STANDARDIZATION ON PURIFICATION PROCESS OF MANOSILAI (RED ORPIMENT)

The dissertation Submitted by

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BONAFIDE CERTIFICATE

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DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled **"Standardization on Purification Process of Manosilai (Red Orpiment)"** is a bonafide and genuine research work carried out by me under the guidance of **Dr. S. Murugesan M.D(s),** Lecturer, Department of **Nanju Noolum Maruthuva Neethi Noolum,** National Institute of Siddha, Chennai - 47, and the dissertation has not formed the basis for the award of any Degree, Diploma, Fellowship or other similar title.

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Place: Chennai-47 **Dr. A. Sureka**

CONTENTS

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INTRODUCTION

Siddha system of medicine, which has been prevalent in the ancient tamill and, is the foremost of all other medical system in the world. The unique nature of this system is its continuous services to humanity for more than 10,000 years, in combating diseases and in maintaining the physical, mental and moral health. Siddhar's are spiritual scientist explored the nature and evolved Siddha science from the findings of the experiments. They educated this disciple and propagated Siddha concepts.

The Siddha system grew though the work of Agathiyar, Bogar, Thirumoolar and others.

Siddhar's knowledge of iatrochemistry, minerals, metals and plants was stupendous. This was successfully used system from the immemorial.

In Siddha system, chemistry had been found developed into a science auxiliary to medicine and alchemy, it was found useful in the preparation of medicines for curing all sorts of suffering, spirituals as well as corporeal and also transmutation of baser metals into gold. The knowledge of plants and minerals was of very high order.[1]

Siddha medicine incorporates wide usage of heavy metals and minerals for curing chronic illness. [2]

The scientific evaluation is needed to validate its preciousness. The Siddha system has not only the curative and preventive effects on different diseases but also paves the way for longevity and immortality. WHO has also recognized Indian system of medicine has an effective alternative medicine in the place of conventional allopathic system of medicine.

In spite of strong efficacy in iddha system is facing crisis in getting appreciation among the mass. The western scientific community condemned the Indian system of medicine to market the drugs reporting the presence of heavy metals like arsenic, lead, cadmium & mercury.

In Siddha system all drugs must be purified individually as told in the text before converting into medication.

‘ஒன்றான சரக்குச் சுத்தி
யாவருமுறைக்கவில்லை
கண்ணான சரக்குக் கொல்லாங்
கையம்மழந் தீர விட்டால்
பண்ணான மருந்து சேர்ந்துப்
பருகிடிலபிணிபா ரிக்கும்
நண்ணான செந்தூ ரங்க
ளிடைபடும் நன்றாதே’[3]

(Agasthiyar Kanma Soothiram)

Detoxification and purification process of raw days have been meticulously described in siddha literature where, purification is primary step in removing impurities of the drug.[4]

Standardization is the process of implementing and developing technical standards. Standardization helps to maximize, compatibility, interoperability, safety, repeatability or quality. It can facilitate commoditization of formerly custom process.[5] Aim of Standardization is to scientifically valid the quality and safety of single drugs of herbals, minerals, metals animal origin and also compound formulations as per API guidelines.

In Siddha system, Metallic preparations are use to cure many challenging disease before preparation of medicine each drug must be purified to remove the impurities.

The purification of metallic drug used in Siddha constitutes a step considered as crucial to ensure the quality and safety of medicines

No medical preparation is done without prior Suddhi process [6]

This process helps metallic drug to lose their undesirable or toxic effect and there by aid better dosage efficacy

Manosilai is one of the metallic drug, cures lot of disease, particularly of effective chronic disease, like, leprosy, fever with chill, asthma, eye disease, urinary tract infection and kabha disease.[7]

Manosilai is also included as the ingredients in the preparations like Sivanar Amirtham, Kasthoori karuppu, Vishnu chakkaram, Bramananda bairavam and Gandaga Sudar thailam.

Being toxicology student I want to study of the chemical changes occur during the purification process of Manosilai.

AIM:

To standardize the purification process of Manosilai.

OBJECTIVES:

- To discover the importance of purification process.
- To analyse the changes during purification process by chemical analysis.
- To analyse the changes during purification process by physico – chemical analysis.
- To evaluate the importance of purification by comparing the unpurified and purified drug by Quantitative analysis.
    - XRD
    - SEM
    - ICPOES
    - FTIR
- To access before and after purification of Pesticide resides
- To access before and after purification of Microbial Load
- To access before and after purification of Aflotoxin Count

மனோசிலை :

இது விளைவு பாஷாணம் 32-ல் ஒன்று. இது அரிதாரம் அகப்படும் பூமிக்குக் கீழே தோண்ட கிடைக்கும்.[8]

வேறு பெயர்கள் :

- சிலை,
- வில்,
- நான்முகன் தேவி, ‘
- சரசோதி,
- வாணி,
- வெள்ளச்சி,
- தாமரைவாசினி.

இது பிறவிச்சரக்கு, வைப்புக்கு சரக்கு என இரு வகைப்படும்.

ஐந்து பங்கு வெள்ளைபாடாணம், மூன்றுபங்கு கந்தகம் சேர்த்து வைப்புச்சரக்கு செய்யப்படுகிறது.

வகைகள்:

- சிவந்த அரிதாரம்
- மடலரிதாரம்
- குதிரைப்பல்பாடாணம் என்றும்,

மேலும் கோஷாயி அனுபோக வைத்தியம் பிரம்ம ரகசியம் பாகம் 2ல்

- ஸயாங்கியம் - லிங்கம் போல்சிகப்பாயும் கொஞ்சம் பச்சை நிறமாயும் பிரகாசமற்று இருக்கும்
- கரவீரம் - சிகப்பாயும், சூரணமாயும், பளுவாயும் இருக்கும்.
- திலிகண்டம்- கொஞ்சம் சிகப்பாயும், பச்சைநிறமாயும் இருக்கும் என்றும் வகைபடுத்தப்பட்டுள்ளது.

மேலும் சாம்பசிவம்பிள்ளை தமிழ் அகராதியில்

- மனோசிலை
- சியாமாங்கி
- கரவீரம்
- துவிகண்டம் என்றும் கூறப்பட்டுள்ளது.

மனோசிலை பொதுக்குணம்.

''கொடிய குஷ்டம் காய்ச்ச நடுக்கலஜ கல்லியிரைப்
புச்சிலந்திப் பேசறும னோசிலைக்குப் பேசு.''

பொருள் :

மனோசிலையினால், சருமகுட்டம் நளிர்சுரம், அஜகல்லிகாரோகம் (ஆட்டுக்கழுத்தில் உண்டாகும் அதிரைப் போன்று கொப்புளங்கள். இது குழந்தைகளுக்கு காணும் நோய்), இரைப்பு (சுவாசம்), சிலந்திவிடம் முதலியன தீரும். மற்றும் காசம், கபநோய், கண்ணோய், மூத்திரக்கீரிச்சரம் முதலியன தீரும்.

பொது குணம்:

''குட்டங்கொடியரணங்கூறுந்திமிர்படையும்
வட்டமிடுங்கிரந்தி வன்மையெலாம் -விட்டுப்போம்
காய்ச்சல் நடுக்கலஜ கன்னியிரைப் புச்சிலந்தி
பேச்சறும னோசிலையைப் பேண்.''

குணம்

மனோசிலையால் குட்டம், அழுகலுற்ற விரணங்கள், திமிருடன் உள்ள படைகள், கிரந்திபுண்கள், சுரம் குளிர் அஜகல்லிகாரோகம் (குழந்தைகளுக்கு காணும் கன்னிப்பூவைப் போன்ற நீண்ட கொப்புளங்கள்), சுவாசகாசம், சிலந்தி விடம் முதலியவைகள் தீரும்.

உபயோகிக்கும் முறை :

இதனை தனியாக உள்ளுக்கு கொடுப்பது கிடையாது. இதனை பிற சரக்குகளுடன் கூட்டி கருப்பு, மாத்திரைகளாக பயன்படுத்துகின்றனர்.

செய்கை:

- உடல்தேற்றி,
- வெப்பகற்றி,
- உடல்உரமாக்கி

வழக்கத்தில் உள்ள சில முறைகள்

- பவுத்திரப் புண்களுக்கு மற்றைய பொருள்களுடன் கலந்து வெளிப்பிரயோகமாக பயன்படுத்தலாம்.
- மனோசிலையை நாயுருவிச்சாம்பலுடன் கலந்து வெண்குட்டத்திற்கு மேல் பூச்சாக பயன்படுத்தலாம்.
- மனோசிலை, தாளகம், சேங்கொட்டை ஒரு வராகன் எடுத்து தூளாக்கி 3 பலம் நல்லெண்ணெயில் விட்டு வெள்ளாட்டு நீர் ஒரு படிவிட்டு காய்ச்சி 3 வேளை காதில் விட காதில் சீழ் வடிதல் குறையும்.[9]
- சுத்தி செய்த மனோசிலை 1 பாகம் சங்கு பற்பம் 2 பாகம், மிளகு ½ பாகம், இந்துப்பு ¼ சூரணித்து தேன் கலந்து கண்ணில் கலிக்கமிட சுக்கிலரோகம், திமிர்ரோகம் கண் ஊளை குணமாகும்.
- மேற்படி சூரணம் செய்த மனோசிலை - சூரணம் செய்து, நீரில் அரைத்து கண்ணில் கலிக்கமிட ஐன்னி பாத சுரம் நிவர்ததியாகும்.
- சிறுதேக்கு, சுக்கு இவைகளை கலந்து உள்ள இரைப்பு தீரும் நஞ்சுக்குறிகுணம்.

