, uparasam, padanam and karasaram. In siddha system of medicine, medicines are classified broadly as Agamarunthugal (Internal medicine) and Puramarunthugal(External medicine).The authors dissertation topic **PADIKARA CHENDURAM** comes under chenduram in agamarunthugal classification.

Padikaram(Alum) is one of the karsaram which is used in both domestic and medicinal purpose. In domestic uses, it is mainly used for purification of water.In medicinal purposes, it is used as styptic,antiseptic, and astringent. Lingam (Red sulphide of mercury) is one of the padanam. The siddhars were aware of the occurance of metallic compounds, ores and their knowledge was so advanced that they could prepare them from simpler materials.

Mercury occupies a very high place in siddha medicine. It is mostly used in combination with sulphur.

Siddhars used various forms of mercury,

Mercury metal	-	Rasam
Red sulphide of mercury	-	Lingam
Mercuric chloride	-	Veeram
Mercurous chloride	-	Pooram
Red oxide of Mercury	-	Rasa chenduram

Any drug has got the possibility of becoming toxic when it exceeds the prescribed dosage and duration.

Through toxicological studies the safety alert dosage, duration of its usage, adverse effects of the medicine, all these things are obtained.

Padikara chenduram is one of the widely used siddha medicine in general practice. To assess its safety and toxicological effects, the author has selected this drug for detailed study through this dissertation work.

AIM AND OBJECTIVE

We should prove the toxic free condition of the siddha preparation with the help of modern scientific techniques for the development of siddha system in the world.

Today the methods and facilities to do a scientific research of a drug are available.

Any drug has got the possibility of becoming toxic when it exceeds the prescribed dosage and duration.

As “Padikara Chenduram” is a effective medicine to cure the diseases like diarrhoea, dysentery, menorrhagia, we should know the toxic effects if it is used for long period. So I took the dissertation topic as “Toxicity study of Padikara Chenduram”. During this study we can find out toxic effects on vital organ like kidney, liver, heart etc.

To asses the safety of this drug, various toxicity studies are carried out in albino rats, under various dosage level of the drug administration.

The studies include:-

1. Acute toxicity study.
2. Chronic toxicity study.
3. Examination of effects of the drug on the individual organs like kidney, heart, liver by histopathological study.
4. Haematological study.
5. Biochemical analysis of the medicine padikara chenduram.

MATERIALS AND METHODS

The drug **Padikara chenduram** was selected in accordance with reference made in the **"Siddha vaidhya thirattu**".

Materials required

1. Purified Lingam
2. Purified padikaram
3. Lemon juice

Purification of Lingam

Mixture containing equal quantity of lemon juice, cow's milk, juice of Acalypha indica is poured on the lingam by the method of "surukkidal".

Surukkidal

Lingam was put in a clay plate and heated. The mixture of juice was added a little by little. When the juice was evaporated completely, again mixture of juice was poured on the lingam until all the juice was used up.

Purification of Padikaram

The salt is dissolved in water and the saturated salt solution is filtered by making use of a filter. This solution is poured in a china clay container and covered by a cloth to prevent dust. Then this solution is exposed to sunlight and

allowed to evaporate. When the water is completely evaporated, the purified crystals are obtained.

Preparation of the test drug

Take a purified Padikaram 1 palam (35gm) and ¼ palam(8.75gm) of lingam and grind it with lemon juice and made in to small villais. These villais are dried. This is kept in a earthern vessel and covered by a earthern lid and plastered with seelai mann (clay cloth) and they are subjected to burning (pudam) by making use of 10 cow dung cakes (varatti). Burnt villais are collected. Then purified lingam is added in amounts equal to ¼ th weight of the villais. Again it is subjected to pudam. This process is repeated for four times. Then Chenduram is obtained.

Dose : 130 mg to 260 mg

Adjuvant : Ghee

REVIEW OF LITERATURE

SIDDHA ASPECT

PADIKARAM

In “Bohar 2000” it is said,

“உங்கந்தா னுப்புவகை இருபத்தைந்து”

- போகர் 2000 காப்புச் செய்யுள்

Karasaram is of two kinds

1. Natural Salts : Ten in number.
2. Synthetic Salts : Fifteen in number.

Padikaram is one of the ten forms of natural salts. In Thathu Jeeva Vahuppu Padikaram is clearly stated in the form of natural salt in the following poem.

“ பிறக்கின்ற கார சாரம்
பருதியே பத்துவகைப் பண்பைக்கேளு
பாங்கான சூடனோடு சீனந்தானும்
வருதியே பூநீறு வளையலுப்பு
மணமாகும் பச்சைக் கர்ப்பூர மாகும்;
புருதியே கல்லுப்புக் கறியுப்போடு
பொன்னம்பர் மீனம்பர் நுரையு மாமே”.

- போகர் 7000-த்துள் இரண்டாவதாயிரத்தில் தாது ஜீவ வகுப்பு, பக்கம் 6

Vernacular Names

Name of the drug	:	Padikaram
Tamil	:	Pattikaram, Shinacarum
English	:	Alum, Sulphate of aluminia and potatsh or of aluminium and Ammonium, Ammonious Sulphate.
Persia	:	Shab-i – Yemeni ; Zake Bilor; Zake sagfed.
Arab	:	Shabb – Zaje – abyaz
Hindi	:	Phitikhari, Phithkari
Gujarthi	:	Phatkari
Telugu	:	Pattikaramu

Other names mentioned in Bohar Nigandu

Vennkari, paduchicheeni, vellachi, paanichi, kurichi, uppu chathru, venneeli, karunchunnathi.

வேறு பெயர்கள்

சீனத்தின் பேர்தனையே சொல்லக்கேளு
சிறந்த வெண்காரிதான் பழகிசீனி
மானத்தின் மின்போல வெள்ளச்சியாகும்
மகத்தான பாணிச்சி குருச்சியாம்

பானுத்தி னுப்புக்கு சந்துரு வேயாகும்

பாங்கான வெண்நீலி கருஞ் சுண்ணத்தி

கானத்தின் கடுஞ் சீனப் பேருமாகுங்

கடுஞ்சுண்ண முறைகளுக்கு யதனை நாட்டே.

- போகர் நிகண்டு 1200, பக்கம் 5, பாடல் எண் 22.

Alum is mentioned in T.V.Sambasivm Pillai Dictionary as **Cheenakkaram and Padikarm.**

Taste : Sweetish, Astringent.

Veeriyam : Seetha veeriyam

Actions :

Anti inflammatory, Astringent, Anti spasmodic, Anti Septic, Haemostatic, Bacterio static, Local styptic, Cleaning, Anhidrotic, Deodorant. Purgative in large dose, Emetic in repeated doses.

Panchapootha Uppu

“ பலித்திட்ட சவுக்காரம் பஞ்சபூதப்

பயனாகப் பண்ணியே பார்த்த நேர்மை

பெலித்திட்ட பிருதிவி மண் கல்லுப்பாச்சு;

பேரான வப்புசலஞ் சத்திச்சாரம்

தெலித்திட்ட தேயுவது வெடியுப் பாமே;

செய்நீர்தான் தீயென்றே செப்ப லாகும்

வலித்திட்ட வாயுவது காற்றுச் சீன

மகத்தான வாகாசம் பூநீ றாச்சே”.

- குணபாடம் தாது ஜீவ வகுப்பு, பக்கம் 7

1. Pirithivi - Kalluppu
2. Appu - Sathicharam
3. Theyu - Vediuppu
4. Vayu - Cheenam
5. Akasam - Pooneeru

சீனத்தின் சத்துரு மித்துரு

"கருதியோர் சீனத்தின் சத்ருத்தான்
காரத்தின் சத்ருவு மிரண்டு மொன்றாம்
பருதியோர் பாஷான முபரசங்கள்
பாங்கான லோகங்கள் மற்றதெல்லாம்
திருதியதோர் சீனத்தின் மித்துருவாகும்
சிவனுடைய வாதார மிந்த வாறாம்
நிருதியதோர் வாதமெல்லாம் மதனாலாகும்
நேர்பாக அறிந்தவனே வாதியாமே".

- போகர் நிகண்டு 1200

பாஷானம், உபசரங்கள், உலோகங்கள் இவைகள் சீனாக்காரத்தின் சத்துரு. மற்றவை அனைத்தும் சீனத்திற்கு மித்துரு ஆகும். சீனக்காரத்தை சத்துரு சரக்கால் அரைந்து பின் மித்துரு சரக்கால் அரைத்து புடம்போட சுண்ணமாகும்.

Types of Padikaram

There are different types of padikarams which can be grouped under two heads namely,

I. Natural Salts II. Synthetic Salts

I. Natural Salts.

The natural salts are found at the volcanoes. Of the different types of natural padikaram available in nature, the following are important.

1. White Padikaram

It is also called cheenakaram, padikaram in Tamil and in Urudhu it is called as kalthar and in parsi it is called as Jasae subedh. This crystal form is white, transparent in appearance.

2. Red Padikaram

It is called as Chempadikaram in Tamil and Rasoori in Urudhu and lagesoorch in Parsi. It looks reddish in colour and brittle in nature. It is rubbed with fingers it becomes powder. It is some what round in shape and having uvarppu taste (saltish).

3. Yellow Padikaram

It is known as peetha padikaram in Tamil, Gnajaphar in parsi and Kaleen kathar in Urudhu. Yellowpadikaram are of different types. It is a fragile type and has a bad odour. They are of long rod shaped structure and has a toxic effect.

4. Green Padikaram

It is known as Maragadha Padikaram in Tamil, Kalkanthar in Unani and jagesabg in Parsi. It is best for alchemic

(Rasavdham). The above four kinds are rarely found in nature. The white padikaram is commonly available in markets.

II. Synthetic Padikaram

Four parts of Iron Sulphate (Anna bedhi) is dissolved in 72 parts of water and filtered. To the filtered solution 1 part egg yellow yolk theeneer is added. Then 1 part purified pooneeru is added. All the above mentioned things are mixed well and are exposed to sunlight to dry or to be kept in a stove to drain the water. It should be kept in a place without any disturbance for five months.

After this process some amount of water is added and dried for period of 10 or 15 days. This is again repeated for two or three times, until a clear crystal padikaram is formed. This is known as white padikaram.

Yellow Padikara Vaippu

The required quantity of padikaram is dissolved in 18 parts of water and the clear liquid is decanted. 9 parts of this decanted liquid is mixed with 1 part of yellow egg yolk and heated till the water content is evaporated. This is known as yellow padikara vaippu.

Green Padikara Vaippu

Required quantity of white padikaram is dissolved in 18 parts of water and decanted. Jangal green (ஜங்கால் பச்சை) and white padikaram is mixed in equal quantity. This mixture is to be heated and decanted. This liquid is known as Jangal fluid. Both the liquid mentioned above are mixed. The above prepared padikara water and Jangal fluid is mixed at the ratio of 4:1. The combined fluid is heated and decanted; this is known as Green Padikara Vaippu.

Red Padikara Vaippu

Required quantity of white padikaram is dissolved in 18 parts of water and decanted. The decanted padikara water and Jangal green is mixed in the ratio of 10:2. Both these are dissolved and decanted. Until the colour is changed into red it is kept undisturbed. Then it should be heated. If the red colouration is delayed some more Jangal green can be added.

Purification of Padikaram

Required quantity of padikaram is powdered. Required quantity of dew drops is collected and divided into two halves. In one half powdered padikaram is dissolved and decanted. The decanted solution is heated till it becomes semi solid. The semi

solid solution is exposed to sunlight until it becomes salt. Now this padikaram salt is again dissolved in the other half of the dew drop solution and decanted. The decanted solution is heated again till it becomes semi solid and is exposed to sunlight until it becomes salt. This process is repeated 7 times and the end product obtained is the purified padikaram.

படிகார சுத்தி

சீனாக்கார சுத்தி (சிறப்புச் சுத்தி)

"கட்டியே குமரிச் சாற்றில் கடிகை முப்பதுவே காய்ச்சி
ஆட்டியே கழுவிப் பின்பு உலர்த்தியே வைத்துக் கொண்டு
கட்டியுஞ் சீனாக்கார சுத்தியின் சிறப்பைக் கேளு
ஆட்டியே யாவின் பாலிலூறவே யதிக சுத்தி".

- 33 வது பாடல்

படிகாரத்தை கற்றாழை சாற்றலிட்டு 1 கடிகை கொதிக்க வைத்து பின் கழுவி எடுத்து பசும்பாலில் ஊறவைத்தெடுக்க சுத்தியாகும்.

"சுத்தியாம் பொரிக் காரத்து சுத்திதான் சொல்லக் கேளு
புத்தியாய்க் கிழியாய்க் காட்டெருமை சாணச் சாற்றில்
வைத்துமே கொதிக்கும் போது வண்மைசேர் கிழியழுக்கப்
பத்தியாங் வைக்க தலையிலை பகரக்கேளே".

- 34 வது பாடல்

- 18 சித்தர் வைத்திய சில்லரைக் கோவை

படிகாரத்தை கிழிகட்டி காட்டெருமை சாணச் சாற்றிலிட்டு கொதிக்க வைத்து பின் கழுவி எடுக்க சுத்தியாகும்.

பொது குணம்

"சீனமெனுங் காரமது சீறிவரு பல்லரணை
ஆணைக்கால் கண்ணோய் அனிலமொடு - மாநிலத்தில்
துன்மாங்கிசம் வாயு தோலாத உள்ளழலை
குன்மமிவை போக்குமெனக் கூறு."

- Gunapadam Thathu Jeeva Vahuppu, Page No.298

Padikaram is used in gingivitis, filariasis, eye diseases, gastritis and gastric ulcer. It is also used in diarrhoea, vomiting, whooping cough, bleeding gums, leucorrhea and menorrhagia.