சுத்தி முறைகள்

- இஞ்சிச்சாறு, பழச்சாறு, பசுவின்மோர் இவைகளில் ஒன்றை மனோசிலைக்கு விட்டு, ஒருசாமம் நன்றாய் அரைத்து, உலர்த்தி எடுக்கச் செய்யுவும்
- மனோசிலை ஒரு பலம், இதனைச் சிறு துண்டுகளாகச் செய்து 5பலம் புளித்த மோரைப்பீங்கான் பாத்திரத்தில் விட்டு, அதில் இத்துண்டுகளை இட்டு வெய்யிலில் வைத்துக் கிளறிக் கொடுக்க வேண்டும். மாலையில் எடுத்து நீரிலிட்டுக் கழுவி, முன்னளவு புளித்த மோர் விட்டு, மறுநாள் வெய்யிலில் வைத்து முன் போல செய்யவும். இவ்விதம் மூன்றுமுறை செய்யச் சுத்தியாகும்.
- ஐந்து பலம் கொடிவேலி வேர்ப்பட்டையை ¾ படி நீர்விட்டு, மூன்றில் ஒன்றாய் காய்ச்ச, அதில் 1 பலம் மனோசிலையத் துண்டுகளைக் குடிநீரில் படும் படி ஆட்டுக் கொழுப்பை இட்டு அதில் மனோசிலைத்துண்டுகளைத் துணியில் முடிந்துபோட்டு, துணி கருகும் வரை வறுத்தெடுத்து எண்ணெய்ப் பசை நீங்க துணியால் துடைத்துக் கொள்ளவேண்டும். இச் சக்தி வைத்திய இரச வாத முறைகளுக்கு பயன்படும்.
- மனோசிலை 2 பாலத்தை கிழி கட்டிப் பெண் வெள்ளாட்டு மூத்திரம் 1/4 படியில் தோலாயந்திரமாக நீர் சுண்டு வரை எரித்துக் கழுவி எடுத்து, கல்வத்திலிட்டு வெள்ளாட்டு பித்து நீர் விட்டு அரைத்து, சிறு வில்லைகளாகச் செய்து, வெய்யிலிலுலர்த்திக் கல்வத்திலிட்டு முன்போலவே பித்து நீர் விட்டு அரைத்து உலர்த்திக் கொள்ளவும். இவ்விதம் ஏழுமுறை செய்யச் சுத்தியாம்.[7]

- மனோசிலையை கிழகட்டி காடியில் போட்டு எரித்தெடுத்து மீண்டும் ஆட்டு மூத்திரத்தில்துலாயந்திரமாக கட்டி எரித்து எடுக்க சுத்தியாகும்.
- மனோசிலையை மெல்லிய துணியில் மூட்டைகட்டி ஆட்டு மூத்திரத்தில் துலாயந்திரமாகளரிக்க சுத்தியாகும்.
- அகத்தி, இஞ்சி, கரிசலாங்கண்ணி இவைகளீல் வேகவைத்து எடுக்க சுத்தியாகும்.[10]
- மனோசிலையை சுத்தமான கல்வத்திலிட்டு பசுமோரால் ஒரு ஜாமம் அரைத்து எடுக்க சுத்தியாகும்.
- மனோசீலையை இஞ்சிச் சாற்றில் ஒரு ஜாமமரைத்து மாத்திரைகளாகச் செய்து உலர்த்திக் கொள்க

பாஷாணங்கள் சுத்தி மனோசிலைக்கும் பொருந்தும்

"சொல்லிவிட்ட பாஷாண வர்க்கந் தன்னைச்
சுருக்காகத் தொளாந்திரமாய் விட்டம் போட்டு
நெல்லுதனில் மூழ்க வைத்து அவித்துக் கொள்ளு
நிலைத்த சுத்தி யாகுமிது நிசமாய்த் தானே
வெல்லவெ பணவிடைதன் கொண்டால் நல்ல
விருப்பமாய்ச் சகல நோயெல்லாம் போகும்
புல்லறிவாய்ப் பண்டிதற்குப் பத்தி சொன்னேன்
புகலறிய யாகோபு புலன் சொன்னாரே."[13]

பாஷாணகளின் பொது சுத்தி

குப்பைமேனி ரசம்
கற்றாழைப்பால்
பழரசம்
செம்பருத்தி இலைச் சாறு
வெற்றிலைச் சாறு
வகைக்கு 1 படி
முலைப்பால் ¼ படி
ஆதில் பாறைஉப்பு
வெடிகாரம்
படிகாரம்
நவச்சாரம்

வகைக்கு ¼ பலம் தூள் செய்து கலந்து கிளிக்கட்டியிட்டு நிழலாக காற்றில்லாவிடத்தில் 15 நாள் வைத்தெடுத்து காடியில் ஊறவைத்து எடுக்க சுத்தியாகும்.[12]

மனோசிலை கொண்டு செய்யப்படும் பிற மருந்துகள்

- சர்வரோககுளிகை
- ஆறுமுககுளிகை
- ராமபாணமாத்திரை[9]
- ரசகந்தி மெழுகு
- கஸ்தூரி மாத்த்ரை
- விஷ்ணுக்சக்கரம்
- கந்தகசுடர்தைலம் [14]
- பாஷாண மாத்திரை
- பிரமானந்தபைரவம்
- மனோசிலை பற்பம்
- சத்தி மாத்திரை
- பாசமாத்திரை
- திரிவங்கசெந்துரம்
- மகாபாடாணசெந்துரம்
- ரசவீரநாக செந்துரம்[15]
- ரத்தினாதி குளிகை
- நவரச மெழுகு[16]
- ஆனந்த பைரவ மாத்திரை
- தாபசுர மாத்திரை
- மகாகோடாசூழி மாத்திரை
- தசாவதார பேதி
- பஞ்சபாண செந்தூரம்
- ரஷாமணி மாத்திரை
- மேகராஜாங்க மாத்திரை
- ராஜபூபதி மாத்திரை
- நவமூலக்குளிகை
- கௌசிகர் குழம்பு[9]
- மந்தகாச மாத்திரை
- மனோசிலை ரசப்பதங்கம்
- மனோசிலை மாத்திரை
- மனோசிலை சூரணம்

- மனோசிலை எண்ணெய்
- மனோசிலை புகை
- காளகண்ட மேகநாராயண மாத்திரை
- பூரணசந்திரோதயம்

மனோசிலை சேரும் நயன மருந்துகள்:

- சந்திரோதயக் குழம்பு
- நயனரோக மாத்திரை
- ரோபணிரசக்கிரியை
- சரணாஞ்சனம்
- முக்தாதிமகாஞ்சனம்
- லேகாஞ்சனப்பொடி
- நயன வியாதி மாத்திரை[17]

மனோசிலை சேரும் விஷமுறிவு மருந்துகள்:

- விஷக்குழம்பு
- விடைமை
- சுடுகாட்டுமீட்டான் குழம்பு
- திருகுதைலம்
- விஷமருந்து[18]

நஞ்சுக்குறிகுணம்

அசுத்த மனோசிலையின் தோடம், பரிகாரமும்:

- அசுத்த மனோசிலையினால் வாந்தி, பிரமை முதலிய அனேக வியாதிகள் உண்டு பண்ணும்.
- பசும் பால், தேன் இவைகளைக் கலந்து மூன்று நாள் உட்கொண்டால் அசுத்த மனோசிலையின் தோம் நீங்கும்.
- மனோசிலையின் நஞ்சுக்குறிகுணம் தனியாக கூறப்படவில்லை அதனால் வெள்ளைப்பாடாணத்திற்கு கூறியுள்ளவற்றை இங்கு எடுத்துக் கொள்ளலாம்.

நஞ்சுக்குறிகுணம்:

- சிரங்கு கொப்புளம் உண்டாதல், கை, கால், வலித்துக் குரங்கு பைசாசங்களின் விரல்களைப்போலாதல்.
- நாளுக்கு நாள் முகத்தில் வீக்கமுண்டாதல்.
- வாய் கசத்தல், மூக்குத்தண்டு வீங்குதல்,மேல் வாய் உதடு புண்ணாதல்.

- வாயில் ஒரு வித களிம்புச்சுவை உண்டாதல், நீர் சுரத்தல்.
- தாகம், நீரடைப்பு, மூர்சித்தல், வியர்த்தல், கையுங்காலும் வியரத்துத் திமிர்த்தல், முதலிய கொடிய குறிகுணம் காணும்.

நஞ்சு முறிவு:

ஏலம், முசுமுசுக்கைவேர் இரண்டும் சமஅளவு எடுத்குது குடிநீர் செய்து அதில் வெள்ளைச்சர்க்கரை, படிகாரம் சேர்த்து இரு வேளையாக ஒரு மண்டலம் சாப்பிடவேண்டும்.[19]

ARSENIC DISULPHIDIUM

Eng: Realgar or Red orpiment; Arsenic disulphide; Sans: Manashila Red Orpiment is a deep orange-yellow colored mineral with formula As_2S_3

It is found in volcanic fumaroles, low temperature hydrothermal veins, and hot springs and is formed both by sublimation and as a byproduct of the decay of another arsenic mineral.[20]

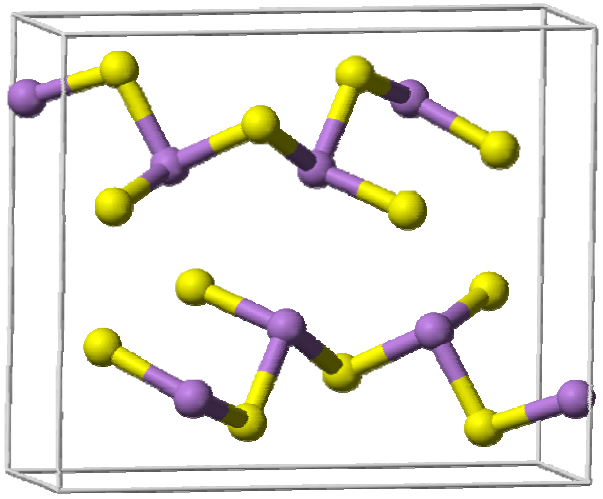
General	
Category	Sulfide mineral
Formula (repeating unit)	As_2S_3
Strunz classification	2.FA.30
Crystal system	Monoclinic
Crystal class	Prismatic (2/m) (same H-M symbol)
Space group	$P2_1/n$
Unit cell	a=11.475(5), b=9.577(4) c = 4.256(2) [Å], β = 90.45(5)°; Z = 4

Identification	
Color	Lemon-yellow to golden or brownish yellow
Crystal habit	Commonly in foliated columnar or fibrous aggregates; may be reniform or botryoidally; also granular or powdery; rarely as prismatic crystals
Twinning	On {100}
Cleavage	Perfect on {010}, imperfect on {100};
Tenacity	Sectile
Moh scale hardness	1.5 – 2
Luster	Resinous, pearly on cleavage surface
Streak	Pale lemon-yellow
Diaphaneity	Transparent
Specific gravity	3.49

Historical uses

Orpiment was traded in the Roman Empire and was used as a medicine in China even though it is very toxic. It has been used as a fly poison and to tip arrows with poison. Because of its striking color, it was of interest to alchemists, both in China and the West, searching for a way to make gold

Crystalline structure



After its toxicity was discovered, its use as a pigment declined. People took advantage of its toxicity to use it as a poison for insects and rodents. Some people continued to use it as a ritualistic cosmetic and "medicine" even after its toxicity was known, and that practice continues today in some parts of the world.