Uses of Padikaram

1. 130 mg of padikaram is dissolved in 28 ml of water. This solution can be used for washing the eyes in case of eye disease.
2. 35 gm of padikaram is dissolved in 10.4 liters of water. This solution is used for mouth wash (gargle) in Akkaram. It is also used for washing wounds.
3. To stop bleeding in wound, padikaram is dissolved in water and a cloth is dipped in the solution and it is used for bandage.

4. Alum, catechu and chinnamom are taken in equal quantity and powdered. 975 gms of this powder is given with honey in diarrhoea proceeding cholera.
5. Administration of 65 mg of padikaram relieves vomiting.
6. Administration of 195 mg padikaram with 14 ml rose water twice a day relieves asthma and cough.
7. 260 mg of padikaram is mixed with juice of Adathoda vasica and administered thrice a day for leucorrhoea and menorrhagia.
8. To extract Aloe Vera juice padikaram powder is used.

- Gunapadam Thathu Jeeva Vahuppu, Page No.229

Procedure of the Synthetic Salt

One hundred grams of each uppu, kalluppu and padikaram were purified with sterile water and filtered and dried by constant heat in a mud – plate. Then the mixture was put into a brass-vessel and lime juice and curd in equal quantity were poured into it, till the salts were immersed completely. The brass-vessel was covered with a suitable brass lid and concealed cloth. The vessel was buried in a cow –dung pit and after a lapse of forty eight days the product was collected.

சீன வைப்பு

" பாரப்பா சரக்கினுட வைப்பைச் கேளு
பாருப்பு தன்னுடனே கல்லுப்பக் கூட்டி
ஊரப்பா பழச்சாற்று தயிருங் கூட்டி
ஊடன் சேர்த்துப் பாண்டத்தில் விட்டு மூடி
காரப்பா குழிவெட்டி யெருவைப் போட்டுக
கருவான பாண்டமதை யதன் மேல் வைத்துச்
சேரப்பா எருப்போட்டு சமாதி வைத்தால்
திறமாக மண்டலத்தில் சீனமாச்சே"

- (பாடல் 647)

சோற்றுப்பு, கல்லுப்பு இவற்றை பழச்சாறும், தயிரும் கலந்த கலவையில் ஊற வைத்து பாண்டத்திலிட்டு மூடி சீலை செய்து 1 மண்டலம் புடமிட வைப்பு சீனகாரம் கிடைக்கும்

சீன பாஷான வைப்பு

"பாரப்பா சீனமொன்று வெடியுப்பொன்று (பாடல் 622)
பரமான விந்துடனே மூன்றுங் கூட்டி"

- அகத்தியர் அமுதகலை ஞானம் 1270

"சீனவைப்பு சொல்லுவேன் சீனம் தொடு குறிபோல
நல்ல வருப்புங் கல்லுப்பு ரெண்டு (பாடல்87)
மல்லும் பழச்சாறும் தயிர்விட்டுப்
பல்லுறவாகப் பாண்டத்தில் மூடே

மூடியே சாணி முழுதுமே பூசி

நாடியே ஆவின் பதிதானிற்றாக்கிக்

கூடியே மண்டலங் குறிப்பாக வைத்துத்

தேடி யெடுக்கச் சீனமுமாச்சே".

- மச்சமுனி நாயனார் கடைக்காண்டம் 800

- கொங்கணர் சரக்கு வைப்புக் குறிப்புகள் 800

வறுத்த கல்லுப்பு - 2 பங்கு, தயிரும் பழச்சாறும் கலந்த கலவையில் போட்டு, பாண்டத்தை மூடி, பாண்டம் முழுவதும் சாணத்தால் பூசி, புடமிட்டு 1 மண்டலம் கழித்து எடுக்க வைப்பு சீனம் கிட்டும்.

Alum – Alumen

It mostly occurs in native state at the volcanoes in Sicily, Italy and other places and also in many parts of India, Nepal, Sindh, Cutch, Punjab etc. It is extensively manufactured in India mainly in Punjab, Bihar and Sindh.

It is white and available in lumps and it is sour and astringent to taste. It contains water and while boiling, removal of water takes place. It is available in all the druggist bazaars. In appearance it resembles China sugar candy.

It is generally used with great advantage in opthalmia hemorrhage, venereal ulcers, tooth ache and also given in combination with other medicines. The powder is dissolved in water and applied to eyes as an eye wash, mixed with

albumin of the egg. It is externally applied in diseases of the eye. Mixed with opium, it is given in cases of inflammed urethra lungs and bladder. Mixed in arrack and steeped in cloth it is used as a lint in cases of sprain abscess, contusion etc. Its powder mixed with chalk in equal proportion or dehydrated alum powder in the proportion of three parts mixed with red ochre five parts is prescribed for menorrhagia, epistaxis, bleeding gums etc. The latter is given in doses of three grams with cane jaggery for menorrhagia.

In Ayurvedha it is considered useful in leucorrhoea, stranguary, vomitting, leucoderma etc. Moreover in atonic diarrhoea, infantile cholera catarrhal affections of the stomach, colic peritonium whooping cough, bronchitis it has been administered internally with benefit. It is used in leucorrhoea, gonorrhoea, menorrhagia, prolapses of the uterus and the rectum (as an injection) and ulcerations attended with profuse discharge, exuberant granulations, foul ulcers, gangrene in the form of lotion or powder. It is rarely used internally.

Note:

It is double sulphate of Aluminium and potassium. It has long been produced artificially from different ores. It is brittle,

odourless and transparent crystals. It has an acid sweetish astringent taste. The common imported alum contains potash. Vaidyans employ it as astringent, styptic and antiseptic pharmacopeias preparation is dried alum. Alumen is used for cleaning muddy water.

In most of the bazaars alum is solid and it is more or less in the impure state and it may be rendered fit for medicinal purposes by dissolving it in water and evaporating the solution and cooling it to obtain crystals. It forms the principle constituent conjoined with the oxide or iron of silazeth or alum earth of Nepal which forms an important article in the Indian Meteria Medica.

- *T. V. Sambasivam Pillai - Dictionary, Vol V. Page 3150*

Padikaram is colourless, transparent crystals with acid, sweetish astringent taste. It is useful in leucorrhoea, haematuria, haemoptysis, menorrhagia and other haemorrhages. In chronic diarrhoea and dysentery and in generally alum is useful. In chronic diarrhoeas, a mixture containing ten grains of alum, 5 drops of laudanum and 11/2 ounces (45 ml) infusion of acorus root, given thrice daily in divided doses.

In the diarrhoea proceeding cholera and in the diarrhoea of phthisis a compound powder of alum catechu and cinnamom each 10 grains mixed with honey is given in repeated doses. In narcotic poisoning in children, it is a good and effective antidote. In whooping cough, after the first or acute stage has passed alum in doses of 2 to 4 grains according to age of the child, given twice or thrice a day in the form of powder or in solution in omum water (1 in 60) in doses of a teaspoonful for a child from 1 to 4 years old, given thrice a day is most beneficial. For asthma and cough alum 5 grains in half an ounce of rose water is given twice a day.

In obstinate cases of Malaria desiccated alum in 5 grains doses with some aromatic compound powder to disguise the taste given, 2 hours before the expected rigor with only a teaspoon of water has given very satisfactory results. It is palliative in diabetes and albuminuria also.

Externally alum forms one of the ingredients of some hair dyes and hair lotions. It is applied in a saturated solution, i.e. 5 percent in bleeding from nose, gums, vagina or the rectum. In inflammation round the ear, a paste made of alum and gypsum equal parts and gille armani (Armenian Bole) is applied. In otorrhoea, it may be dropped into the ear. It is

often sprinkled over indolent ulcers, especially chronic umbilical ulcers of infants.

In scorpion sting and insect bites alum moistened with water and locally applied, affords instantaneous relief.

- *Indian Materia Medica, R.N Chopra*

Pharmacological aspect of Vaippu Padikaram

A partial liberation of its water of crystalline, permits it to act as an acid. Lemon juice precipitates aluminium hydroxide in compatibilities of the water soluble sulfates. It is a powerful astringent in acidic solutions. And it is only slightly anti-septic probably due to bacteriostasis through liberation of acid on hydrolysis.

The anti inflammatory activity is increased by fusing potassium alum with potassium nitrate.

It is sometimes used as local styptic and frequently is employed in making astringent lotions. As in astringent it is used in concentrations of 0.5 - 5%. It is used as cleaning and deodorant preparation, and to toughen the tissue also.

The addition of sodium chloride in the preparation of synthetic padikaram helps to form the intermolecular attractions between aluminium and chlorine molecules and forms the aluminum chloride. The long time process of

synthesis leads to the crystallization of salts. This crystal is yellow with white sweet and astringent in taste. It is working as a astringent and anhidrotic and it enhances the efficacy of antifungal activities of the synthetic padikaram.

The Aluminium sulphate (Al_2 $(So_4)_3$ H_2O). Water is also crystallized during the synthesis. It is a crystalline powder stable in air, odourless and has a sweet mildly astringent taste; aqueous solution (1 in 20) is acid and has a PH not less than 2.9%. It is used as a powerful astringent acting much like alum. The formation of potassium aluminium sulphate helps to clean the cloudiness of the cataratous lens and enhances the vision.

- Indian Materia Medica, Page No.: 93, 131, 259

Medicines prepared in combination with Padikaram

Padikara Navaneetha Parpam

Powdered padikaram is roasted in an earthern vessel till the water evaporates and becomes white. Then it is allowed to cool. Now it is removed from the earthern vessel and put in a kalvam, a little by little and ground well. Now this powder is kept in an earthern pot, covered with a lid and plastered with seelai mann(சீலை மண்). Then it is kept inside a heap of about 5 kg of paddy for six months. After six months it becomes crystals

like kalluppu (NaCl). When 130 mg of this form of padikaram is administered in butter, cures Neerchurruku and Neer erichal (நீர் சுருக்கு, நீர் எரிச்சல்) urinary disorders.

- கண்ணுசாமி பரம்பரை வைத்தியம், பக்கம்.73

Padikara Parpam- I

35 gms of butter is kept in a small earthern pot (siru matkalam). 35 gms of padikaram is immersed into the above mentioned butter. The mouth of the earthern pot is covered with another earthern lid and plastered with seelai mann (சீலை மண்). Then it is kept under 10-15 cow dung cakes (வரட்டி) and is calcined. 130mg of parpam is administered twice a day in the anubanam honey, butter or ghee. It cures ulcer (ரணம்), diarrhoea, leucorrhoea and burning micturation (நீர் எரிச்சல்).

Padikara Parpam-II

An empty earthern vessel is heated and 350 mg of Padikaram in placed on it. To this 750 ml of (பேய் கருப்பஞ்சாறு) Paikarupancharu is poured and closed with another earthenlid. It is pasted with three layers seelai mann (சீலை மண்) and kept under 50 cowdung cakes and heated. Now it becomes calcined. 130 mg is administered for Neererichal and Neerkattu.

- வைத்திய அறிச்சுவடி, பக்கம் 13

Seena Pashana Parpam (சீன பாஷாண பற்பம்)

175 gms of padikaram and 35 gm of purified sangu pashanam is ground in a mortar. By using the mixture of children's urine and juice of vitis quadrangularis (பிரண்டைச் சாறு சிறுபிள்ளைகள் அழுரி). The liquid mixture is added a little by little and ground for a period of 9 hours (3 சாமம்). This is made into dry cake. Again this is kept in a earthern vessel and covered by a lid and plastered and burnt by making use of seven to eight cow dung cakes (வரட்டியில்). Now it become calcined powder. 60 mg of parpam is put into a grape (திராட்சை பழம்) for administration. This dosage should be given twice or thrice a day for suram, kasam, neer erichal.

Salokar Mathirai

Thirikadugu, vengaram, padikaram, kadal nurai, indhuppu, surai charru (juice of lagenaria vulgaris), purified croton tiglium (வாளம்), 35 gms is ground a little by using (kombukkalli) milky latex of Sarcosemma Brevistigma. Then made into (piper longum) pepper size tablets.

- கண்ணுசாமி பரம்பரை வைத்தியம்,

Padikra Patru (பற்று)

"கடுக்காயுடனே படிகாரம் கரிய போளத்துடன் கூட்டி
நெடுக்க கல்வ மதிலிட்டு நிம்பச் சாற்றி லுடனரைத்து
இடுக்கக் காய்ச்சி யிமையின் மேல் இறுகத் தடவக் கண் சிவப்பும்
நடுக்குங் கண்ணில் நீர் விடுதல் நடுங்கி யோடுங் கண்டீரே".

- போகர் காரசாரத்துறை மற்றும் போகர் 7000

கடுக்காய், படிகாரம், கரிபோளம் இவற்றை கல்வத்திலிட்டு வேமபுச் சாற்றால் அரைத்து இமை மேல் பற்றிட கண் சிவப்பு, கண்ணில் நிர் வடிதல் நீங்கும்.

Powdered peel of Kadukai (Terminalia Chebula) is ground with lime juice. It is kept in a iron vessel. Powdered padikaram and kariapolam is added and heated. If applied over the eye it cures red eye and shedding of tears. Lingathuvar used in the treatment of diarrhoea contains padikaram.

Poongavichenduram used in the treatment of menorrhagia also contains padikaram.

- Gunapadam Thathu Jeeva Vahuppu, Page 300

Padikara Neer

Powdered padikaram and yellow egg yolk in the ratio of 1:3 is mixed in a vessel and heated lightly and stirred well without touching by hand and it becomes black when the egg yolk is added and heated and stirred well. When the water content is

evaporated it becomes hard, like stone and then it is allowed to cool.

The padikaram is powdered and kept in a glass container. The mouth of the container is concealed and kept in a saineer pit made of stools of horse. Now the padikaraneer is collected.

Padikara Sunnam

A solitary piece of padikaram of about 1500 grams is taken and kept in the floor and enclosed with brick or clay. It is covered with charcoal (நாட்டுக் கரி). It is fired and air is blown with two thruthi on one side for 12 hours. Now the padikaram melts and becomes alkaloid. Then it is allowed to cool for clay. Then it becomes a hard substance like sukkan. It is powdered and preserved in a container. It is known as padikara sunnam. It is otherwise known as seenakkuru.