Chemical composition of arsenic disulphide

Substance name	-arsenic disulphide
Origin of Substance	-arsenic ore, realgar
CHEMICAL GROUP	-A compound of arsenic, a group VA element

REFERENCE NUMBERS

CAS	-12044-44-79-0; 1303-32-8
RTECS	-NIF
UN	-1557
HAZCHEM	-NIF

PHYSICO- CHEMICAL PROPERTIES

Chemical structure	-	As_2S_3
Molecular Weight	-	213.97
Physical state at room temperature	-	Solid
Colour	-	Red – brown
Odour	-	None
Viscosity	-	NA
PH	-	NA
Solubility	-	Practically insoluble in water auto
ignition temperature	-	NIF
Chemical interactions	-	NIF
Major products of combustion	-	Sulphur dioxide gas and Arsenic trioxide
Explosive limits	-	NA
Flammability	-	Ignites at high temperatures
Boiling point	-	565 C
Density	-	alpha 3.506 B 3.254
Vapor pressure	-	NIF
Relative vapor density	-	NIF
Flash point	-	NIF
Reactivity	-	No reaction with water.

MEDICINAL USES

- It is purified by being rubbed with the juice of lemons or ginger. It is used as an alternative, febrifuge and tonic, given in fever, cough, asthma and skin disease; in these last is used also externally.
- Locally it is applied to fistulous sores recommends for application to the eye, in affections of the internal tunics, tumors or other growths, night blindness etc., It is used as an alternative, febrifuge and tonic, given in fever, cough, asthma and skin disease; in these last is used also externally.
- In fever it is generally used in combination with mercury, orpiment etc.., as in following:

- Chandesvara Rasa already mentioned under arsenious acid is recommended in Rasenrdrasarasangraha for remittent fevers.
- Svasakuthara Rasa is another preparation mentioned in the same, and consisting of Reaglar, Mercury, sulphur, Aconite, Borax, Black pepper, Ginger And Long pepper, is Recommended is asthma with cough and in remittent fever with cerebral complications. Dose is 4 grains in pills form.
- In coma from remittent fever, these pills are powdered and used as a snuff to rouse the patient.
- A preparation known as chandraprabha varti is made of realgar, gale, conch shell lime, seeds of Maringa pterygosperma, long pepper, liquorices and the kernel of belleric myrobalan in equal parts rubbed together with goat's milk, dried and made in to small pastilles, these are rubbed with a little honey and applied the eyes as a collyrium.[21]
- It is purified by being rubbed with the juice of time or ginger. It is used internally in fever, skin disease cough, asthma etc and externally in skin disease. Realgar mixed with ashes of (achyranthus aspera) is used externally for leucoderma.[1]

MISCELLANEOUS USES

- Leather industry,
- Depilatory agent
- Paint pigment,
- Shot manufacture,
- Pyrotechnics,
- Rodenticide

ARSENIC DISULPHIDIUM

Introduction

Arsenic disulphide is a naturally occurring form of arsenic and is found as realgar, one othe major arsenic containing minerals. Arsenic disulphide is insoluble in water and so poorly absorbed. It therefore represents a much less acute toxic hazard than soluble arsenic compounds.

Type of product:

Insoluble arsenic compound found naturally as the ore realgar.

Toxicokinetics

Absorption

Insoluble compounds, such as arsenic disulphide, are poorly absorbed after ingestion. The efficiency of absorption is dependent on particle size; fine powders are better absorbed than larger particles. Following inhalation irrespirable particles are trapped in the upper airways and deposited in the gastrointestinal tract by mucociliary clearance.

Distribution

Absorbed arsenic is distributed to all body tissues. High concentrations would be expected in keratin-rich tissues such as hair, skin and nails due to sulphydryl group binding. Trivalent arsenic is methylated in the liver to methylarsonic acid and dimethylarisinic acid.

Excretion

The half – life of arsenic in blood is about 60 hours with rapid renal excretion predominantly as mono – and dimethyl – detivatives and the whole body half – life of arsenic in six human.

Toxicity

Arsenic disulphide poisoning is rare. Exposure may occur via ingestion of herbal remedies or in industry. Fatal dose not known.

Features :

Systemic toxicity may follow arsenic disulphide ingestion. Inhalation or topical exposure.

Topical:

Irritant to skin and mucous membranes. Systemic arsenic poisoning may occur after substantial exposure.

Ingestion

Very small ingestion is likely to cause only mild gastro – intestinal upset.

Substantial ingestions:

- Rapid onset (within 1-2 hours) of burning of the mouth and throat, hypersalivation, dysphagia, nausea, vomiting, abdominal pain and diarrhea.
- In severe cases gastrointestinal haemorrhage, cardiovascular collapse, renal failure, seizures, encephalopathy and rhabdomyolysis may occur.
- Other features: facial and peripheral ocdema, ventricular arrhythmias (notably torsade de pointes), ECG abnormalitiy (QT interval prolongation, T- wave changes), muscle cramps.
- Investigations may show anaemia, leucopenia, thrombocytopenia or evidence of intravascular haemolysis.
- Death may occur from cardiorespiratory or hepatorenal failure. The adult respiratory distress syndrome (ARDS) has been reported.
- Survivors of severe poisoning may develop a peripheral neuropathy and skin lesions typical of chronic arsenic poisoning.

Inhalation

Rhinitis, pharyngitis, laryngitis and tracheobronchitis may occur. Tracheal and bronchinal haemorrhage may complicate severe cases.

MODE OF ACTION:

Arsenic interferes with cellular respiration by combining with the sulphhudral groups of mitochondrial enzymes, especially pyruvate kinase and certain phosphatases. Arsenate causes it's toxicity by uncoupling mitochondrial oxidative phosphorilation. It interfers with glycolysis. Its particular target is vascular endothelium, leading to increased permeability, tissue edema and hemorrhage (speciously in intestinal canal). It causes irritation of the mucous membrances and depression of the nervous system. 18

SIGNS AND SYMPTOMS OF ACUTE ARSENIC POISONING

The symptoms usually appear within half an hour, they may be delayed for several hours (especially in parental route).

The patient usually complaints of a feeling of tiredness, depression, nausea, fever burning pain, constriction in the throat and stomach which increases on pressure. Increase salivation and stomatitis may present. Intense thirst and projectile vomiting are the constant symptoms.

Gastro intestinal symptoms:

- Resembles bacterial food poisoning
- Sweetish metallic taste
- Constriction in throat, difficulty in swallowing.
- Projectile vomiting.
- Purging (rice water stool).

Renal :

The urine is suppressed or scanty and contains albumin, increased vascular permcability, ventricular tachycardia and ventricular fibrillation.

Central nervous system:

Headache, vertigo, hyperthermia, tremors, convolutions, coma, general, paralysis.

Skin:

Delayed loss of hair, skin eruptions.

Other symptoms:

- There may be severe cramps in the calf muscles, as well as other muscle, which usually commence in purging.
- The patient becomes restless greatly dehydrated and passes in to a state of collapse. The skin becomes cold and clammy, and the face is pale anxious but later becomes cyanosed.
- The eyes are shrinken.
- The pulse is feeble, irregular and frequent. The respiration becomes labored. Lastly hypoxic convulsions' and coma proceed death.
- When a large done is taken, the death may occur rapidly from shock without producing any symptoms.

SUB ACUTE TYPE

It is usually result when arsenic is administered in small doses at repeated intervals to cause death by gradual prostration. The symptoms are dyspepsia, cough and tingling in the throat, followed by vomiting, purging with abdominal pain and tenesmus, foul tongue, dry, congested throat, feeling of depression and languor. The stools are bloody. The symptoms of neuritis are pronounced. Severe cramps in muscles, which are extremely tender on pressure. Very restless and cannot sleep.

CHRONIC ARSENIC EXPOSURE

- May occur following ingestion, inhalation or topical exposure. Features include weakness, lethargy,
- Gastrointestinal upset, dermal manifestations (hyperkeratosis and "raindrop" pigmentation of the skin), a peripheral (motor and sensory) neuropathy and psychological impairment.
- Also reported: peripheral vascular disease (cold sensitivity progressing to ulceration and gangrene), renal tubular or cortical damage and hematological abnormalities (notabl pancytopenia).[23]

TREATMENT

(1) Emetics are not recommended

(2) Freshly precipitated, hydrated Ferric oxide orally in small doses converts toxic arsenic to non toxic Ferric oxide.

(3) B.A.L, 400 to 800 mg on firstday, 200 to 400mg on second and third day.

(4) Penicillamine may be used with BAL.100 mg/kg daily upto 1 to 2 g.

(5) Demulcents lessen irritation.

(6) Castor oil or magnesium sulphate to prevent intestinal absorption of arsenic.

(7) Hemodialysis or exchange transfusion may be given if necessary.

(8) Chelation Therapy is ineffective in arsine poisoning.

RECENT RESEARCH

1. The medicinal use of realgar (As_2S_3) and its recent development as an anticancer agent.

Wu J1, Shao Y, Liu J, Chen G, Ho PC.

Arsenicals have been known as poisons and paradoxically as therapeutic agents. In the early 1970s, Chinese physicians from Harbin revived the medicinal use of arsenicals as anticancer agents. Notable success was observed in the treatment of acute promyelocytic leukemia (APL) with arsenic trioxide (ATO). The FDA approved ATO injection in the year 2000 for the treatment of APL. In contrast, the clinical use of the other arsenical, realgar (As_4S_4), is currently much less established, though it has also long been used in medical history. According to ancient medical records and recent findings in clinical trials, realgar was found as effective as ATO, but with relatively good oral safety profiles even on chronic administration. These give realgar an advantage over ATO in maintenance treatment. Though there is increasing understanding on the mechanisms of action and metabolic profiles of ATO, similar aspects of realgar are unclear to date. Biol Pharm Bull. 2013;36(4):641-8. Epub 2013 Jan 25.

2. Reversal effect of arsenic sensitivity in human leukemia cell line K562 and K562/ADM using realgar transforming solution.

Wang X1, Zhang X, Xu Z, Wang Z, Yue X, Li H

The success of arsenic trioxide (ATO) in treatment of acute promyelocytic leukemia (APL) attracts a great deal of attention to researchers to explore its activity of anti-leukemia. However, ATO has unavailable effect on chronic myeloid leukemia (CML), especially multidrug resistant (MDR)-CML, unless using high concentration. Realgar (As(4)S(4)) has been employed in Chinese traditional medicine for 1500 years. Research evidences confirmed realgar has similar effect on treating with APL as ATO, but the problem of large dose and long period in the CML/MDR-CML treatment still exist. By using a microbial leaching process with Acidithiobacillus ferrooxidans, we obtained realgar transforming solution (RTS) which showed significantly higher extent in inhibiting CML cell line K562 and MDR-CML cell line K562/ADM, and then trigger apoptosis. Both K562 and K562/ADM showed arsenic-dose-dependent effect on RTS. Interestingly, the overexpression of MDR1 mRNA and P-glucoprotein (P-gp) in

K562/ADM cells were down-regulated by RTS, where there are no obvious effects on ATO and realgar and arsenic can be subsequently accumulated in K562/ADM cells efficiently. The intracellular accumulation of arsenic in K562/ADM cells treated with RTS for 4 h was 2-fold and 16-folds higher than those treated with realgar or ATORealgar-induced apoptosis and differentiation in all-trans retinoic acid (ATRA)-sensitive NB4 and ATRA-resistant MR2 cells

3. Realgar-induced apoptosis and differentiation in all-trans retinoic acid (ATRA)-sensitive NB4 and ATRA-resistant MR2 cells

Realgar has been used in Western medicine and Chinese traditional medicine since ancient times, and its promising anticancer activity has attracted much attention in recent years, especially for acute promyelocytic leukemia (APL). However, the therapeutic action of realgar treatment for APL remains to be fully elucidated. Cellular cytotoxicity, proliferation, apoptosis and differentiation were comprehensively investigated in realgar-treated cell lines derived from PML-RARα+ APL patient, including the all-trans retinoic acid (ATRA)-sensitive NB4 and ATRA-resistant MR2 cell lines. For analysis of key regulators of apoptosis and differentiation, gene expression profiles were performed in NB4 cells. Realgar was found to induce apoptosis and differentiation in both cell lines, and these effects were exerted simultaneously. Gene expression profiles indicated that genes influenced by realgar treatment were involved in the modulation of signal transduction, translation, transcription, metabolism and the immune response.

வெள்ளாட்டு மூத்திரக் குணம்.

"சோபையொடு பாண்டுவைத்து ரத்தும் பலவீக்க
தாபமகற் றும்முதிரத் தைப்போக்கும் - கோபமுடன்
உள்ளாட்டுத் துர்ச்சதையோ டோங்குதர நோயகற்றும்
வெள்ளாட்டு மூத்திரம்வி ரைந்து"

(பொ-ரை) வெள்ளாட்டு மூத்திரம் சோபை, பாண்டு, பற்பல வீக்கத்தினெரிச்சல், இரத்தப்போக்கு, துர்மாமிசம், மகோதரம், இவைகளை நீக்கும்.[19]

URINE

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

One of unique healing method that human ever experienced is urine therapy or also known as urotherapy. Maybe its sound unbelievable but yes, its happen and being used by several person to overcome several health problem. [24]

HISTORY

Though urine has been used for diagnostic and therapeutic purposes in several traditional systems, and mentioned in some medical texts, auto-urine therapy as a system of alternative medicine was popularized by British naturopath John W. Armstrong in early 20th century.

Armstrong was inspired by his family's practice of using urine to treat minor stings and toothaches, by a metaphorical reading of the Biblical Proverb 5:15 "Drink waters out of thine own cistern, and running waters out of thine own well", and his own experience with ill-health that he treated with a 45-day fast "on nothing but urine and tap water".

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

MEDICINAL PROPERTIES OF URINE

- It may sound strange but urine's medicinal properties were discovered by our ancient stages. Charak samhita has described the role of urine in anointing, pasting, enema, purgatives, fomentation and abdominal distension.
- Urine is used in poisoning also.
- Urine endowed with properties of being sharp, pungent, saline and non unctuous is useful in diseases
- Urine promotes appetites and digestion.
- Urine acts as anti poison and kills worms in the body.

- Urine gives appreciable results in anemia. Ayurvedic texts have described properties of eight types of urine.
- Urine is used in the form of internal application by drinking and through its external application by mixing it with some powered drugs.

GOAT'S URINE

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

Some people claim that urine is actually a wonderful natural medicine

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

URINARY PARAMETERS IN GOAT'S URINE[25]

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

USES OF GOAT URINE

- Healing cancer
- Heart disease
- Allergies
- Auto-immune disease
- Diabetes
- Asthma
- Infertility
- Infections, wounds and on and on.

The usually staid Robert James has the most to say on this particular topic. He advises his readers that goat's urine "is recommended above say on this particular topic.[22]

He advises his readers that goat's urine "is recommended above that of all other Animals for dissolving the Stone [kidney and urinary tract stones], and promoting a discharge of Urine; for which Reason it is proper in a **Dropsy**. (Dropsy – an accumulation of fluid under the skin – is often accompanied by poor urine flow.) He goes on to suggest using the goat's urinary bladder can be "dry'd and reduced to a Powder "because" it is said to be a medicine of peculiar Efficacy in an Incontinence of Urine[26]".

OTHER USES OF GOAT'S URINE

The goat's urine is gently heated and filtered, when it is given at the doses of 1 – 1½ oz. in Nardostachys grandiflora (sodamanjil), it controls epilepsy.[7]

GOAT URINE IN AYURVEDA

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

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

Goat urine is used as liquid binding agent in Vilwadi Gulika. It is used in treating scorpin bite, rhodent bite etc. [27]

Goat urine for external application:

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

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

Usage in uterine disorders

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

RECENT RESEARCH

1. P-Ethylphenylsulphuric Acid in Goat Urine

BY J. K. GRANT, Department of Biochemi8try, UniverBity of Edinburgh

(Received 13 April 1948) 24

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

2. Cerebral sodium/angiotensin interaction studied by RIA-determination of urinary arginine vasopressin in the hydrated goat.[29]

Lishajko F, Appelgren B, Eriksson S.

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

உளுந்து

BOTANICAL NAME:

Vigna mungo (Lion) Hep

வேறு பெயர்:

- உளுந்து
- மாடம்
- மாஷம்

VERNACULAR NAME:

Eng.	Black gram
Tel.	Minumu
Mal.	Ulunnu
Sans.	Masha
Kan.	Uddu
Hind.	Masha

இ.ந்து இந்தியாவிலெங்கும் பயிராகும் ஒருவகைச் செடியின் விதை.[31]

பயன்படும் உறுப்பு:

- விதை,
- வேர்

சுவை

இனிப்பு,

தன்மை

தட்பம்,

பிரிவு

இனிப்பு.

வகைகள்

சிறு உளுந்து

பெரு உளுந்து

என இருவகைப்படும் இவற்றுள் சிறியதுதான் சிறந்தது. இதனைக் கொழித்துக் கல் மண் முதலியவைகளை நீரில், நன்றாக உலர்த்திப் பிறகு சிறிது நல்வெண்ணெயை உளுந்தின் மீது படும்படி (அதிக எண்ணெய் தேவையில்லை) நன்றாகக் கோதி, கல்யந்திரத்திலிட்டு இரண்டி ரண்டு பிளவாகும். படி உடைக்கவும். பிறகு உரலிலிட்டுக் குத்தி பொட்டை நீக்கிப் பருப்பை எடுத்துப் பல பண்டங்களுக்கும் உபயோகப்படுத்தலாம். இ.ந்து இனிப்புச் சுவையையும், நெய்ப்பு, கனம், உஷ்ணம்,வாத மடக்கி, முதலில் குணங்களையும் பெற்றுள்ளது[32]

செய்கை:

- உள்ளழலாற்றி
- குளிர்ச்சியுண்டாக்கி
- காமம்பெருக்கி
- பாற்பெருக்கி
- உரமாக்கி
- உடலுரமாக்கி

பொது குணம்:

இ.ந்து உணவுப் பொருட்களுள் ஒன்று. மிகுந்த அளவின் உண்ணில், வயிற்றுக்கடுமையுண்டாகி, பசித்தீயைக் கெடுக்கும். உடற்கு ஊட்டத்தையும் அழகையும் கெடுக்கும்., பெண்களுக்கு இடுப்புக்கு வலிமையைத் தரும்., உடலுக்குக் குளிர்ச்சியைத்தரும[24]

செய்யவுஉளுந் திற்குச் சிலேத்மவனி லற்பிறக்கம்
வெய்யபித்தம் போமந்தம் வீறுங்காண்- மெய்யதனில்
என்புருக்கி தீரும் இடுப்புக் கடுபலமாம்
முன்பு விருநத்தியுண்டாய் முன்[25]

வ-கு : உளுந்தை மாவாக்கிப் பண்டங்களாக செய்து அருந்த வன்மை தரும்.

உளுந்துவடை

இதைச் சாப்பிடுவதால் வளிக்குற்றம் மிகும், பசி கெடும். குளிர்ச்சியுறும்.

‘வெறுமுளுந்திற் செய்வடைக்கு மேன்மேலும் - வாதம்
உறும்பித்தம் சற்றே யொடுங்கும் - நறுத்தீ
பணம்போம் புசிப்பிற் பருகநன்றம் வாலி
யனம்போ ணடையா யறி.’

உளுந்தோதனம்

- இது மந்தம் உண்டாகும்:
- இது ஐயத்தையும் வளிக்குற்றத்தையும் பெருக்கும்:
- தீக்குற்றத்தைத் தன்னிலைப்படுத்தும்,
- உடம்பை வலுக்கச் செய்யும்.