Preparation of eye drops

One gram of purified padikaram is ground well and added with 100 ml of sterile water and filtered with a filter paper. 1-2 drops to be instilled into the eyes. It causes slight irritation. To avoid this irritation completely it is added to pure rose water instead of the plain water.

Dose: 2-3 drops three times a day for one to four weeks is enough.

Vellai Mathirai

Pavalam -1 varagan

Pal thutham

Cheenakaram

Roasted copper sulfate (பொரித்த துருசு)

1 varagan of each drug is taken and washed with water. And then it is allowed to dry and powdered and then it is ground by using mother's milk (தாய்ப்பால்) 1/8, Tender coconut (இளநீர்) water 1/4. Till it becomes wax like it is ground and made into small pills. This preparation should be kept for one year before use.

LINGAM

இலிங்க பாடாணத் தோற்றம்

"மருவுகின்ற லிங்கமா பாடாணந்தாறும்
வண்மையான உற்பத்தி யெங்கே யென்றால்
திருவுகின்ற சிவன்தானும் முப்புரத்தைச்
சினத்தெரிக்க வெந்துமே தான் எரிந்து போச்சு
உருவுகின்ற ருத்திர மூஞ் சப்போதானார்
உயர்ந்த நெற்றிக் கண்ணினாலே பொரியை வீசி
நருவுகின்ற ரசகந்தி நிலத்தே வீழ
நடுங்கியே தான் லயமாகி லிங்கமாச்சே
லிங்கமெனும் பாடாணம் மேருக் கீழால்
லபித்து ரச கெந்தியுமே கட்டியாகி
வங்கத்து மலையடியில் அண்டிக் கொண்டு
மலைதோறும் லிங்கப் பாடாணமாச்சு".

- Bogar 7000,Vol.3,P.21

The ancient history says, that when the "Lord Siva" burnt the "Tripura" a molecule from the third eye of "Lord Siva" fall on the universe containing "Rasam", and "Gendhi" under the mountain of Bengal at the east side of meru.

- Thathu Jeeva Vaguppu, P.200

"Rasam" is otherwise called "Siva" and "Gandagam" is otherwise called "Sakthi". So lingam is called "Siva Sakthi". Rasa is related to the sun and Gandagam is related to the moon. So

Indian System concluded that all the drugs have been formed from Rasam and Gandagam. They are also being used to cure almost all the diseases.

- Anubhoga Vaidhya Navaneetham, P. 3

Synonyms of Lingam

Tamil	:	Lingam, Manivari, Chendooram, Inguligam, Malarirasam, Vannikarpam, Culigam, Kalingam, Maninagam, Sathilingam, Sandagam, Kanchanam, Samarasam, Saniam
English	:	Cinnabar
Telugu	:	Ingilekam
Malayalam:		Chayilyam
Urudu	:	Changfur, surk

Speciality of Lingam

Lingam is basic fundamental for Rasavatham and vaithyam. Since it is a combination of mercury and sulphur.

If it is properly purified and used it is sure to be powerful and better than any other drugs.

- Anuboga Vailhiya Navaneetham, vol 4, p.5

General Characters of Lingam

" பேதிசுரஞ் சந்தி பெருவிரண நீரொடுத
காதகடி காசங் கரப்பான்புண் - ணோத
வுருவிலிங்க சங்கதமா யூறுகட்டி யும்போங்
குருவிலிங்க சங்கமத்தைக் கொள்".

Lingam is administered for diarrhoea, fever, fits, chronic ulcers, polyurea, insect bite, bronchitis, eczema, scabies and abscess.

Varieties of Lingam

Generally there are two types of lingam namely

1. Natural or red lingam

Natural lingam is obtained with the ores of gold and copper.

2. Artificial lingam

Artificial lingam is classified as

1) Ullantha lingam
2) Rumi lingam
3) Mathulai lingam
4) Misiri or bambai lingam and
5) Cheena or nattu lingam

- Anuboga Vaithiya Navaneetham, Page 4

In general Ullantha lingam is available. Rumi lingam is available in Punjab, Kashmi, etc.

1. Ullantha lingam

320 grams of mercury and 106.25 grams of sulphur are burnt in reduced fire cautiously in an earthern pan until effervescence. Then fire is cutoff immediately and cooled with care. After cooling, the contents are transfered in Valluga apparatus (வாலுகா இயந்திரம்) and burnt as above. Thus ullantha lingam is obtained.

Though various varieties are dealt in the literature, lingam is artificially prepared according to the method described in Yakhobu vaidhyam 300.

2. Rumi Lingam

Purified Mercury 12 parts, Sulphur 8 parts and Manosilai (yellow orbiment) 5 parts are ground well and subjected to as above in valluga apparatus. Thus Rumi lingam is obtained.

3. Mathulai Lingam

Equal parts of mercury and thotti padanam are ground well and subjected for burning in valluga apparatus as above. Thus mathulai lingam is obtained.

4. Bambai Lingam

Purified Rasam (mercury) 7 parts and 2 parts of purified Gandagam (sulphur) is ground well, called kajalli. This is subjected to kuppi-erippu method (குப்பி எரிப்பு முறை) in valluga

apparatus (வாலுகா இயந்திரம்) for not less than 16 hours. After cooling, the bottle is broken and the lingam is preserved. Thus bambai lingam is prepared.

5. Cheena Lingam

Equal parts of purified mercury and sulphur is subjected to as above in valluga apparatus. Thus cheena lingam is prepared.

- Anuboga Vaithiya Navaneetham, Page -5

Purification

Impure lingam can be purified for therapeutic use for preparing medicines in any one of the following ways namely,

1. A mass of impure lingam is soaked in breast milk for 12 hours, then the milk is changed and the same procedure is repeated 3 times.

   - Chikitcha Rathna Deepam, p.37

2. 17.5 gm of camphor and 17.5 gm of benzoin are ground into a paste. This paste is spread in a clean white cloth and is covered over 35gms of impure lingam and lighted with fire. After burning, the ashes are scrapped and wiped off.

   - Sarabendra Siddha Maruthuva Sudar p. 79

3. “மாதர் முலைப்பாலதனில் வைத்துதூரச் சாதிலிங்கம்

ஏதமுற நாற் சாமமே”

35 gm of impure lingam as a single mass is soaked completely in breast milk for 12 hours.

- Sarabendra Siddha Maruthuva Sudar p.87

4. "பாரேயார் கட்டியாய் லிங்கம் வாங்கி

பகரொருநாள் தேனதிலே யூரப்போட்டு

நேரேதா னதையெடுத்து அமுர்தப்பாலில்

நேர்மையுடன் ளுனொருநா ளுரப்போட்டு

சீரேதான் எலுமிச்சம் பழச்சாரோடு

சிறந்தகுப்பை மேனிசா ரமுதப்பாலும்

காரோதான் மூன்றையுமே சேர்த்துவைத்து

கருத்தாக அடுப்பிலே சட்டியேத்தி

தாரேலிங் கத்தைசட்டையிலே வைத்து

கடையன்றிப் புகையாமல் சுருக்கு”

35 gms of impure lingam as a single mass is soaked in honey for one day and then it is soaked in breast milk the next day. Then the mass is subjected to a process of churukku with equal parts of mothers milk, lemon juice and the juice of Acalypha indica (குப்பைமேனி).

Yokhobu Vaidhyam 300

5. Impure lingam is ground with lime juice for 3 hours and dried.

6. "முன்னுசாதி லிங்கந் தன்னை முலைப்பாலி லூறவைத்தே
பின்னருநற் சம்பீரத்தின் பெருங்கனிச் சாற்றிற் சூத்தி".

- Anubogha Vaidhya Navaneetham. Vol.1, P 98. 6. single mass of lingam is soaked in breast milk for 1 day and then with lime juice the next day.

7. Impure lingam can be subjected to churukku with equal parts of lime juice, milk and Acalypha indica (குப்பை மேனி) juice.

Artificial Lingam – Preparation

The method of preparing cinnabar according to the rules prescribed in the Tamil Medicine. The following is the method of preparing it, as laid down in Agasthyar's "Poorana Sutram".

12 pagodas (வராகன்) weight of sulphur is to be put into an earthen pot and fused over a slow fire; when in a state of fusion, 80 pagodas weight of mercury must be added to it, and the whole kept gently stirred until it is reduced to a black powder. Again 12 pagodas weight of sulphur, 4 pagodas of lit silver lead cut into small pieces are to be added to the black powder, and to the whole is to be added the same quantity of saltpeter

(வெடியுப்பு). All of these are to be put into a bottle which must be sufficiently large. Half of the medicine to be kept in this bottle and is then to be covered and made air-tight, with clay in the most perfect manner.

An oven is now to be made in the ground over the mouth of which is to be put a broad hollow earthen pot and in this pot is to be placed the kuppi (bottle) containing the medicines, which is to be then covered over with sand up to its neck. It is burnt for 12 hours, after which the kuppi is to be removed and kept till it is cooled when it may be broken and in the neck of it will be found collected the required cinnabar in a lump.

- T. V. Sampasivam Pillai Dictionary, P.536

Action of Lingam

Most of the soluble salt of mercury are absorbed slowly from the intact mucous membrane of the alimentary tract and produce their systemic effects. The insoluble mercurial salts however are very sparingly absorbed. Mercurous chloride and mercurous iodide are known to be absorbed as mercury can be detected in the urine after their administration.

It has been found that after administration of 0.6 gm of Calomel and 20 mg of mercurous iodide daily. 5 mg and 4 mg of mercury respectively are excreted in the urine. In the case of

sulphides, however, a great deal of doubt exists as to whether they are absorbed at all. The sulphide ion is very inert and it is clear that unless and until the salt is dissociated into its constituent ions, mercury will not be able to exert its influence on the body tissues.

Sulphide of mercury is not used in any of the pharmacopoeias of western countries as it is considered to be devoid of therapeutic activity. This idea gains additional support from the fact that the various mercurial salts after absorption are excreted into the caecum and colon as sulphides and in this form, mercury is found in the faeces.

In Ayurvedic pharmacopoeia, on the other hand mercury is predominantly used in the form of sulphides. It is indeed strange that a country, where this metal was first harnessed into the service of medicine should have chosen an insoluble and possibly an inert salt for therapeutic uses.

The red sulphide and the black sulphide of mercury arc extremely efficacious in liver complaints, such as commencing cirrhosis of the liver, dyspepsia, chronic dysentery and similar other allied diseases, such as chronic diarrhoea where the stools are deficient in bile.

- Indian Materia Medica, 72

Mercury occurs rarely in the free state but generally as a compound the sulphide known s cinnabar or Hingool. Its ore occurs in small quantities in Nepal, but the bulk of metal is obtained from China, Spain, mixed with different kinds of clay.

Hingula is obtained in Calcutta market in two varieties, soft and hard. The soft one contains more mercury than hard variety. Hard variety is used in medicine, after being duly corrected by soaking in lemon juice.

Preparation from Hingula

1. **Hinguleswara** : It contains equal parts of cinnabar, mitigated aconite and long pepper rubbed together and made in to pills about one grain each. This is given mixed with little honey in fevers with pain all over the body.
2. **Sree mrityunjaya Rasa** : It contains cinnabar two parts and mitigated aconite, sulphur, black pepper and long pepper and borax each one part well powdered and rubbed with water for several days and then made in to one grain pill. It can be given in typhoid, rheumatism, chronic fever, indigestion.
3. **Ananda bhairava Rasa** : It contains cinnabar mitigated aconite, black pepper, borax and long pepper in equal parts, well powdered and made into two grain pills and taken with honey mixed with the decoction of the bark of Holarrhena

antidysenterica. It is specific for diarrhoea, chronic or acute pains in the body and also in typhoid conditions.

- Pharmacopoeia India-K.C. Bose.

Other medicines prepared with Lingam

Linga Mathirai

Purified lingam	-	50gm
Roasted Borax	-	50 gm
Garlic	-	Required amount

Lingam and Borax are ground well in a mortar and purified garlic is added little by little till it becomes wax like substance. Tablets arc made weighing 65 mg.

Dose: 1 tablet

Curable Diseases: Bronchial asthma, back pain, fever

- Kannuswamy Parambarai Vaithyam, P-164

Linga Chenduram

Lingam - 35 gm

It is kept in a iron vessel and heated simultaneously Anda thylam is added drop by drop (சுருக்குக் கொடுத்தல்)for a period of 12 hours. Then it is powdered and preserved in a bottle.

Dose: 60 mg

Adjuvant: Butter, Honey

Curable Diseases: General Tonic (தாது விருத்தி) Aphrodisiac

- Veeramamunivar Vagada Thiratu, p. 190

Chanda Marutha Chenduram

Veeram	-	10 gm
Pooram	-	20 gm
Lingam	-	40 gm
White pepper powder	-	80 gm
Hen's egg white	-	5 eggs

All the pashana drugs are ground in a mortar one by one. White pepper powder is added to the above and ground with egg white. It is dried and preserved.

Dose: 50- 100 mg

Curable Diseases: Fever, Indigestion, Arthritic pain

- Thamizhaga Siddha Vaidhiya Gurugulam, p.439

Padika linga chenduram – I

Drug

1.	Alum	-	8parts
2.	Cinnabar	-	1 Part
3.	Chinese galls	-	1 Part
4.	Fire flame flowers	-	3 Part
5.	Water	-	8 Parts

Process

Prepare decoction of 3 and 4 by boiling in 5 until reduced to 825 ml. Finely powder 1 and 2 grind with addition of

decoction in to fine mass. Dry in shade and powder. The chenduram should be pale purple in colours.

Indications: Dysmenorrhoea, Dysentery, diarrhoea and stomach ache.

Dose: 500 mg with butter or ghee.