“எஞ்சுகப வாதமிக ஏறுமதி மந்தமுறும்
விஞ்சுபித் தந்தாமு மெய்யுரக்கும் - அஞ்சம்
எழுந்தோதம் புக்கு மினியநடை மாதே
உளுந்தோ தனத்திற் குரை.” 33

உளுந்தின் பயன்கள் :

- பச்சை உளுந்து மாவைத் தேன் சேர்த்து அருந்தலாம்.
- உளுந்தை நீரில் ஊறவைத்து எடுத்த நீரை, மறுநாள் அதிகாலையில் அருந்த மூத்திர சம்பந்தமான வியாதிகள் போம்.
- இதைக் கொண்டு செய்கிற எண்ணெய், வளிநோய், முடக்கு நோய்கள் முதலியவற்றிற்கு நோயுள்ள இடத்தில் பூசிவர அவை போம்.
- வேரை அரைத்துக் சூடக்கி வீக்கங்களுக்கு வைத்துக்கட்டலாம்.
- உளுந்தை வடையாகச் செய்தும், கஞ்சியாக் காய்ச்சியும் உண்கின்றனர். இதனால் இளைத்த உடல் பருக்கும். உளுந்து வடை வன்மை உண்டாம்.
- பெரும்பாலும் இதனை நீரில் ஊறவைத்து ஆட்டுக் கல்லில் ஆட்டித்தான் இட்டிலிக்கோ, வடைக்கோ, மற்றப்பணியாரங்களுக்கோ உபயோகப்படுத்துகிறார்கள்.
- இடுப்புக்கு உறுதியாகையால், இதனை வறுத்து மாவாக அரைத்து, சர்க்கரை நெய் இட்டு உக்களியாகக் கிண்டிப் பெரும்பான்மையும் புஷ்பவதியான பெண்களுக்குக் கொடுப்பது வழக்கம்.

- இதனை அடையாகச் செய்து உண்ண, வாதாதிக்கமாகும். பித்த கோபமும், உதிராக்கினியும் கெடும். ஆனால் உண்டி யோடு வடையைத் தின்று நன்று.

உளுந்த பருப்பின் குணம்:

"உளுந்தின் பருப்பை யுலர்த்தியூ றச்செய்
தழுந்தா தரைத்துவடை யாக்கிச் - செழுந்தேனிற்
கூட்டியுள்ள வையபித்த சோபையறும் ஊனதையிலை
தீட்டியவேற் கண்மாதே தேர்."

புளித்த தயிரில் உளுத்தம் பருப்பை ஊறவைத்துப் பெருபடியாக அரைத்துப் பாகமாகச் சுட்ட வடையை நல்ல தேனில் தோய்த்து உண்ணில். பித்த சிலேஷ்மரோகங்கள் அறும். வாத தோஷம் விருத்தி ஆகாது.

பேயன் வாழைப்பழத்தைச் சேர்த்துச், செய்த உளுத்தம் வடையை நெய் தொட்டு உண்ண. வாதபித்த தோடங்கள் தத்தம் நிலையில்நிற்கும்.

''பேயன் கதலிபழம் பெய்தமா ஷத்தின்வடை
நேயமுற அமைத்து நித்தமுமே - நேயமுடன்
தானருந்தில் வாதபித்தந் தத்தம்நிலை கொண்டமருந்
தேனருந்தாத் தேனே தெளி.''

உளுந்தின் மருத்துவப் பயன்கள்:

- உளுந்தை மாவாக்கி, அதனுடன் மிளகு, சீரகம், கொத்தமல்லி மஞ்சள் ஆகியவற்றைச் சேர்த்து அரைத்து கஞ்சி காய்ச்சி குடித்தால், குடல் புண்கள் ஆறும்.
- உளுந்து, பார்லி – தலா 100 கிராம், மிளகு, சீரகம், பூண்டு மஞ்சள் - தலா பத்து கிராம் எடுத்து அரைத்து, கஞ்சி காய்ச்சி குடித்தால் வெட்டைச்சூடு, வெள்ளைப்படுதல் போன்றவை குணமாகும்.
- உளுந்து மாவு, திணை மாவு - இரண்டையும் சம அளவு எடுத்து தேனில் குழைத்துச் சாப்பிட்டு வந்தால், உடல் இரும்பைப்போல் உறுதியாகும்.
- உளுந்தைத் தண்ணீரில் போட்டு ஊறவைத்து, மறுநாள், காலையில் அந்தத் தண்ணீரைக் குடித்தால் சிறுநீரக நோய்கள் அனைத்தும் குணமாகும்.
- உளுந்து, சின்ன வெங்காயம் - இரண்டையும் சேர்த்தும் கஞ்சி காய்ச்சிக் குடித்தால். ஆண்மைக் குறைவு நீங்கும்.
- உளுந்து, சிறு பருப்பு, பச்சரிசி – முன்றையும் சேர்த்து காய்ச்சி குடித்தால், பாலூட்டும் பெண்களுக்கு பால் சுரக்கும்

யுனானி முறை

- உடல் செழிக்கும், தாது விளையும், இடுப்புக்குப் பலம் கொடுக்கும்.
- மந்திக்கும், மலச்சிக்கல் உண்டாகும், காற்றை உண்டாக்கும் வயிறு உப்பும்.

மாற்று : நெய், ஜீரண பதார்த்தம். [35]

நஞ்சுக் குறிகுணம :

இதை அளவறிந்து உண்ணில் உடம்பிற்கு ஊட்டத்தையும் அழகையும் கொடுக்கும். அளவிற்கு அதிக அளவில் உண்ணில் பசித்தீயைக் கெடுத்து அசீரணத்தை உண்டாக்கும் வயிற்றுக்கடுப்பும், வயிறு பளுவும் உண்டாகும்.

மலச்சிக்கலாவது, கழிச்சலாவது காணும் நெஞ்சுக் கரிப்பு ஏற்படும்.

முறிவு

தேவையான பொருட்கள் : (1) 4 கிராம் கொள்ளுக் காய் வேளை, (2) 4 கிராம் மிளகு, (3) 4 கிராம் சீரகம், (4) 4 கிராம் தேன்.

செய்முறை : கொள்ளுக்காய் வேளை, மிளகு, சீரகம் ஆகிய முன்று சரக்குகளையும் மேற்சொன்ன அளவின்படி எடுத்து இடித்து மண்சட்டியிலிட்டு, 165 மி.லிட், நீர்விட்டு காலாழாக்காகக் காய்ச்சி அத்துடன் 4 கிராம் தேன். சேர்த்து வன்மைக்குத் தக்க நாளளவு கொடுக்க உளுந்தினால் உண்டான நஞ்சு வேகம் தணியும்.[19]

BLACK GRAM

BOTANICAL NAME

(Phascolus mungo Linn.)

FAMILY

Fabaceae

VERNARCULAR NAMES:

Eng : Black gram

Hin : Urd

Kan : Uddu

Mal : Ulunnu

San : Masah

Tam : Ulunthu (உளுந்து)

Tel : Uddulu, Minumulu, Nallaminumulu.

DISTRIBUTION:

Cultivated all over India

The Plant: An erect hairy annual with long twining branches, leaves trifoliate, leaflets ovate, Entire; flowers small, yellow on elongating peduncles; fruits cylindrical pods, hairy with a short, Hooked beak; seeds 1-4 per pod, generally black with a white hilum protruding from the seed.

PARTS USED:

- Roots
- Seeds [35]

DESCRIPTION

Black gram (Vigna mungo (L.) Hepper) is an erect, fast-growing annual, herbaceous legume reaching 30-100 cm in height. It has a well-developed taproot and its stems are diffusely branched from the base.

Occasionally it has a twining habit and it is generally pubescent. The leaves are trifoliate with ovate leaflets, 4-10 cm long and 2-7 cm wide. The inflorescence is borne at the extremity of a long (up to 18 cm) peduncle and bears yellow, small, papilionaceous flowers.

The fruit is a cylindrical, erect pod, 4-7 cm long x 0.5 cm broad. The pod is hairy and has a short hooked beak. It contains 4-10 ellipsoid black or mottled seeds). Many Vigna mungo cultivars exist, each one adapted to specific environmental conditions.

Vigna mungo seeds are mainly a staple food and the dehulled and split seeds . They can be ground into flour and used for making papadum, a typical Indian flat bread). Seeds, sprouts and green pods are edible and much appreciated for their high digestibility and lack of flatulence induction.

DISTRIBUTION

Vigna mungo originated from central Asia and India from where it was domesticated. It is now found in many tropical areas of Asia, Africa and Madagascar. It is cultivated in the USA and Australia as a fodder crop. It is generally found in lowlands but can grow up to 1800 m above sea level provided there is neither frost nor prolonged cloudiness. Optimal growth conditions are average day temperatures ranging from 25°C to 35°C and annual rainfall of 600-1000 mm.

CULTIVATION DETAILS

A plant of the drier tropics, where it is found at elevations up to 2,000 metres. It grows best in areas where annual daytime temperatures are within the range 22 - 35°c, but can tolerate 8 - 40°c

The plant does not tolerate frost. It prefers a mean annual rainfall in the range 650 - 900mm, but tolerates 530 - 2,430mm

Rain at flowering time has a very adverse effect upon seed yields

Plants are not adapted to wet, humid areas with high rainfall, but can, however, be grown in the dry season of wetter areas so long as this is at least 4 months in duration.[36]

CHEMICAL CONSTITUENTS

Seed

- y-glutamyl-y- glutamylmethionine,
- Aalanine
- L-pipecolic acid,

Seed coat

- Vitexin
- β sitostaerol

Seed protein

- Cystine
- Methionine
- Valine
- Isoleucine
- Phenylalnine [36]

NUTRITIONAL VALUE OF BLACK GRAM

Vigna mungo is a nutritious bean that is rich in protein, dietary fiber and carbohydrates. Around 25% of its weight includes various proteins. Every 100 gram of urad dal offers, 18 gm (72%) of dietary fibers, 1 gm of potassium (8%) and only 2gram of fat.

PROPERTIES AND USES:

- The roots are narcotic and are used for ostalgia, abscess and inflammations.
- Seeds are sweet, emollient, thermogetic, diuretic, aphrodisiac, tonic, nutritious, galactagogue, appetizer,
- Laxative and nervine tonic. They are useful in dyspepsia, anorexia, strangury, constipation, vitiated
- Conditions of vata, haemorrhoids, hepatopathy, neuropathy and agalactia. They are used in the form of decoction, powder, paste etc.

- The roots are narcotic and are used for ostalgia, abscess and inflammations.
- In traditional medicine, the seed is used for its suppurative, cooling and astringent properties. For example, it is ground into a powder, moistened and applied as a poultice on abscesses.

TRADITONAL USES:

Black gram and skin benefits

Apart from being used as a culinary ingredient, black gram also finds use in beauty cared because of its skin nourishing and rejuvenating properties. It offers immense benefits in maintaining a healthy and glowing skin. It provides moisturization to your skin and keeps it soft and supple. or vitiligo

Digestive Disorders

A decoction obtained by boiling black gram in water is effective in treating indigestion and other digestive disorders like diarrhea, dysentery and dyspepsia.