Padika linga chenduram – II

Drugs and Process

Place 20 gm of powdered Alum in a broad clay pan over fire, melt and when water is evaporated, a kind of frothy surface will be formed. At that time, make space in the middle of it with a knife and put it 2 gm of finely powdered cinnabar and cover it with alum froth from the sides, cover the pan with another pan, until all water evaporates and becomes dry. Scrape all from the pan, triturate well in a mortar until everything is completely mixed up. store.

Dose : 60 – 240mg in ghee or honey

Indication : Diarrhoea, Dysentery, bilious fever, sleepiness, vomiting etc.

Linga Kattu

Purified Lingam	-	50 gm
Nellikai Gandagam	-	50 gm

Gandagam was made into powder. Small amount is placed in a long handle spoon and allowed to cool. Pieces of lingam are added to it. Gandagam is added until it burns. It is allowed to cool. Then it is powdered in Kalvam.

Dose : 130 mg

Anupanam : Honey

Curable disease : Arthritis

Cheenalinga Chenduram

Purified Padigaram - 87.5 gm

Purified lingam - 17.5 gm

Both drugs are taken in a mud kuduvai and placed on mild flame.

Then drugs are allowed to cool and made into fine powder.

Dose : 100 mg

Anupanam: Honey

Indication : Arthritis

Irukaara Parpam:

Purified Vengaram - 35 gm

Purified Padikaram - 35 gm

Vengaram and Padikaram with required quantity of lemon juice was taken and grind in the kalvam. They were made into parpam by Pudam podal method.

Dose : 130 mg

Anupanam : Honey. Ghee

Indications : Renal disorders

Sadhurmuga Parpam

Purified Vengaram - 35 gm

Purified Padigaram - 35 gm

Purified Vediuppu - 35 gm

Purified Pooneru - 35 gm

All the above drugs are grind well with Musa pardiasica (Banana) stem's juice and made into parpam by pudam podal method.

Dose : 130 - 260mg

Indications: Renal disorders.

CITRUS ACIDA

Sans	:	Jambha, Jambeeram
Eng	:	Acid Lime, sour – lime of India
Hind	:	Nimbu
Beng	:	Nebu
Kasb	:	Niumb
Tel	:	Nimmapandu
Tam	:	Elumicchai
Mal	:	Cherunarakam
Parts Veed	:	Fruit, its juice

Its oil from the rind, leaves, flowers

Constitutents

Lemon juice contains

- Citric acid 7 – 10pc
- Phosphoric acid, malic acid
- Citrates of potassium and other bases
- Sugar
- Mucilage and ashes

Action

Juice is Antiscorbutic due to the presence of citric acid.

Juice taken internally, enters the blood as alkaline citrates, potassium salts and phosphoric acid.

Citrus are partly oxidized into carbonic acid and water.

Potassium salts and phosphoric acid out upon the red corpuscles. They precipitate uric acid and this promotes the formation of calculi. It is supposed to dissolve organic matters in the system; hence used in the treatment of atheroma. Citric acid is a natural antiseptic against fermentation in the stomach or bowels. It acts as a germicide.

Lime juice is most useful in dysentery with sloughing of the mucous membranes.

ANUPANAM

Anupanam is also known as “Thunai Marunthu” in Tamil is commonly translated as Vehicle, Adjuvant, Conjoint or Concurrent drug therapy.

Siddha system considers a suitable Anupanam as an important one in order to enhance the value of medicine.

“அனுபானத்தாலே யவிழ்தங்கட் காண்மை
கனமாகு மேன்மையெல்லாம் காட்டும் - குணமான
பேதா பேதங்களெல்லாம் பேதித் தறிந்தவரே
நாதாக்க ளென்னுமறை நூல”.

- தேரையர் யமக வெண்பா 446.

Conjoint administration of some specific liquid, solid and semisolid drugs before, after or along with other drugs is made so that due to this combined effort, a better therapeutic result is achieved.

Ghee

Sans	-	Ghrita, Ghritham
Hind	-	Ghi
Ben	-	Ghee
Tam & Tel	-	Neyi

It is chiefly prepared from the milk of cows and buffaloes. Ghee prepared from cow’s milk is superior than ghee prepared

from buffalo milk. Cow's ghee is stomachic, nutrient, anti-bilious, tonic, improves memory.

Ghee by itself or mixed with honey is much esteemed as an application over wounds, inflammatory swellings and blistered surfaces.

Ghee is also used in the preparation of medicated oils, and as an ointment base.

Ayurvedic perspective:

1. Old ghee is used commonly in Ayurveda for its excellent medicinal properties. It is used in hazzy vision, burnt injury and to neutralize the effect of poison.
2. It is used in panchakarma. Ghee causes secretion and liquefactions in the dhatus (bodily tissues) dissolve wastes allowing the functional intelligences of the body-and carry away toxins – ama (also known as aam).
3. In Ayurveda, when a person has a chronic peptic ulcer or gastritis, ghee is used to heal that ulcer inside the intestine.
4. Ghee works wondrously on bed sores for elderly or debilitated.

CHEMICAL ASPECTS

Alum

In chemistry, is a term given to the crystallized double sulfates of the typical formula $M_2So_4.M^{III}_2(So_4)_3.24H_2O$, where M is the sign of an alkali metal (lithium, sodium, potassium, rubidium, caesium or francium) and M^{III} denotes one of the trivalent metals (aluminium, chromium, or ferric iron).

Drug Name: Potassium alum.

$K_2SO_4Al_2(So_4)_324H_{2O}$

Preparation :

Prepared from the mineral bauxite, a hydrated aluminium oxide and sulfuric acid with the addition of potassium sulfate.

Description:

Large, colorless crystals, crystalline, fragments or a white powder, odourless and has a sweetish, strongly astringent taste, solutions are acid to litmus.

Solubility:

1 gm potassium alum in 7.5 ml water and soluble in about 0.3 ml boiling water.

Incompatibilities :

When alum is dispersed in powder form with tannic acid, grey or green colour may be developed due to traces of iron in the alum.

Preparation

Alum from clays or bauxite

In the preparation of alum from clays or from bauxite, the material is gently calcined, then mixed with sulphuric acid and heated gradually to boiling; it is allowed to stand for some time. The clear solution drawn off and mixed with acid potassium sulphate and allowed to crystallize. When cryolite is used for the preparation of alum, it is mixed with calcium carbonate and heated. By this means, sodium aluminate is formed; it is then extracted with water and precipitated either by sodium bicarbonate or by passing a current of carbon dioxide through the solution. The precipitate is then dissolved in sulphuric acid, the requisite amount of potassium sulphate added and the solution allowed to crystallize.

Types of Alum

Potash alum

Potash alum, $K_2SO_4.Al_2(SO_4)_3.24H_2O$, crystallizes in regular octahedral and is very soluble in water. The solution

reddens litmus and is an astringent, when heated to nearly a red heat is gives a porous, friable mass which is known as "burnt alum". It fuses at 92^0C in its own water of crystallization. "Neutral alum" is obtained by the addition of as much sodium carbonate to a solution of alum as will begin to cause the separation of alumina; it is much used in mordanting. Alum finds application as a mordant, in the preparation of lakes for sizing hand-made paper and in the clarifying of turbid liquids.

Soda alum

Sodium alum, $Na_2So_4.Al_2(SO_4)_3.24H_2O$, occurs in nature as the mineral mendozite. It is very soluble in water, and is extremely difficult to purify. In the preparation of this salt, it is preferable to mix the component solutions in the cold, and to evaporate them at a temperature not exceeding 60°C. 100 parts of water dissolve 110 parts of sodium alum at 0^0C and 51 parts at 16°C.

Chrome alum

Chrome alum, $K_2SO_4.Cr_2(SO_4)_3.24H_2O$, appears chiefly as a by-product in the manufacture of alizarin, and as a product of the reaction in bichromate batteries.

Ammonium alum

Ammonia alum, $NH_4 A1(SO_4)_2.12H_2O$, a white crystalline double sulphate of aluminum, is used in water purification, in vegetable glues, in porcelain cements, in natural deodorants, in tanning, dyeing and in fireproofing textiles.

Alum solubility

The solubility of the various alums in water varies greatly, sodium alum being readily soluble in water, while caesium and rubidium alums are only sparingly soluble. 1 gm potassium alum in 7.5 ml water and soluble in about 0.3 ml boiling water.

Uses

Shaving alum is a powdered form of alum used as an astringent to prevent bleeding from small shaving cuts. The styptic pencils sold for this purpose contain aluminium sulphate or potassium aluminium sulphate. Similar products are also used on animals to prevent bleeding after nail-clipping.

Crystal deodorant

Alum was used in the past as a natural underarm deodorant in Mexico, Thailand and the Far East and in the Philippines where it is called *Tawas.*

- http://encyclopedia, labortawtak.com/Alum.
- http://en.wikipedia.org/wiki/image:Alum.jpg.

Alums are not natural but secondary products manufactured out of pyritous shales or “alum shales”

Production

Pyritous shale’s when exposed to air, under heat and moisture, give rise to the oxidation of the pyrites, producing iron sulphate and free sulphuric acid. The latter attacks the alumina of the shale’s and converts it into aluminium sulphate. On the addition of potash salts, such as nitre or common wood, ashes, potash alum is produced and when common salts or other soda – salts are introduced, soda alum is produced. In this way several alums are made, depending upon the base added.

The natural weathering of the shale’s being a very slow process, it is expedited in the artificial production of alum by roasting them. The roasted shale is then lixiviated and concentrated. A mixture of various soda and potash – salts is then added and the alum allowed to crystallize out.

The common alums produced in India are soda and potash alum.

The principal consumers of alum in the country being the dyeing and tanning industries, where its use as an antiseptic and as an agent for cleansing water by coagulation of mud particles is common knowledge.

- Minerals of India - Meher D.N.Wadia

LINGAM (VERMILION)

Vermilion is a reddish orange pigment, used since antiquity, originally derived from the powdered mineral cinnabar. Chemically the pigment is mercuric sulphide, HgS. Like all mercury compounds it is toxic before purification.

Today vermilion is most commonly produced artificially by reacting mercury with molten sulphur, in which case it may also be known as vermilion substitute. Most naturally produced vermilion comes from cinnabar mined in China, giving rise to its alternative name of China red.

As pure sources of cinnabar are rare, natural vermilion has always been extremely expensive. In the middle ages, Vermilion was often as expensive as gilding.

In painting, vermilion has largely been replaced by the pigment cadmium red, partly because it is cheaper, but also because the colour is more consistent.

Vermilion is also the name of the typical pigment, which is a bright red tinged with orange. It is somewhat similar to the colour scarlet.

History

Vermilion is one of the oldest pigments used by human beings. There is evidence of its use in China since prehistory. It was known to the Romans; Pliny the Elder records that it became so expensive that the price had to be fixed by the Roman government.

The pigment was used throughout Europe from the 12th century, mostly for illuminated manuscripts, although its use didn't become widespread until the 15th century when the artificially produced alternatives started to become available.

China red

"China red" is another name for the pigment vermilion, as derived from cinnabar, which is the traditional red pigment of Chinese art. Chinese name chops are printed with a red cinnabar paste, and cinnabar is the pigment used in Chinese red lacquer.

- http :/org/wiki/vermilion

Chemical Aspects

Chemically lingam is a siddha drug has been identified as cinnabar, the chief ore of mercury. Chemically cinnabar is known as mercuric sulphide (or) mercuric bisulphide. Its formula is HgS.

Cinnabar is a heavy native ore of mercury from which only most of the mercury is extracted all over the world. It is found in all continents except Antarctica most of the naturally occurring mercury one is cinnabar and the world supply comes mainly from Italy, Spain and USA.

Cinnabar exists in two modifications black and red respectively. Usually it exists as dense aggregates of brick red to dark brown crystals, which might be coloured blue black by impurities. Artificially prepared cinnabar, however a vivid scarlet substance and is used as an artist pigment called vermilion.

The scarlet red variety occurs as lumps and in hexagonal crystals. This can be described as having a deformed sodium chloride structure, of hexagonal symmetry. The structure is derived from that of sodium chloride by displacement of the non-metal atoms, some what from their ideal positions, there by changing the symmetry. The shortest distance HgS is 2.52 A^0; and the binding between mercury and sulphur is probably ionic in character. Black mercury sulphide has the zinc blend structure with 5.84A^0. The shortest HgS distance 2.53A° is the same as in cinnabar.

Black mercuric bisulphide is found native in small amounts, with cinnabar, as metacinnabarate, a black powder apparently

amorphous, but actually composed of minute regular tetrahedral crystals.

It blackens on exposure to light particularly in presence of H_2O (or) Alkali hydrochlorides. At about 250°C become brownish at higher temperature black, but red again on cooling. When heated in air, decomposed in to metal and sulphur the latter burning to sulphur dioxide (So_2).

$$HgS + O_2 \xrightarrow{\triangle} Hg + SO_2$$

It is practically insoluble in water not attacked by nitric acid (or) cold hydrochloric acid, but decomposed by hot concentrated sulphuric acid, soluble in aquaregia with separation of sulphur and in warm hydrochloric acid with evoluation of hydrogen sulphide.

Also soluble in concentrated solution of sodium sulphide (or) potassium sulphide forming this salts $K_2HgS_25H_2O$.

Molecular weight of cinnabar is 232.68 mercury and its extraction from cinnabar was known to the ancient Greeks and Romans. Mercury preparations were introduced in to medicine chiefly by the Iatrochemists. The first reliable report dates from Theophrastus about 300 BC.

Mercury is prepared by heating its sulphides either in a current of air (or) with the addition of iron (or) quick lime.

$HgS + O_2 \longrightarrow Hg + So_2$

$HgS + Fe \longrightarrow Hg + FeS$

$4HgS + 4\ Ca\ O \longrightarrow 4\ Hg + 3\ CaS + CaSo_4$

- Text book of Inorganic Chemistry by R.D. Madan, P-433

Identification of Cinnabar (Lingam)

On heating in a test tube, Cinnabar sublimes of So_4 and black mercury sulphide are obtained.