Black gram keeps healthy

Black gram has been found to be beneficial in boosting the health of your heart. The fiber in this lentil is effective in reducing cholesterol and the potassium helps to balance the effects of sodium, thus helping in lowering high blood pressure. Studies also show that black gram can help reduce lipids and cholesterol in body. These black seeds have ability to inhibit process of absorption of lipids and cholesterol.

Black gram boosts energy

If you are constantly suffering from fatigue and tiredness, including black gram in your diet can help you become active. The high amount of nutrients like iron in this lentil raises your energy levels and keeps your active for a very long time.

Black gram has Anti-inflammatory properties

Ayurvedic medicine considers black gram as an excellent remedy for treating inflammation and joint pain owing to its potent anti-inflammatory properties. A hot poultice of this lentil placed on the affected area will help in relieving the inflammation and pain associated with it.

Black gram Increases Immunity

While being used as popular lentil, its use has been common in traditional Ayurveda where it has been used to treat various diseases. It is traditionally believed to be food which increases immunity.

Black gram for Pain and Inflammation of the points –

A decoction obtained by boiling black gram with rock salt and sesame oil, when applied to the affected areas in found to be beneficial in reducing pain and inflammation. This is particularly helpful for people suffering from joint pain and arthritis.

Vigna mungo and Male Reproductive health

According to Ayurvedic medicine, Vigna mungo has aphrodisiac properties and helps in increasing the count and motility of sperms. It is also found to be good for treating premature ejaculation and erectile dysfunction. This is traditional **home remedy for increasing the sperm count in males-** heat some ghee (Clarified butter) and fry black gram in it, until it changes to light brown color. Let it cool and then blend the fried lentil to a find powder. It is also useful in treating erectile dysfunction and improving sexual potency.

Vigna mungo for Diabetic patient

Vigna mungo is a good food option for people suffering from diabetes as it is rich in fiber. A diet containing high amounts of fiber helps in controlling blood sugar levels and prevents spikes in these levels especially after a meal. A wonderful home remedy for diabetic patients to keep their blood sugar levels under control is to take black gram (germinated) along with half a cup of bitter gourd once a day for about four months.

Vigna mungo health benefits for Bones

Black gram is rich in proteins and minerals like calcium, phosphorus and magnesium that promote the growth and maintenance of healthy and strong bones. The nutrients in this lentil strengthens your bones and prevents conditions like osteoporosis, which is characterized by a decrease in bone density and bone mass, thus making your bones easily susceptible to breakage and fractures.

Black gram is good for Pregnant Women

Pregnant women are often advised to include black gram in their diet because of its high nutritional value. Black gram is a rich source to iron, which is needed for the production of hemoglobin and increased blood circulation. It is also high in protein, dietary fiber and nutrients like folic acid that is not only good for the expecting mother but also for the fetus as it helps in preventing birth defects.

Other uses of black gram In

Traditional Ayurvedic practice, black gram is used in treatment of various nervous system disorders including paralysis.

RECENT RESEARCH

1. Trypsin-chymotrypsin inhibitors from Vigna mungo seeds.[38]

Cheung AH[1], Wong JH, Ng TB.

Three trypsin-chymotrypsin inhibitors were isolated from seeds of the black gram (Vigna mungo) with a procedure that entailed cation exchange chromatography on SP-Sepharose, anion exchange chromatography on Q-Sepharose, ion exchange chromatography by fast protein liquid chromatography (FPLC) on Mono Q and Mono S, and gel filtration by FPLC on Superdex 75. Two of the trypsin-chymotrypsin inhibitors were adsorbed on the first four types of chromatographic media. All three inhibitors have a molecular mass of 16 kDa as judged by gel filtration and sodium dodecyl sulfate-polyacrylamide gel electrophoresis. The trypsin inhibitory activity of the inhibitors was attenuated in the presence of the reducing agent dithiothreitol. The remaining inhibitor was unadsorbed on SP-Sepharose but adsorbed on Q-Sepharose, Mono Q and Mono S. The protease inhibitors did not exert any inhibitory effect on hepatoma (Hep G2) and breast cancer (MCF 7) cells or antifungal action toward Botrytis cinerea, Fusarium oxysporum and Mycosphaerella arachidicola. Two of the inhibitors slightly inhibited the activity of HIV-1 reverse transcriptase, with an IC50 in the mill molar range.

SUDDHI

Siddha system of medicine emphasis, before going to medicine preparation every raw drug must be purified. The concept of *Shuddhi (*purification) in Siddha is not only a process of purification / detoxification, but also a process to enhance the potency and efficacy of the drug .

Purification of raw drug is a process aimed at both purification as well as concentration of the raw drug.It usually involves processes like cleaning, frying, soaking, and grinding until impurities are removed.

FORENSIC TOXICOLOGY:

Forensic Toxicology deals with the source, physical and chemical properties, absorption, fate, pharmacological and toxic actions, signs and symptoms in human beings, fatal dose, and fatal period of different poisons, laboratory investigations, diagnosis, treatment, and circumstances and other medicolegal aspects of different poisoning cases.

Drugs are natural or synthetic substances which are used to exert physiological or psychological effects in the consumer.

SIDDHA TOXICOLGY:

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

1. PORUT PAARVAI-PHYSICAL PURIFICATION: Assessing the worthiness of the substance:

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

ii) Whether it has been prepared afresh to be beneficial for the intended time and season.

2. PORUT THUIMAI-CHEMICAL PURIFICATION: Assessing the purity of the substance:

i) Whether it has been properly purified strictly

ii) Whether the substance purified is qualified for consumption.

iii) Whether the dosage is suitable for consumption.

iv) Whether the antagonist of substance is avoided

v) Whether the diet regimen is followed

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

It is our primary responsibility to protect our health by curing the disorders caused by the toxins of the substances as well as to prevent the occurrence of toxicity.[38]

VARIOUS SUDDHI OR PURIFICATION PROCESS:

1. Removing the outer skin (epicarp).
2. Removing the inner nuts.
3. Removing the cotyledons.
4. Boiling with milk, cow□s urine, etc.
5. Frying ordinarily, with cow□s ghee, etc.
6. Soaking in Mother□s milk, cow□s urine, herbal juices, etc.
7. Pacing the raw drug inside another material and treating.
8. Grinding with various juices.
9. By Thula endiram
    i) immersed
    ii) Without immersed.
10. By Pudam process
11. Simply washing or removing dust.

OBJECTIVES OF SUDDHI:

1. To remove impurities, toxins present
2. To enhance the brittleness
3. To improve the potency and efficacy of the drug
4. To enhance the synergistic effect through purification methods
5. Transformation of the nonedible non-homogenous material to edible and beneficial homogenous material
6. Alleviation of desired therapeutic qualities
7. To prove the unique and favourable changes from physico-chemical changes for further application or benefits of drug.

Test drug collection

Manosilai was procured from a well reputed indigenous drug shop at Chennai on 10-2-2016

Goat's urine was collected from anverthikanpet village on 17-3-2017

Ulunthu was procured from country Market shop at thambram on 12-2-2016

Identification and authentication

The mineral drug was identified and authenticated by Pharmacologist in Siddha Central Research Institute (SCRI) Arumbakkam Chennai.) On 25-05-16

The raw drug Ulunthu was Idenified and authenticated In Plant Anatomy Research centre, by Prof.P.Jayaram, Retd, professor, Presidency College Chennai-5 on 17-02-2017

Method of purification

.I will go for purification procedures as per text after that Subjected to standardization procedures as per PLIM guidelines.

Required materials

- **Manosilai**
- **Goats urine**
- **Black gram boiled water**
- **Thola appliances**

METHOD

Manosilai is made into small pieces and make in to a bundle, The above bundle is boiled with goat's urine by using thula appliances and then the bundle is take out and kept in black gram boiled water after that the bundle is opened and dried it.[40]

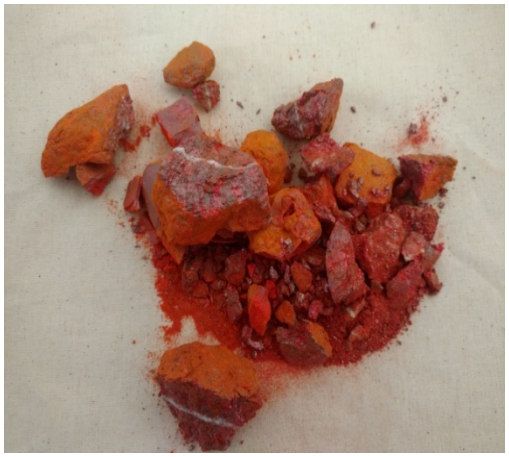
REFERANCE: AGATHIYAR VAITHIYA KAVIYAM

PAGE: 600

EDITION: 1994

VARIOUS STAGES OF PURIFICATION PROCESS OF MANOSILAI (ARSENIC DISULPHIDE)

1. Unpurified Manosilai



2. Goat's Urine

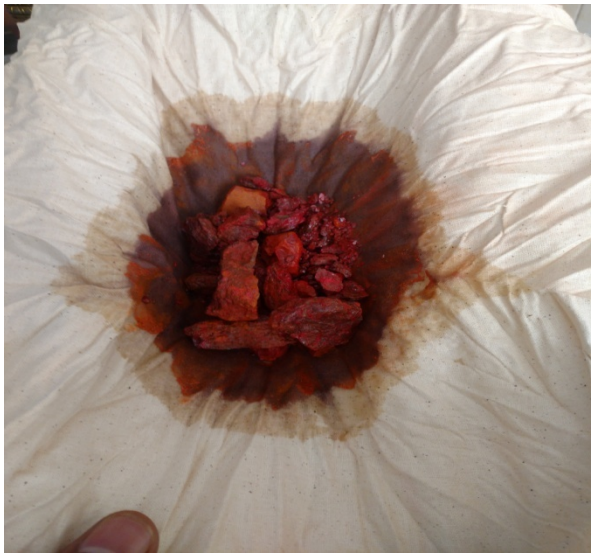
3. Bundled Manosilai

4. During Process

5. Boiled Blackgram water

6. Manosilai kept in black gram boiled water

7. After purification



8. Purified Manosilai

QUALITATIVE ANALYSIS:

1. PHYSICO-CHEMICAL ANALYSIS:

The physico-chemical analysis was done at Centre for Advanced Research in Indian System of Medicine (CARISM), SASTRA University, and Thanjavur.

The physico-chemical parameters were analyzed to evaluate the quality of the drug. Physico-chemical parameters are done for both unpurified and purified drug.

Appearance:

Colour:

About 5gm of the drug were taken separately in clean glass beaker and tested for its color by viewing again an opaque back ground under direct sunlight.

Odour:

About 5gm of the drug were placed separately in 100 ml of beaker and tested for its odour by wafting the air above the beaker.

Loss on drying at 105◦C:

A glass stoppered Petridish was weighed and has been dried under the same conditions to be employed in the determination. The specific quantity of sample was transferred to the dish, covered and accurately weighed. Then the sample is evenly distributed in the petridish. Then the stopper is removed and the loaded dish is placed in the drying chamber as directed in the monograph. The sample is dried to constant weight or till two consecutive weights remain within ± 0.5mg.After drying is completed, the sample is cooled in desiccators. The dish and the contents are weighed.

$$\text{Loss on drying (\%w/w)} = \frac{\text{Loss in weight (g)} \times 100}{\text{Mass of the sample (g)}}$$

Determination of pH:

The pH meter was operated according to the manufacturers instructions. The apparatus was calibrated using buffer solutions, adjusting the meter to read the appropriate pH value corresponding to the temperature of the solution. The electrode is immersed in the solution being examined and the pH is measured at the same temperature as for the standard solutions. At the end of a set of measurements, the pH of the solution used to standardize the meter and electrodes was recorded. If the difference between the reading and the original value is greater than 0.05, the set of measurements must be repeated. All solutions and suspensions of substance being examined must be prepared using carbon dioxide - free water.

Total Ash:

About 2 to 3g accurately weighed taken from the ground drug is incinerated in a tared platinum or silica dish at a temperature not exceeding 650 ºC, until free from carbon, cooled and weighed. If a carbon free ash cannot be obtained in this way, the charred mass is exhausted with hot water, the residue is collected on an ash less filter paper, the residue and filter paper is incinerated, the filtrate is added, evaporated to dryness, and ignited at a temperature not exceeding 650ºC.The percentage of ash with reference to air-dried drug is calculated.

$$\text{Percentage of total ash (\%w/w)} = \frac{\text{Mass of ash (g)} \times 100}{\text{Mass of the sample (g)}}$$

Acid Insoluble Ash:

The ash obtained is boiled for 5 minutes with 25ml of dilute hydrochloric acid. The insoluble matter is collected in a Gooch crucible, or on an ash less filter paper, washed with hot water and ignited to constant weight. The percentage of acid-insoluble ash with reference to the air dried drug is collected.

Calculation:

Percentage of water soluble extractive (%w/w) = Mass of the residue (g) × 100 × 100

Mass of the sample (g) × 25

Water soluble extractive:

5g of the coarsely powdered drug is macerated with 100ml of chloroform water in a closed flask for 24 hours. It is frequently shaked for first six hours and allowed to stand for eighteen hours. Then it is filtered rapidly, 25ml of filtrate is evaporated to dryness in a tarred flat bottomed shallow dish over a water bath. Dried at 105ºC, in an oven to constant weight and the dish is weighed. The percentage of water soluble extractive with reference to the air-dried drug is calculated.

Calculation:

Percentage of water soluble extractive (%w/w) = Mass of the residue (g) × 100 × 100

Mass of the sample (g) × 25

Alcohol soluble extractive:

5g of the coarsely powdered drug is macerated with 100ml of ethanol, of specified strength (as specified in the monograph) in a closed flask for 24 hours. It is frequently shaked for first six hours and allowed to stand for eighteen hours. Then it is filtered rapidly, taking precautions against loss of ethanol25ml of filtrate is evaporated to dryness in a tarred flat bottomed shallow dish over a water bath dried at 105 ºC, in an oven to constant weight and the dish is weighed. The percentage of alcohol soluble extractive of the drug is calculated.

Calculation:

Percentage of alcohol soluble extractive (%w/w) = Mass of the residue (g) × 100×100

Mass of the sample (g) × 25

2. CHEMICAL ANALYSIS:

The Chemical analysis was done at Biochemistry Lab, National Institute of Siddha, Chennai-47..

Table no: 1 Procedure for Chemical analysis of unpurified and purified raw drug Manosilai

Experimental procedures of Chemical analysis

S.No	EXPERIMENT	OBSERVATION	INFERENCE
1.	Appearance of sample	Dark Orange in colour	
2.	**Test for Silicate:** a. A little (500mg) of the sample is shaken well with distilled water. b. A little(500mg) of the sample is shaken well with con. HCl/Con. H_2So_4	No Sparingly soluble	Absence of Silicate
3.	**Action of Heat:** A small amount (500mg) of the sample is taken in a dry test tube and heated gently at first and then strong.	White fumes evolved	Presence of Carbonate
4.	**Flame Test:** A small amount (500mg) of the sample is made into a paste with con. HCl in a watch glass and introduced into non-luminous part of the Bunsen flame.	Bluish green flame appeared.	Presence of Copper
5.	**Ash Test:** A filter paper is soaked into a mixture of sample and dil. cobalt nitrate solution and introduced into the Bunsen flame and ignited.	No Yellow color flame appeared	Absence of Sodium

Preparation of extract:

5gm of Manosilai seed powder is weighed accurately and placed in a 250ml clean beaker and 50ml of distilled water was added with it. Then it was boiled well for about 10 minutes. Then it was allowed to cool and filtered in a 100ml volumetric flask and made up to 100ml with distilled water.

S.No	EXPERIMENT	OBSERVATION	INFERENCE
	I. Test For Acid Radicals		
1	**Test For Sulphate:** 2ml of the above prepared extract is taken in a test tube to this added 2ml of 4% dil ammonium oxalate solution.	No Cloudy appearance present	Absence of Sulphate
2	**Test For Chloride:** 2ml of the above prepared extract is added with 2ml of dil.HCl is added until the effervescence ceases off.	NO Cloudy appearance present	Absence of Chloride
3	**Test For Phosphate:** 2ml of the extract is treated with 2ml of dil.ammonium molybdate solution and 2ml of con.HNO_3.	No Yellow precipitate present	absence of Phosphate
4	**Test For Carbonate:** 2ml of the extract is treated with 2ml dil. magnesium sulphate solution.	Presence of cloudy appearance	Presence Of Carbonate
5	**Test For Nitrate:** 1gm of the substance is heated with copper turning and concentrated H_2SO_4 and viewed the test tube vertically down.	NoBrown gas is evolved	absence of Nitrate

6	**Test For Sulphide:** 1gm of the substance is treated with 2ml of con. HCL.	NoRotten Egg Smelling gas is evolved	Absence of Sulphide
7	**Test For Fluoride & Oxalate:** 2ml of extract is added with 2ml of dil. Acetic acid and 2ml dil.calcium chloride solution and heated**.**	No Cloudy appearance	Absence Of fluoride and oxalate
8	**Test For Nitrite:** 3 drops of the extract is placed on a filter paper, on that-2 drops of dil.acetic acid and 2 drops of dil.Benzidine solution is placed.	No Characteristic changes present	Absence Of Nitrite
9	**Test For Borate:** 2 Pinches (50mg) of the substance is made into paste by using dil.sulphuric acid and alcohol (95%) and introduced into the blue flame.	No Bluish green color flame appeared	Absence Of Borate
Test for Basic Radicals			
1	**Test For Lead:** 2ml of the extract is added with 2ml of dil.potassium iodine solution.	NO Yellow Precipitate is obtained.	Absence of Lead
2	**Test For Copper:** One pinch (50mg) of substance is made into paste with con. HCl in a watch glass and introduced into the non-luminuous part of the flame.	Blue color precipitate is formed.	Presence Of Copper

3	**Test For Aluminum:** To the 2ml of extract dil.sodium hydroxide is added in 5 drops to excess.	No Yellow color appearance	absence of Aluminum
4	**Test For Iron:** a. To the 2ml of extract add 2ml of dil.ammonium solution. b. To the 2ml of extract, 2ml thiocyanate solution and 2ml of con HNo3 is added.	Brown precipitate is formed Red color appearance	Iron present
5	**Test For Zinc:** To 2ml of the extract dil.sodium hydroxide solution is added in 5 drops to excess and dil.ammonium chloride is added.	Nonwhite precipitate is formed	absence of Zinc
6	**Test For Calcium:** 2ml of the extract is added with 2ml of 4% dil.ammonium oxalate solution.	Cloudy appearance or white precipitate formation is present	Presence Of Calcium
7	**Test For Magnesium:** To 2ml of extract dil.sodium hydroxide solution is added in drops to excess.	White precipitate is obtained	Presence of Magnesium
8	**Test For Ammonium:** To 2ml of extract 1ml of Kessler's reagent and excess of dil.sodium hydroxide solution are added.	No Brown color is appeared	Absence Of Ammonium

9	**Test For Potassium:** A pinch (25mg) of substance is treated with 2ml of dil.sodium nitrite solution and then treated with 2ml of dil.cobalt nitrate in 30% dil.glacial acetic acid.	No Yellowish precipitate is obtained.	Absence of Potassium
10	**Test For Sodium**: 2 pinches (50mg) of the substance is made into paste by using HCl and introduced into the blue flame of Bunsen burner.	No Yellow color flame appeared	Absence of Sodium
11	**Test For Mercury**: 2ml of the extract is treated with 2ml of dil.sodium hydroxide solution.	Yellow precipitate is obtained	Presence Of Mercury
12.	**Test For Arsenic:** 2ml of the extract is treated with 2ml of dil.sodium hydroxide solution.	Brownish red precipitate is obtained	Presence Of Arsenic
Other constituents:			
1	**Test For Starch :** 2ml of extract is treated with weak dil.iodine solution	No Blue color formation	absence of starch