Sulphur Content

Sample (lgm) was dissolved in 25 ml of aquaregia by heating and diluted to 50 ml by distilled water. Sulphur was extracted by adding CS_2 (20ml) three times. The extract was evaporated to dryness on a water bath cautiously. The residue was weighed and calculated as sulphur content.

Mercury Content

The aquaregia extract after removal of sulphur was dilated and evaporated to dryness in a frame chamber. The residue obtained was dilated and H_2S gas was passed through it. The precipitate obtained was dilated and H_2S gas was passed through it. The precipitate obtained was filtered and dissolved in 1:1 HNO_3. The undissolved black precipitate was weighed and sublimated to get mercury. This is weighed and calculated.

According to the reports of Dr. Chattergy

1. Cinnabar contains mercury 86.22% and sulphur 13.7% in mercuric sulphide.
2. It is black in acid medium, white in neutral medium.
3. Change of red coloured cinnabar powder to black in presence of other fruit juices is due to change in PH value.
4. Neutral form of mercuric sulphide (scarlet colour) is obtained by reaching sublimated mercury and sulphur in Kuppi pakkuva (குப்பி பக்குவம்) apparatus.
5. The samples showed the absence of Pb, Cu, Bi, As, Sb contents.

- *Journal of Indian Drugs - P. 225*

PADIKARAM

(Siddha Aspect)

Toxic effects

If the dose is exceeds, following symptoms are developed.

1. Nausea
2. Vomiting
3. Diarrhoea
4. Gastric Ulcer

Antidote for uppu vagaigal

1. 80 ml juice of Acalypha indica (குப்பைமேனி) twice daily.
2. 80 ml juice of Thazhai (தாழை விழுது) twice daily till the toxicity subsides.
3. Euphrobia hirta (அம்மான் பச்சரிசி) leaf is ground well and 5 gms are administered till the toxicity subsides.

    - Nanju murivu nool, Murugesa Mudhaliyar, Page 31

MODERN ASPECT

ALUM (Pith akari)

This is a double sulphate of aluminium and Potassium(Potash alum) $KAI(So_4)_2$ or sulphate of aluminium and ammonium(ammonia alum) $NH_4Al(So_4)_2$.

It occurs as transparent, colourless and octahedral crystals or as a white powder, having a sweetish, astringent taste. It is soluble in water, glycerin but insoluble in alcohol. It is largely used as a mordant for dyeing as a constituent of certain baking powders to white, bread and for purifying water before filtering it.

Symptoms

Burning pain in the mouth, throat and stomach, vomiting mixed with blood, dyspnoea, frequent pulse, subnormal temperature, loss of co-ordination. Convulsions of a clonic nature, death. In the solid form it acts as corrosive in the mouth and throat as it precipitates protein.

Fatal Dose

About 10gm of alum.

Fatal Period :

Twenty four hours.

Treatment :

Emetics, lime water, sodium carbonate in larger quantities of milk.

Post-mortem appearances

The tongue, mouth and oesophagus are oedematous and corroded. The mucous membrane of the stomach is corrugated, loosened or hardened and is stained red or velvety. The intestines are inflamed.

Medico – Legal points

Aluminium is present in many vegetables and fruits, in milk, in eggs and in sea food and probably in the tissues of the human and animal bodies. Aluminium vessels are for cooking purposes are regarded as quite harmless.

A case is recorded in which a man working with the metal suffered from loss of memory, tremors, jerky movements, impaired co-ordination, chronic constipation and incontinence of urine. Workers exposed to aluminium dust complain of pulmonary irritation, dyspnoea, abdominal pain and x-rays show characteristic appearance in the lungs.

- Medical Jurisprudence and Toxicology, Modi's, 21st edition, P.133

LINGAM (Siddha)

TOXIC EFFECTS

Symptoms:

- ❖ Ulcerative stomatitis
- ❖ Ulcerative laryngitis
- ❖ Ulcerative enteritis
- ❖ Ulcerative uvulitis
- ❖ Ulcerative gastritis
- ❖ The ulcers will be look like sunburnt Gossypium flowers (Paruthi)
- ❖ Aphasia
- ❖ Dysphagia
- ❖ Bad breath
- ❖ Tongue hardly allows the pungent substance
- ❖ Burning sensation in the stomach
- ❖ The saliva is like the spoiled toddy or the vinegar

Antidote:

Ingredients :

1. Myristica fragrans (Nutmeg)	- 4 g
2. Piper Cubeba – tail pepper	- 4 g
3. Root bark of Gossypium arboreum	- 4 g
4. Sugar candy	- 35 g
5. Water	- 850 ml.

Method of preparation:

Nutmeg, tail pepper and root bark of Gossypium arboreum each 4 g are boiled in 850 ml. of water and reduced to one eighth. 35 g of powdered sugar candy is added to the decoction and given daily in the morning and evening for 40 days.

- Decoction (1 in 8) made out of equal parts of Myristica fragrans, Cubeba officinalis, root bark of Indigofera tinctoria, rock sugar and Gossypium herbaceum root bark, twice daily for 15 days.
- Gossypium herbacium root bark decoction can also be given.

CINNABAR (Mercuric Sulphide)

(Modern Aspect)

Mercuric sulphide occurs as the chief ore of mercury and is artificially prepared as a red, crystalline powder, which is then known as the pigment vermilion. It is regarded as non – poisonous, but its vapours are poisonous. Cases of acute poisoning have occurred from its use as fumigant. Chronic poisoning has also occurred from it, having been used to colour vulcanized rubber meant for artificial teeth. Its use in tatoos on man is known to have caused prurities and nodular swelling following exposure to sun.

The properties and action of Lingam (cinnabar).

Symptoms:

First phase:

- Acrid metallic taste and feeling of constriction in the throat; hoarse voice , difficulty in breathing.
- The mouth, tongue and fauces become corroded, swollen and show a greyish white coating.
- Hot burning pain in the mouth, extending down to the stomach and abdomen, followed by nausea, retching and vomiting. The vomit contains greyish slimy mucoid material with blood and shreds of mucous membrane.

- This is followed by diarrhoea with bloodstained stools and tenesmus.
- Circulatory collapse occurs soon.
- Inhalation of fumes produces nervous symptoms, e.g, ataxia, restriction of visual field, paresis and delirium.

Second phase:

If the person survives, second phase begins in one to 3 days.

Glossitis and ulcerative gingivitis appear within 24 to 36 hours. Severe infection, loosening of teeth and necrosis of the jaw may occur (PHOSSY JAW).

In 2 to 3 days, renal tubules show necrosis and produce transient polyuria, albuminuria, cylindruria, uremia and acidosis.

Recovery may occur within 10 to 14 days. After many days membranous colitis develops and produces dysentery, ulceration of colonic mucosa and haemarrhage.

Fatal dose

1 to 2 g

Fatal period:

3 to 5 days.

Treatment:

1. Give egg-whites, milk (or) animal charcoal to precipitate mercury.
2. Gastric lavage can be done with 2 to 5 % solution of sodium bicarbonate.
3. 10 g of sulphoxylate in 100 to 200 cc of distilled water by slow I. V. injection and repeated after 4 to 6 hours acts as an antidote.
4. B.A.L is the chelator of choice
5. Pencillamine.
6. Haemodialysis is indicated if there is significant kidney damage.
7. Maintain electrolyte and fluid balance.
8. Demulcents.
9. High colonic lavage with 1: 1000 solution of sulphoxylate twice daily.
10. Symptomatic treatment.

Post Mortem Appearances

- The mucosa of the gastrointestinal tract shows inflammation , congestion, coagulation and corrosion.

- If the person survives for few days, the large intestine shows necrosis due to the re-excretion of mercury into the large bowel.
- Acute tubular and glomercular degeneration (or) haemorrhagic glomerular nephritis is seen.
- The liver is congested and shows cloudy swelling or fatty change.

Chronic Poisoning:

This may result from,

- Continuous accidental absorption by the workers.
- Excessive therapeutic use,
- From recovery from a large dose, and
- If ointment is used as external application for a long time.

Symptoms:

- Salivation, inflammation of gums, sore mouth and throat, loosening of teeth, gastrointestinal disturbances, fine tremors of the tongue, hands, arms and later of legs, anaemia, anorexia, loss of weight and chronic inflammation of kidneys.
- **Mercurial tremors** are also called hatter's shakes (or) glass blower's shakes, because they are common in persons

working in glass – blowing and hat industries. There may by mental disturbances.

- **Mercurial erethism** is seen in persons working with mercury in mirror manufacturing firms. This term is used to refer to the psychological effects of mercury toxicity. These include anxiety, depression, shyness, irritability, loss of confidence, mental depression, emotional instability, loss memory and insomnia.
- **Mercurialentis** is a peculiar eye change due to exposure to the vapour of mercury. It is due to brownish deposit mercury through the cornea on the anterior lens capsule. Slit lamp examination demonstrates a malt – brown reflex form the anterior lens capsule. It is bilateral and has no effect on visual acuity.

Treatment :

- Removing the patients from source of exposure
- B.A.L.
- Oral hygiene
- Demulcent drinks and
- Saline purgatives

Fate and Excretion:

After absorption, the mercuric ion is distributed between blood cells and plasma. It then diffuses into the tissues where it rapidly binds to most protein sulphydryl groups. Mercury is impounded in all tissues, particularly in liver, kidneys, spleen and bones. Excretion is by kidneys , liver and colonic mucous membrane. It is also excreted in the saliva, milk, sweat and faeces. If the quantity is larger it passes rapidly to the foetus in utero through the placental circulation. It is not a constituent of the human body.

The Circumstances of poisoning:

Accidental poisoning by mercuric chloride may be due to the use of strong solution for washing abscess cavities or irrigating the vagina, uterus or rectum, sometimes, it is introduced into the vagina as a contraceptive or for producing abortion. Homicidal and suicidal poisoning is rare.

BIO – CHEMICAL ANALYSIS OF KANTHA CHENDURAM

Preparation of the extract:

100 mgs of chenduram is weighed accurately and placed into a clean beaker and added a few drops of conc. Hydrochloric acid and evaporated it well. After evaporation cooled the content and added a few drops of conc. Nitric acid and evaporated it well. After cooling the content add 20ml of distilled water and dissolved it well. Then it is transferred to 100 ml volumetric flask and made up to 100 ml with distilled water. Mix well. Filter it. Then it is taken for analysis.

Qualitative Analysis:

S.No	EXPERIMENT	OBSERVATION	INFERENCE
1	**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 is added.	No White precipitate is formed.	Absence of calcium.
2	**TEST FOR SULPHATE:** 2 ml of the extract is added to 5% barium chloride solution.	A white precipitate is formed	Indicates the presence of sulphate

3	**TEST FOR CHLORIDE:** The extract is treated with silver nitrate solution	A white precipitate is formed	Indicates the presence of chloride
4	**TESTFOR CARBONATE**: The substance is treated with concentrated HCL	No brisk effervescence is formed	Absence of carbonate
5	**TEST FOR ZINC:** The extract is added with potassium ferrocyanide	No white precipitate	Absence of zinc
6	**TEST FOR IRON:** Ferric: The extract is treated with glacial acetic acid and potassium ferro cyanide	No blue colour is formed	Absence of ferric iron.
6	**TEST FOR IRON:** Ferrous: The extract is treated with concentrated nitric acid and ammonium thiocynate.	No blood red colour is formed	Absence of ferrous iron
7	**TEST FOR PHOSPHATE:** The extract is treated with ammonium molybdate and concentrated nitric acid	No yellow precipitate is formed	Absence of phosphate
8	**TEST FOR ALBUMIN:** The extract is treated with Esbach's reagent	No yellow precipitate is formed	Absence of albumin

9	**TEST FOR TANNIC ACID:** The extract is treated with ferric chloride	No blue black precipitate is formed	Absence of tannic acid
10	**TEST FOR UNSATURATION:** Potassium permanganate solution is added to the extract	It does not get decolourised	Absence of unsaturated compound
11	**TEST FOR REDUCING SUGAR:** 5 ml of Benedict's qualitative solution is taken in a test tube and allowed to boil for 2 mts and added 8-10 drops of the extract and again boil it for 2 mts.	No colour change occurs	Absence of reducing sugar
12	**TEST FOR AMINO ACID:** One or two drops of the extract are placed on a filter paper and dried it well. After drying 1% Ninhydrin is sprayed over the same and dried	No violet colour is formed	Absence of amino acid.

13.	**TEST FOR MERCURY:** The extract is treated with Ammonia and boil (till the ammonia cases off)and then potassium iodide is added.	A scarlet precipitate is formed.	Indicates the presence of mercury.

Result :

The given sample of Padikara Chenduram contains Sulphate, Chloride and Mercury.

TOXICITY STUDIES

INTRODUCTION

Siddha System of medicine is the oldest method practiced by so many physicians. Herbals, minerals and metals are widely used as medicines for the well being of people. On the basis of application the medicines are divided into 64 types as Internal 32 and External 32. The internal medicines in the form of parpam, chenduram, mathirai etc and external medicines are in the form oil, paste etc. Till now the toxicity studies of the medicines are not carried out scientifically. It is the time to bring the matter.

General principles of the Toxicity Studies

To asses the toxicity the following test animals are generally used namely mice, albino rats, rabbit and dog. By this research methodology acute, sub acute and chronic toxicities has to be carried out.

Selection of animal species

1. **Mice :**

   The age should be 8 to 12 weeks weighing 20-25gms are selected.

2. Albino rats :

12 weeks old weighing 180 to 200 gms are selected.

3. Virgin animals should be selected.

Preparation of Test Animals

1. The animals are kept in cages and properly fed.
2. Animals brought from outside are allowed to get acclimatized in the cages for about 5 days.
3. Animal house must have the temperature of 19^0 to 25^0C, humidity not exceeding 30%.
4. Animal should be kept 12 hrs in dark and 12 hrs in light.
5. The test animal must be free from infections.

Preparation of the Test Drug

1. The drug should be soluble in honey, water or any other liquid so that it may be administered orally.
2. The drug should be stable.
3. The drug should be prepared whenever necessary.
4. Drug should not have hyper acidity or hyper alkalinity and high toxicity.

Preparation of Doses

1. Depending of the weight of the animal the dose should be determined.
2. When mice and rats are selected, the dosage should not exceed more than 1ml for 100 gm of body weight.
3. If soluble in water 2 ml should be administered to 100gm of body weight.
4. The vehicle (anubanam) should not contain any toxicity.

PROCEDURE:

a. Administration of drug

During drug administration care should be taken that the drug does not enter into the respiratory passage. Before drug administration, the animal has to be fasted. In case of mice and albino rat` the fasting period is 3hrs and 12hrs respectively. The weight of the animal has to be noted before drug administration. Then the drug is administered to the animal. After administration of the drug, the animal should be fed after a lapse of 1 to 2 hrs in mice and 3-4 hrs in albino rats.

b. Number of animals and dose levels

The dose of the drug given in the animal depends upon

1. Body weight of the animal, i.e. 1/8 of the human dose.
2. Metabolic rate of the animal

$$\text{Drug dose} = \frac{\text{Human dose}}{\text{Average wt of the men}} \text{ X 5-8 times animal metabolic rate.}$$

While conducting acute toxicity study the number of animals in each group should be 5+5. Animals of both sex should be used. In case of chronic toxicity study the animals are divided into 3 groups, each group consisting of 5 animals.

Observation:

In acute toxicity study, the animals are carefully observed for every 30min up to 24hrs. During that period, the animal may show changes in the skin, eye, mucous membrane, blood circulation, respiratory movements and the neurological problems may arise.

In case of sub acute toxicity study, the animals have to be observed for 28 days. For chronic toxicity study the animals have to be observed for 90 days or sometimes up to 1 year. Some researchers conduct the chronic toxicity study for the whole life time of the animal.

Body weight of the animal:

The weight of the animal must be taken four times during the course of study.

- First before drug administration.
- 1 week after drug administration.
- Then 2 weeks after drug administration.
- Finally before sacrificing the animal.

Data and report:

At the end of the animal study, the following data's must be given.

- Number of animals selected for the study.
- Number of animals died due to the toxicity of the drug given.
- Number of animals sacrificed at the end of animal study.
- Changes in animal behaviour due to acute and chronic toxicity.
- Histopathological changes in the internal organs such as liver, kidney, heart etc.

TOXICITY STUDY

The toxicity evaluation of Padikara Chenduram is carried out in tow phase.

Phase I - Acute toxicity study

Phase II - Chronic toxicity study

ACUTE TOXICITY STUDY

Animals Selected:

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

Sex: Animals of both sex were used.

Weight: Animals weighing between 80-120 grams

Food and Water:

The animals were maintained with standard animal food and water ad libitum.

Number of Animals:

30 rats were divided into 6 groups each group consisting of 5 rats.

Dose Levels:

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

I Group Control

II Group 100 mg/100 gm body weight of animal

III Group 200 mg/100 gm body weight of animal

IV Group 400 mg/100 gm body weight of animal

V Group 800 mg/100 gm body weight of animal

VI Group 1600 mg/100 gm body weight of animal

Route of Administration:

The test drug is administered in a single dose orally.

Preparation of the test drug:

The drug was weighed and it was suspended in 10 ml of Ghee. It was grounded well before administration. The drug was administered once on the day of the experiment.

OBSERVATION

The following details were recorded.

I. Stimulation

Hyper activity

Pyloerection

Twitching

Rigidity

Irritability

Jumping

Clonic convulsion

Tonic convulsion

II. Depression

Ptosis

Sedation

Sleep

Loss of pinna reflex

Ataxia

Loss of muscle tone

Analgesia

III. Autonomic Effect

Straub tail

Laboured respiration

Cyanosis

Blanching

Reddening

Abnormal secretions.

At the end of 24 hrs, the number of animals alive/dead in each group was noted. On the basis of number of animals dead the approximate LD 50 was determined. The tabular column was made and the result were analysed.

TABLE NO.1

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF PADIKARA CHENDURAM, AT A CONTROL DOSE.

Observation	At 1 hr	At 2 hrs	At 4 hrs	At 24 hrs
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II DEPRESSION:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	-
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO.2.

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF PADIKARA CHENDURAM, AT A DOSE OF 100mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	-
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesis	-	-	-	-
I.Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO .3.

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF PADIKARA CHENDURAM, AT A DOSE OF 200mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	-
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III.Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO.4

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF PADIKARA CHENDURAM, AT A DOSE OF 400mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	-
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO.5

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF PADIKARA CHENDURAM, AT A DOSE OF 800mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	+
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO.6

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF PADIKARA CHENDURAM, AT A DOSE OF 1600mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	+
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

RESULT

ACUTE TOXICITY STUDY

The said parameters in acute toxicity study were observed on various six groups (Group-I, Group-II, Group-III, Group-IV, Group-V, Group-VI). Group-I is the control and Group II to VI were treated with the drug such as, 100mg, 200mg, 400mg, 800 mg, 1600mg/100 g body weight of the animal respectively. The results were tabulated in Table-I to VI.

From the Table I – VI it is being found that the drug "Padikara Chenduram" did not produce any mortality even up to 1600 mg/100 g body weight of the animal.

A very mild sign like sleep was observed only in animals treated with 800mg/100g body weight of the animal and 1600 mg/100g body weight of the animal (Group V & VI level) and that was even seen only after 24hrs.

Since it is practically difficult to give more than 1600 mg/100g body weight of the animal in this small species (Wistar albino rats), it is unable to calculate the lethal dose in this preliminary acute toxicity study.

So, it is inferred that the drug is safe up to 1600 mg/100g body weight of the animal.

CHRONIC TOXICITY STUDY

Introduction

The drug Padikara Chenduram is used for the following conditions in siddha system of medicine.

Diarrhoea

Dysentery

and

Menorrhagia

The drug was given up to 90 days.Since the drug is usually given for a long term in chronic ailments it was decided to find the chronic toxicity of the drug in experimental animals.

Animals :

Wistar albino rats bred in the animal house attached to the Post Graduate, Pharmacology department, Government Siddha Medical College were used.

Sex : Animals of both sex were used.

Body weight : Animals weighing between 80-120 gram.

Food and Water:

The animals were maintained with standard animal food and water ad libitum.

Number of groups :

15 rats were divided into 3 groups. Each consists of 5 animals.

Preparation of the drug :

The drug was weighed and suspended with Ghee. It was ground well before administration. The preparation was done in such a way. So as 1 ml of suspension contained 100mg/ml and 200mg/ml.

Ghee in which Padikara Chenduram administered to the patient in clinical practice. The administration was done once on the day of experiment.

Selection of the dose:

2 doses were selected. These doses did not have any acute toxicity effect and presumed to be safe in long term administration in animals.

I Group	Control
II Group	100mg/100gm body weight of animal
III Group	200mg/100gm body weight of animal

Route of administration:

Oral administration

Observation:

The following details were recorded before the beginning of drug administration

1. Body weight of the animals
2. Haematological Investigations
    a. WBC Total count
    b. WBC Differential count
    c. Haemoglobin %
    d. SGOT,SGPT

The above parameters were recorded at 30 days, 60 days at the end of the experiments and the results were tabulated.

The animals were sacrificed at the end of the experiment and were dissected. The viscera like Heart, Liver and Kidney were removed from each animal and were preserved in 40% formalin and sent for Histo-pathological studies.

Histopathological process:

The sections were stained with haemotoxilin and eosin and the histopathological report was given by Prof. Dr. V. Paramasivam, B.Sc., M.D. (Path), M.D. (F.M), Head of the Department, Department of pathology, Tirunelveli Medical College, Tirunelveli.

Changes in the parameters of weight and hematological indices in Group I animals (Control)

S.No	Blood	At O' day (Mean)	At 30th day (Mean)	At 60th day (Mean)	At 90th day (Mean)
1.	WBC Total	6100/cumm	6100/cumm	6000/cumm	6000/cumm
2.	Differential Count				
	Neutrophil	65%	64%	65%	63%
	Eosinophil	-	-	01%	-
	Basophil	-		-	-
	Lymphocyte	33%	36%	34%	37%
	Monocyte	-	.	-	-
3.	Haemoglobin	11 gm	11. 6 gm	11. 4 gm	11. 4 gm
4.	SGOT	56 IU/L	54 IU/L	58 IU/L	58 IU/L
5.	SGPT	25 IU/L	25 IU/L	23 IU/L	27 IU/L
6.	Body Weight	100 gm	110 gm	110 gm	120 gm

Changes in the parameters of weight and haematological indices in Group II animals (100 mg/animal)

S. No.	Blood	At O' day (Mean)	At 30th day (Mean)	At 60th day (Mean)	At 90th day (Mean)
1.	WBC Total Count	6200/cumm	6500/cumm	6300/cumm	6400/cumm
2.	Differential Count				
	Neutrophil	64%	55%	56%	58%
	Eosinophil	2%	4%	-	-
	Basophil	-	-	-	-
	Lymphocyte	34%	41%	44%	42%
	Monocyte	-	-	-	-
3.	Haemoglobin %	12 gm	13 gm	10.8 gm	11 gm
4.	SGOT	60 IU/L	57 IU/L	61 IU/L	64 IU/L
5.	SGPT	25 IU/L	26 IU/L	22 IU/L	21 IU/L
6.	Body Weight	100 gm	120 gm	130 gm	130gm

Changes in the parameters of weight and haematological indices in Group III animals (200 mg/animal)

S.No.	Blood	At O' day (Mean)	At 30th day (Mean)	At 60th day (Mean)	At 90«» day (Mean)
1.	WBC Total Count	6800/cumm	6700/cumm	6780/cumm	6780/cumm
2.	Differential Count				
	Neutrophil	60%	58%	58%	60%
	Eosinophil	1%	2%	-	–
	Basophil	-	-	-	-
	Lymphocyte	39%	40%	42%	40%
	Monocyte	-	-	-	-
3.	Haemoglobin %	12 gm	11 gm	10.6gm	11.8 gm
4.	SGOT	58 IU/L	60 IU/L	59 IU/L	59 IU/L
5.	SGPT	27 IU/L	25 IU/L	26 IU/L	25 IU/L
6.	Body Weight	100 gm	110 gm	120 gm	130gm

HISTOPATHOLOGICAL STUDIES ON ANIMALS

[Wistar Albino Rats]

Chronic toxicity studies

Group I - control

Liver - normal

Kidney - normal

Heart - normal

Group II

The effect of Padikara chenduram at the dose of 100mgm /100 gm body weight of the animal

Liver:

Section shows Congestion with Fatty changes.

Kidney:

Glomerulus shows Congestion

Tubules show distention

Inter tubular haemorrhages seen.

Heart:

Inter muscular haemorrhage noted

Group –III

The effect of Padikarachenduram at the dose of 200mgm/100gm body weight of the animal.

Liver:

Shows fatty change and evidence of congestion.

Kidney:

Glomerulus shows Congestion

Interstitium shows tortuous vessels

Heart:

Marked area of hemorrhage seen.

RESULT

The mean value of body weight and haematological indices for the three groups of rats, each group containing 5 animals with two different dosage levels were observed and the results were tabulated in tables I, II, III, for the control, 100mg/100gm body weight of the animal, 200mg/100mg body weight of the animal, dose groups respectively.

Histopathological studies reveal that the Padikara chenduram on long term administration produces pathological changes in the liver kidney and heart. So, the drug produces toxic effects on long term use.

SUMMARY

The drug Padikara Chenduram is used by the siddha physicians for the treatment of diarrhea, dysentery, menorrhagia.

Lingam and Padikaram are chemically identified as Red Sulphide of Mercury(Cinnabar) and Pottasium Aluminium Sulphate respectively.

The biochemical studies of the drug bring out the presence of Sulphate, Chloride, Mercury and absence of Calcium, Carbonate, Zinc, Ferrous iron, Ferric iron, Phosphate, Albumin, Tannic acid, Unsaturated compound, Reducing sugar and amino acid.

The aim of this dissertation is to find out the acute and chronic toxicity of the drug Padikara Chenduram administered at various presumed moderate dose levels in the experimental animals.

The Wistar albino rats with both sex were selected from animals house attached to the Government Siddha Medical College, Palayamkottai. The animals weighing between 80 - 120 g were selected and fed with standard food and water.

To evaluate the acute toxicity study, 30 rats were selected and divided into 6 groups, each group consisting of 5 rats, and

they were administered with the drug in different graded dose levels upto 1600mg/100 g body weight of the animal by orally. The animals were observed and the details were recorded. The drug did not produce any mortality even upto 24 hrs, except sleeping. So the drug is safe upto 1600 mg/100 g body weight of the animal.

The chronic toxicity study was conducted for about 90 days duration. In this study 2 dose levels were selected from acute toxicity study for the drug administration. Fifteen rats were selected and divided into 3 groups consisting of 5 rats. First group was kept as control and administered with water. Second & third groups were administered with Padikara Chenduram at the dose of 100 mg/100 g body weight of the animal and 200 mg/100 g body weight of the animal respectively.

The blood samples were taken before and after these studies. Periodical blood sample were taken in chronic study. Then blood samples sent to laboratory for Haematology report.

These animals were sacrificed at the end of the experiment. The visceras - liver, kidney and heart were removed from the animal and sent to the pathologist for histopathology report.

The result revealed marked pathological changes in liver, kidney and heart.

The results were presented in tables with the relevant photos. These studies were discussed and concluded that the physicians should take precaution during prescription of the drug Padikara Chenduram in clinical practice in the following manners like dose, anupanam, pathiyam and other principles of the treatment.

This is the preliminary toxicity study of Padikara Chenduram. It will be very useful for further research in future.

DISCUSSION

The author went through the toxicity studies on albino rats for Padikara Chenduram.

The present study with Padikara Chenduram was conducted with an objective of finding out, whether this drug has got any side effects in long term administration to patient.

Padikara Chenduram is a drug used to treat various chronic diseases such as diarrhoea dysentery, menorrhagia. The drug will have to be administered for a long duration of time depending upon the severity of the disease condition. So it was thought that this drug may produce any adverse effect in long term administration.

Moreover, the raw drug used in the medicine Padikara Chenduram was mentioned in the literatures as an inorganic irritant poisons, which often causes toxicity. So it was decided to study briefly the acute and chronic toxicity of Padikara Chenduram.

While studying this drug experimentally, every precaution was taken, as it is administered clinically. With this view, the drug was administered with proper adjuvant in all experiments conducted.

The details of experiment have been already given. A brief outline of the same is given below for discussion.

Acute toxicity study:

The following 6 graded doses were given to animals in this study.

1. Control.
2. 100 mg/100 g body weight of the animal
3. 200 mg/100 g body weight of the animal
4. 400 mg/100 g body weight of the animal
5. 800 mg/100 g body weight of the animal
6. 1600 mg/100 g body weight of the animal

As per the findings of the study it is found that the single doses upto 1600 mg/100 g body weight of the animal, Padikara Chenduram did not produce any mortality, even at the end of 24 hrs. The drug produced mild sleep at the end of 24 hrs of drug administration.

Chronic toxicity study:

As per the findings of the long term administration of Padikara Chenduram, the doses like 100 mg/100 g body weight of the animal and 200 mg/100 g body weight of the animals produced congestion, fatty changes in liver, Glomerulus shows congestion, Tubules show distention, inter tubular haemorrhage

in kidney, marked areas of haemorrhage in the heart. These changes denote the potential adverse effect of Padikara Chenduram in long term use.

The toxicities are correlated with the toxic effects of Padikara Chenduram mentioned in many literatures. So the toxic effects of Padikara Chenduram is observed to have been produced in long term use.

From this toxicity studies it is inferred that this drug is more suitable for short term administration that is not more than 40 days as per the rules of siddha system of medicine.

CONCLUSION

From the studies conducted we come to know that Padikara chenduram does not produce death in rats within 24 hours at the dose level of 1600 mg/100mg body weight of the animal.

The chronic toxicity studies also revealed that the drug has harmful effect on liver, kidney and heart in long term administration. The dose administered for chronic toxicity studies in rats are relatively very high when compared to the dose usually administered to the patients.

The aim of giving such a high dose was to find out the type of toxicity if the drug is given in abnormally high doses. This toxicity could occur in patient if the prescribed dose is not advised by physician or not followed by the patient.

In this respect the chronic study has reasonably established that Padikara Chenduram in high doses causes fatty changes, congestion in liver, renal damage as well as marked area of haemorrhage in heart in long term administration.

Further studies with smaller doses may perhaps establish the safety of the drug. In clinical practice, the drug Padikara Chenduram should be used with caution. The patient must be advised to take the drug properly with the adjuvant (anupanam)

and to follow the diet restrictions during the course of the treatment.

The physician who administers this drug should also look for potential adverse effects in the patients by regularly monitoring them by doing hematological examination and also the liver, kidney and the cardiac function tests.

CONVERSION TABLE – METRIC SYSTEM

நிறுத்தளலவை

ஒரு உளுந்தெடை	-	65மி.கி
ஒரு குன்றி எடை	-	130மி.கி
ஒரு மஞ்சாடி	-	260மி.கி
ஒரு மாஷம்	-	780மி.கி
ஒரு பணவெடை	-	488மி.கி
ஒரு யவம்	-	135மி.கி
ஒரு வராகனெடை	-	4.2 கி
ஒரு கழஞ்சு	-	5.1கி
ஒரு பலம்	-	35கி
ஒரு கைசா	-	10.2கி
ஒரு தோலா, ரூபா வெடை	-	12கி
ஒரு அவுன்ஸ்	-	30கி, 30மி.லி
ஒரு சேர்	-	280 கி
ஒரு வீசை	-	1.4 கி.கி
ஒரு தூக்கு	-	1.7 கி.கி
ஒரு துலாம்	-	8.5 கி.கி

முகத்தலளவை

ஒரு ஆழாக்கு	-	168 மிலி
ஒரு உழக்கு	-	336 மிலி
ஒரு உரி	-	672 மிலி

ஒரு நாழி	-	1.3லி
ஒரு குறுணி	-	5.3லி
ஒரு பதக்கு	-	10.7 லி
ஒரு முக்குறுணி	-	16.1கி
ஒரு தூணி	-	21.5லி
ஒரு கலம்	-	64.5லி
ஒரு டிரான், தேக்கரண்டி	-	4 மிலி
ஒரு குப்பி	-	700 மிலி
ஒரு தீர்த்தகரண்டி	-	1.33மிலி
ஒரு நெய்க்கரண்டி	-	40 மிலி
ஒரு அரைக்கால்படி	-	65 மிலி
ஒரு படி	-	2 லி
ஒரு உச்சிக்கரண்டி	-	16மிலி
ஒரு பாலாடை	-	30 மிலி
ஒரு எண்ணெய்கரண்டி	-	240மிலி
ஒரு சொம்பு	-	1.360 மிலி

வேறு

ஒரு அனு, திலம்	-	0.003 கி
ஒரு காகிணி	-	0.006 கி
ஒரு விரிகி	-	0.024கி
ஒரு விதலிம்	-	0.048கி
ஒரு குஞ்சம்	-	0.096கி
ஒரு தனகம்	-	3.9கி

ஒரு சாணம்	-	11.7கி
ஒரு நிட்கம்	-	46.8 கி
ஒரு வடகம்	-	23.4கி
ஒரு சுபம்	-	1225 கி
ஒரு பாரம் , ஒரு கலம்	-	2000கி
ஒரு நாழிகை	-	24 நிமிடம்
ஒரு சாமம்	-	3 மணிநேர்
ஒரு நாளுக்கு	-	8 சாமம்

புடம்

காடைப்புடம்	-	எரு1
கவுதாரிப்புடம்	-	எரு3
குக்குடப் புடம்	-	எரு10
வராக புடம்	-	எரு50
மணல் மறைவுபுடம்	-	எரு 90
கன புடம்	-	எரு 100
கெஜபுடம்	-	எரு 1000

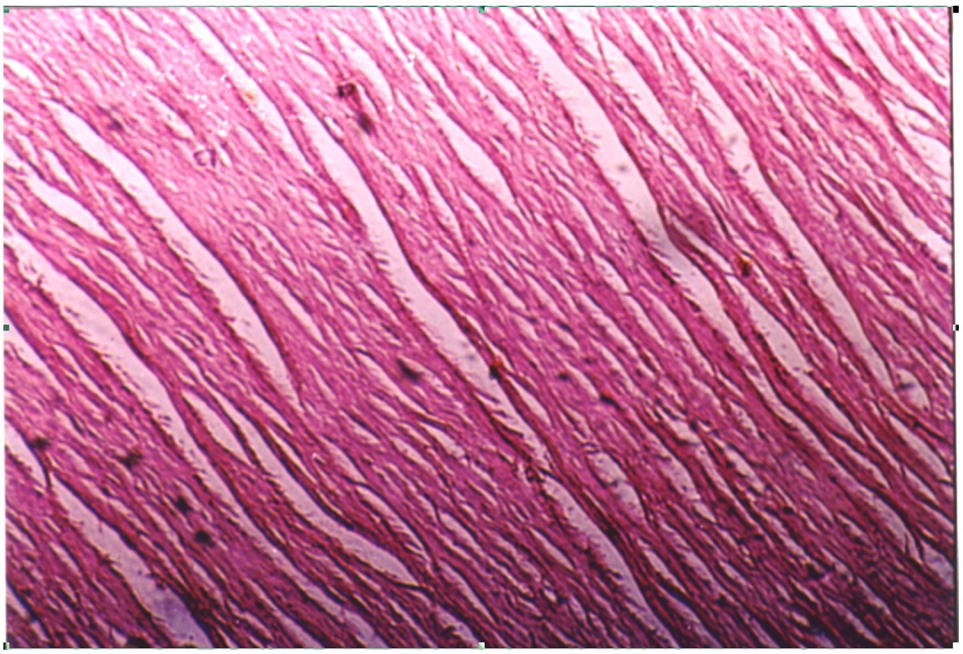
BIBLIOGRAPHY

- ***Bogar 7000,*** Dr.R.Thiagarajan, Ist edition, 1975
- ***Sihicha Ratna Deepam,*** Ist edition, 1978
- ***Sarabendra Siddha Maruthuva Sudar,*** S.P.Rajendran, Ist edition, 1979
- ***Yokhobu vaidhyam 300 –*** S.P.Ramachandran, IInd edition, 2000
- ***Anuboga Vaidhya Murai,*** vol-3
- ***Veeramamunivar Vagada Thirattu,*** S.P.Ramachandran, Ist edition
- ***Thamizhaga Siddha Vaidhiya Gurugulam***, Ist edition
- ***Palathirattu vaidhyam,*** Dr.Nandakumar, RIMP, IInd edition
- ***Text book of Inorganic Chemistry*** – R.D.Madan
- ***Inorganic Chemistry*** – Alan G. Sharpe
- ***Treatise on Inorganic Chemistry*** – H.Remy 1989
- ***Modi's Medical Jurisprudence and Toxicology,*** - Dr.C.A.Franklin, M.D., 21st edition, 1988
- ***The essentials of Forensic Medicine and Toxicology*** – Dr. Narayana Reddy, 20th edition, 2001
- ***Wealth of India***, vol.2B
- ***Gunapadam Mooligai Vaguppu***, Murugesa Mudhaliar, 6th edition

- ***Siddha system of Pharmacopoea*** by Dr.S.Chidambara Thanu Pillai
- ***Gunapadam Thathu Jeeva Vaguppu***, Dr.R.Thiyagarajan, LIM, IVth edition 2004
- ***Siddha Vaidhya Thirattu***, Dr.Kuppusamy, HPIM., and Dr.Uthamarayan, HPIM., Ist edition 1998
- ***Anuboga Vaidhya Navaneetham***, Hakkeem P.Mohamed Abdulla Sahib, vol.1,7&4, IInd edition
- ***T.V.Sambasivam Pillai Dictionary,*** vol.5
- ***Indian Materia Medica,*** R.N.Chopra, IIIrd edition, vol.II,III, 1976
- ***Kannusamy Parambarai Vaidhyam,*** Kannusamy Pillai, Ist edition, 1945
- ***Bogar Nigandu 1200,*** S.P.Ramachandran, Ist edition, 1999
- ***18 Siddhar Vaidhya Chillaraikovai,*** vol 1
- ***Matchamuni nayanar Kadaikkandam*** 800,
- ***Konganavar Sarakku vaippu kurippugal 800***, IInd edition 1991
- ***Agasthiar Amuthakalai Gnanam 1200***, S.P. Ramachan dran, Ist edition 1996
- ***Bogar Karasarathurai and Bogar 7000,*** Ist edition, 1989

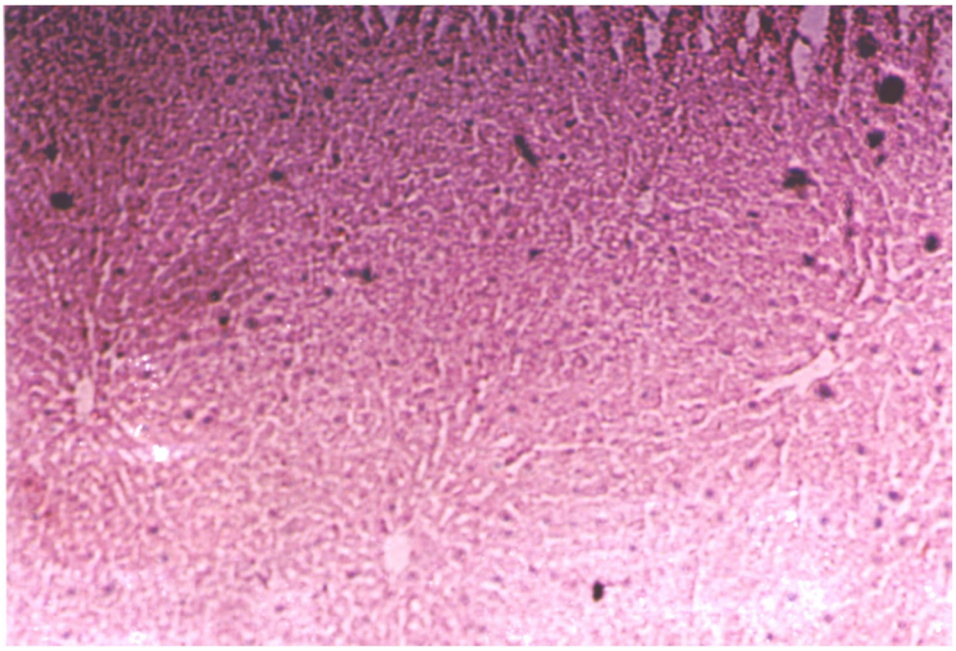
- ***Anuboga Vaithiya Thevaragasiam,*** J.Seetharamprasath, IInd edition 1991
- ***Ramadevar Yakobu Vaidhya Chinthamani 700,*** - S.P.Ramachandran, Ist edition 1996
- ***Nanju Murivu Nool*** – Dr.Murugesa Mudhaliyar, IIIrd edition
- ***Pharmacopoeia India*** – K.C.Bose
- ***Minerals of India*** – Meher D.N.Wadia
- http:/org/wiki/vermilon
- http://encyclopedia.labortawtak.com/Alum

GROUP I -CONTROL

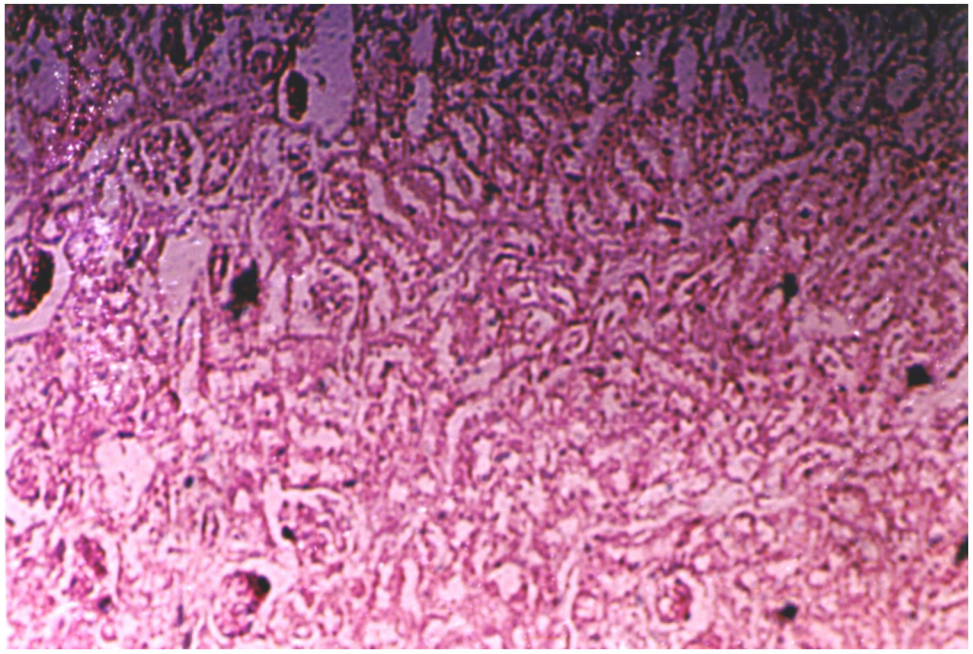


SECTION OF HEART - NORMAL

GROUP I -CONTROL



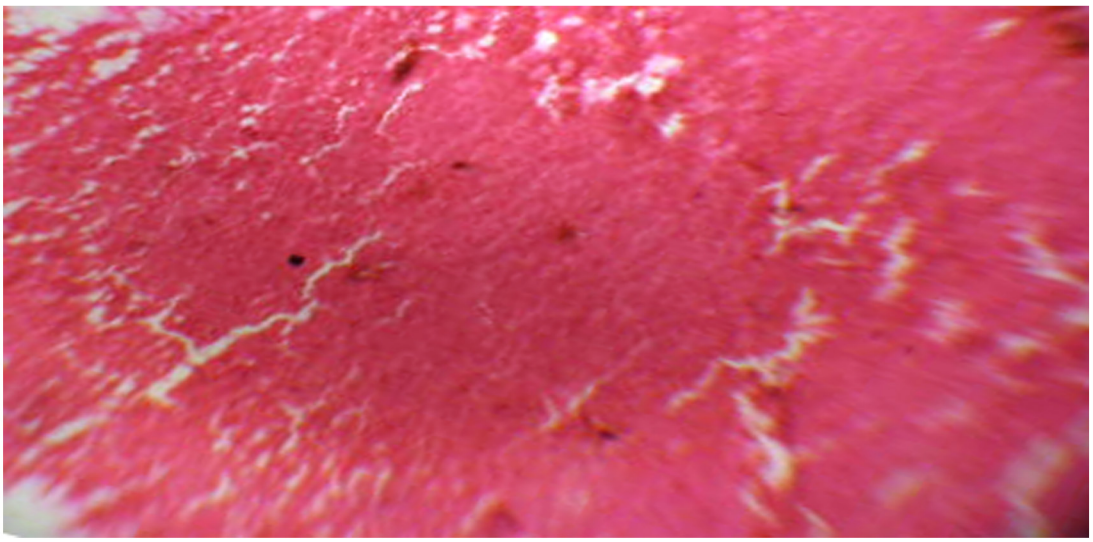
SECTION OF LIVER - NORMAL



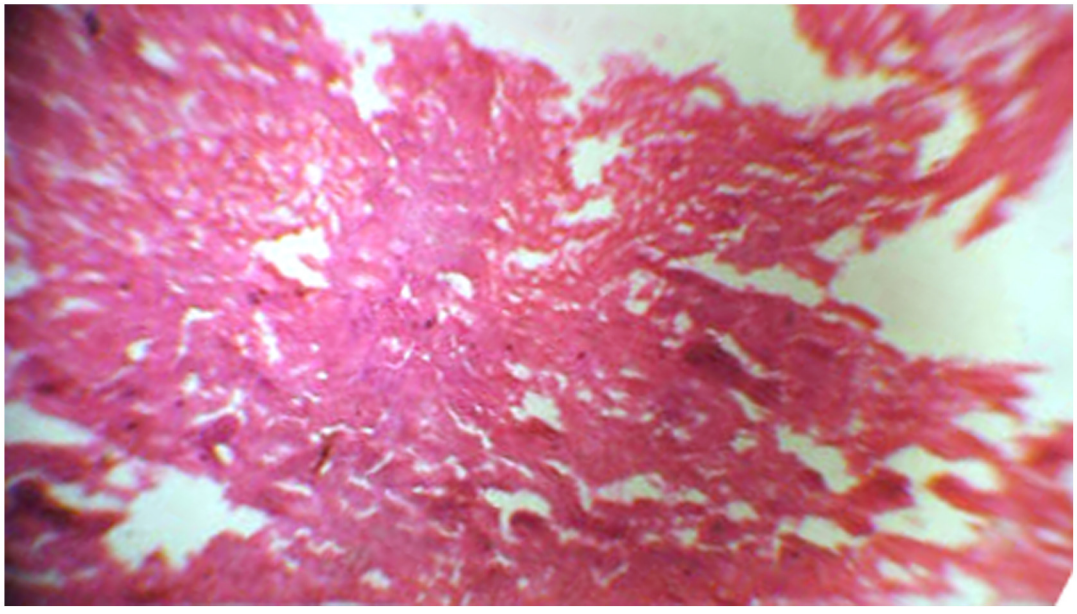
SECTION OF KIDNEY - NORMAL

Group II

The effect of Padikara Chenduram at 100mg dose level



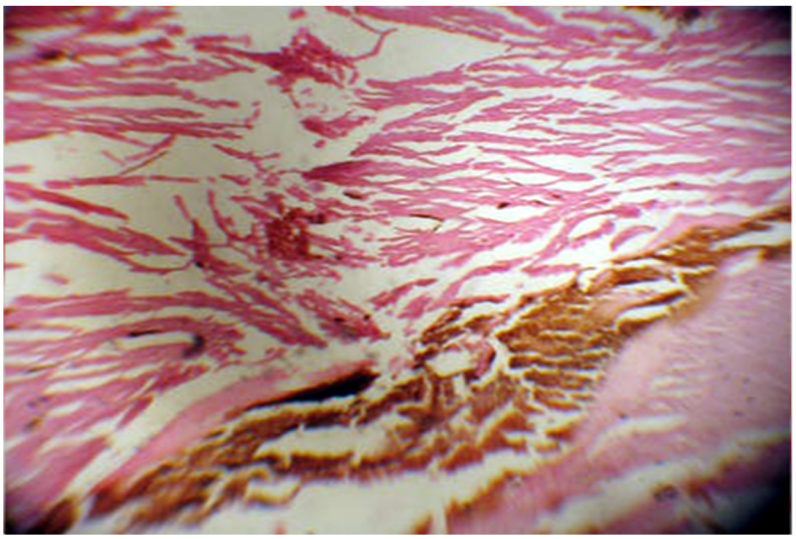
Section of liver congestion, fatty changes



Section of Kidney Glomerulus shows congestion,Tubules show distention, Inter tubular haemorrhages

Group II

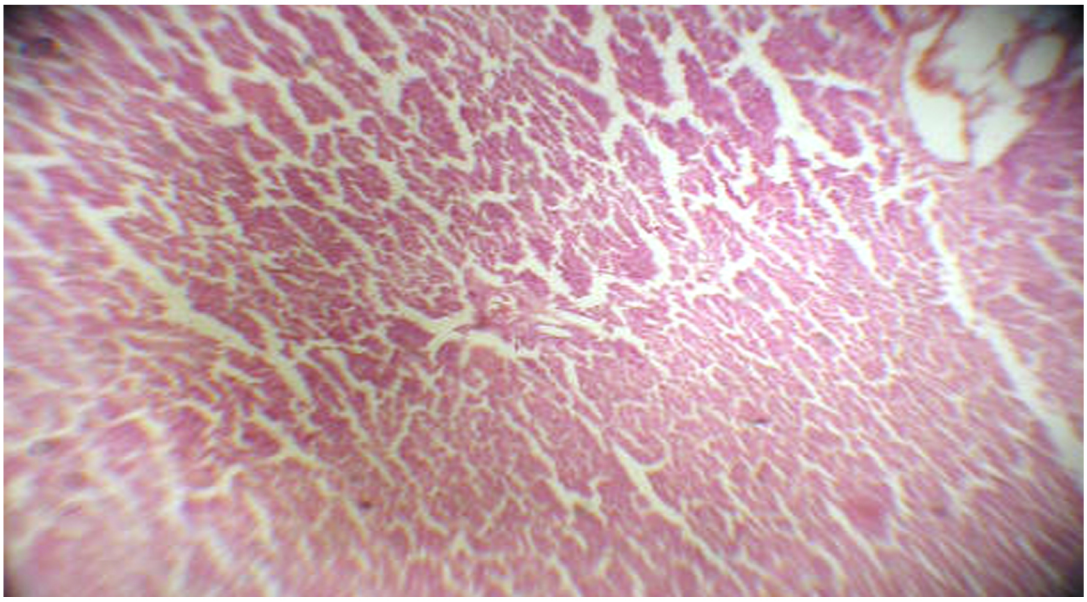
The effect of Padikara Chenduram at 100mg dose level



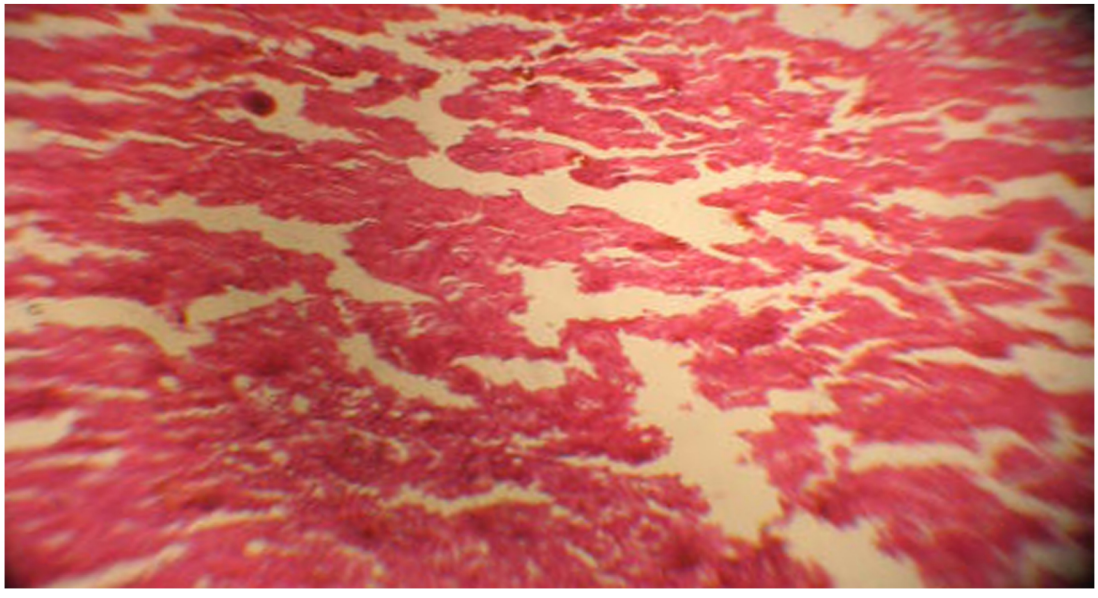
Section of Heart - Inter muscular haemorrhage

Group III

The effect of Padikara Chenduram at 200 mg dose level



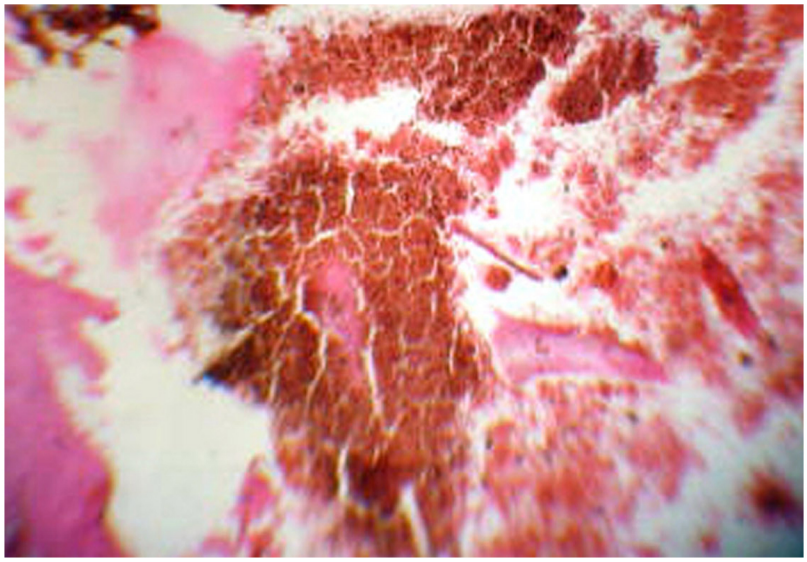
Section of liver shows Congestion,Fatty changes



Section of Kidney shows Glomerulus shows Congestion
Interstitium shows Tortuous vessels

Group III

The effect of Padikara Chenduram at 200mg dose level



Section of Heart - Marked areas of haemorrhage

PADIKARA CHENDURAM

PADIKARAM

BEFORE PURIFICATION

AFTER PURIFICATION