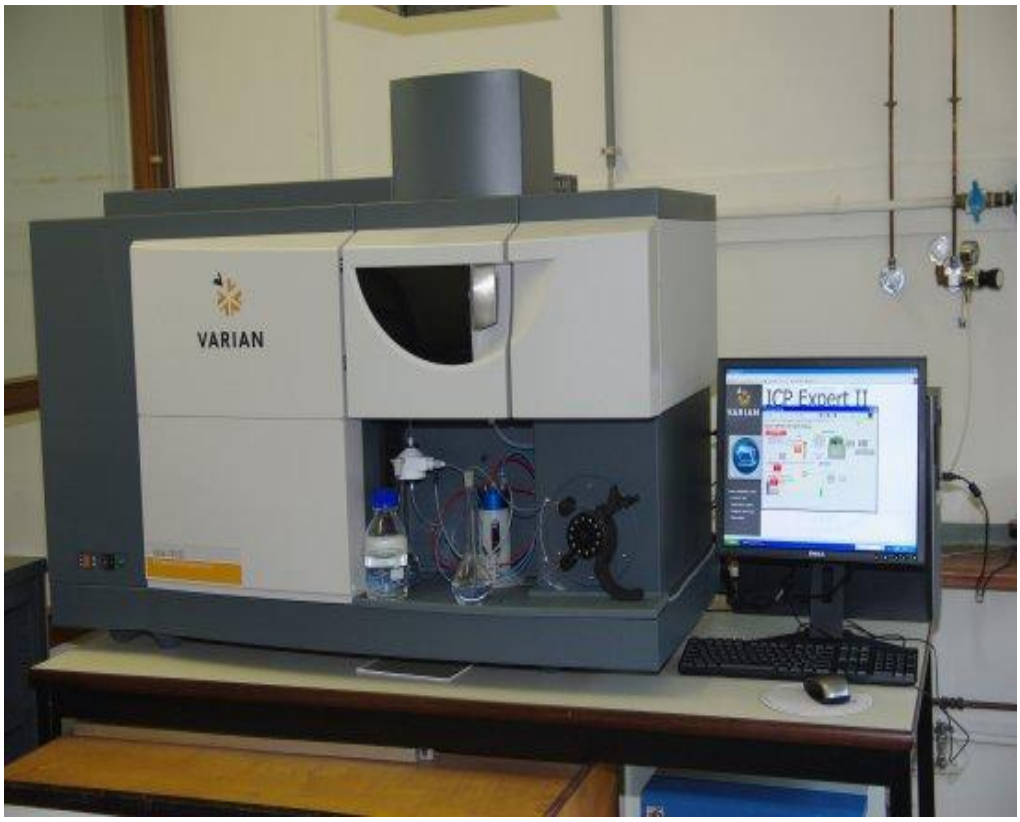
2	**Test For Reducing Sugar:** 5ml of Benedict's qualitative solution is taken in a test tube and allowed to boil for 2 minutes and added 8 to 10 drops of the extract and again boil it for 2 minutes. The color changes are noted.	Brick red color developed	Presence of reducing sugar
3	**Test For The Alkaloids**: a. 2ml of the extract is treated with 2ml of dil.potassium iodide solution. b. 2ml of the extract is treated with 2ml of dil.picric acid.	Reddish brown precipitation appears Yellow precipitation appears	Presence Of Alkaloid
4	**Test For Tannic Acid:** 2ml of extract is treated with 2ml of dil.ferric chloride solution.	No Black precipitate is obtained	Absence of Tannic acid
5	**Test For Unsaturated compound** To the 2ml of extract 2ml of dil. Potassium permanganate solution is added.	No Potassium permanganate is decolourised	Absence of unsaturated compound
6	**Test For Amino Acid:** 2 drops of the extract is placed on a filter paper and dried well. 20ml of Biurette reagent is added**.**	No Violet color is developed	Absence of amino acids
7	**Test For Type of Compound:** 2ml of the extract is treated with 2 ml of dil.ferric chloride solution.	No Specific color formation	Phenols absent

QUANTITATIVE ANALYSIS:

The following quantitative analyses were done at SAIF, IITM, Chennai.

3. ICP-OES:

Perkin Elmer Optima 5300 DV was used for standard ICP-OES analysis. The Emission spectrometry is based on the principle that atoms or ions in an excited state tend to revert back to the ground state and in so doing emit characteristic wavelength and intensity of that light is proportional to the concentration of that particular element in the sample solution. ICP-OES is widely employed for the estimation of metals and metalloids at trace, minor and major concentrations. The elemental composition of a sample is often an important part of the information needed to assess its properties.



Principle:

In this technique, the high temperature plasma source atomizes the sample and excites the atoms resulting in emission of photons. The atoms of each element in the sample emit specific wavelength of light. The emission spectrum from the plasma is dispersed by an optical spectrometer, so that intensities of the individual wavelength can be measured. The number of photons emitted is directly proportional to the concentration

of the element. The photon may be detected either sequentially or simultaneously. Quantitative analysis is achieved by measuring the intensity of these specific wavelengths and after performing the calibrations using known standards.

ICP-OES operating conditions:

Rf frequency : 40 M Hz

Range : 165-782 nm

Detection limit : Upto ppm level using SCD detector

SAMPLE PREPARATION PROCETURE:

A known weight of the sample is 25 mg taken in the Teflon containers. A known 6 ml of concentrated HNO3 and 3 ml of concentrated HCL added and the contents are allowed to react for approximately 5 minute prior to sealing the material the sample is thoroughly filtered paper and the difference in weight is calculated. The sample are preferably stored in plastic container to prevent loss of elements by absorption and quantitatively determinated by PE optima 5200 DV ICPOES vessels. Then it is inserted in separate cabins in the rotar placed in the microware digestion system. The vessels are then heated to the required temperature. After digestion cooled and made upto a known volume in a standard flask with deionized water. If the sample contains any dissolved.

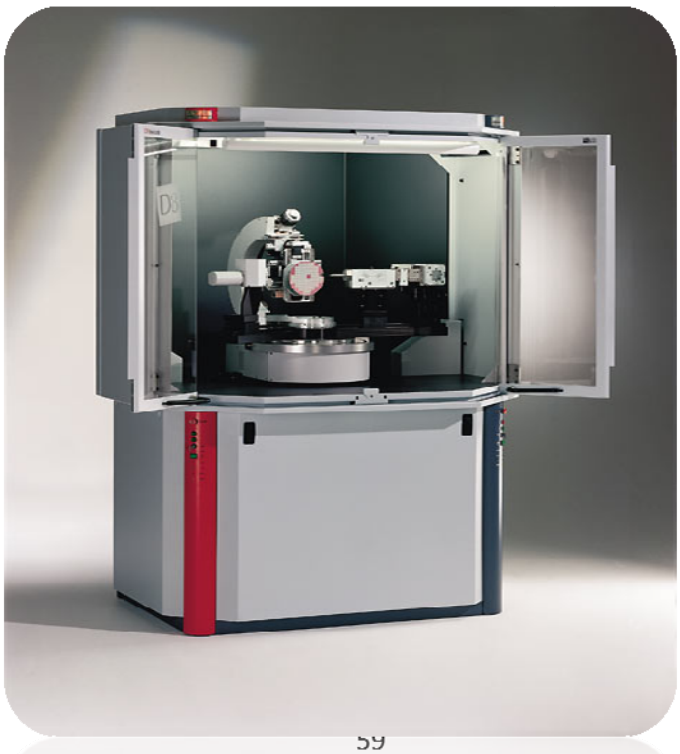
4. FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR)

Fourier transform infrared spectroscopy (FTIR)[1] is a technique which is used to obtain an infrared spectrum of absorption or emission of a solid, liquid or gas. An FTIR spectrometer simultaneously collects high spectral resolution data over a wide spectral range. This confers a significant advantage over a dispersive spectrometer which measures intensity over a narrow range of wavelengths at a time.

The term Fourier transform infrared spectroscopy originates from the fact that a Fourier transform (a mathematical process) is required to convert the raw data into the actual spectrum. For other uses of this kind of technique, see Fourier transform spectroscopy.

The standard method to prepare solid sample for FTIR spectrometer is to use KBr. About 2 mg of sample and 200 mg KBr are dried and ground. The particle size should be unified and less than two micrometres. Then, the mixture is squeezed to form transparent disc which can be measured directly. For liquids with high boiling point or viscous solutions, it can be added in between two NACL pellets. Then the sample is fixed in the cell by skews and measured. For volatile liquid sample, it is dissolved in CS_2 or $CCL_4$to form 10% solution. Then the solutions is injected into a liquid cell for measurement. Gas sample needs to be measured in a gas cell with two KBr windows on each side. That gas cell should first be vacuumed. Then the sample can be introduced to the gas cell for measurement.

5. X-ray Powder Diffraction (XRD)



X-ray powder diffraction (XRD) is a rapid analytical technique primarily used for phase identification of a crystalline material and can provide information on unit cell dimensions. The analyzed material is finely ground, homogenized, and average bulk composition is determined.

Crystalline substances act as three-dimensional diffraction gratings for X-ray wavelengths similar to the spacing of planes in a crystal lattice. X-ray diffraction is now a common technique for the study of crystal structures and atomic spacing.

X-ray diffraction is based on constructive interference of monochromatic X-rays and a crystalline sample. These X-rays are generated by a cathode ray tube, filtered to produce monochromatic radiation, collimated to concentrate, and directed toward the sample. The interaction of the incident rays with the sample produces constructive interference (and a diffracted ray) when conditions satisfy Bragg's Law ($n\lambda=2d \sin\theta$). This law relates the wavelength of electromagnetic radiation to the diffraction angle and the lattice spacing in a crystalline sample. These diffracted X-rays are then detected, processed and counted. By scanning the sample through a range of 2θangles, all possible diffraction directions of the lattice should be attained due to the random orientation of the powdered material. Conversion of the diffraction peaks to d-spacing allows identification of the mineral because each mineral has a set of unique d-spacing. Typically, this is achieved by comparison of d-spacing with standard reference patterns.

All diffraction methods are based on generation of X-rays in an X-ray tube. These X-rays are directed at the sample, and the diffracted rays are collected. A key component of all diffraction is the angle between the incident and diffracted rays. Powder and single crystal diffraction vary in instrumentation beyond this.

6. SCANNED ELECTRON MICROSCOPY(SEM)

A SEM is essentially a high magnification microscope, which uses a focused scanned electron beam to produce images of the sample, both top-down and, with the necessary sample preparation, cross sections. The primary electron beam interacts with the sample in a number of key ways:-

- Primary electron generates low energy secondary electron, which tend to emphasize the topographic nature of the specimen.
- Primary electron can be backscattered which produces images with a high degree of atomic number (Z) contrast.
- Ionized atoms can relax by electron shell-to-shell transitions, which lead to either X-ray emission or Auger electron ejection. The X-ray emitted is characteristic of the elements in the top few μm of the sample.
- The SEM is carried out by using FEI-Quanta FEG 200-High Resolution Instrument.

Resolution: 1.2 nm gold particle separation on a carbon substrate

Magnification: From a min of 12 xs to greater than 1, 00,000X

Application: To evaluate grain size, particle size distributions, material homogeneity and inter metallic distributions.

7. ESTIMATION OF PESTICIDE RESIDUE

Pesticide value of sample 1 was estimated by means of AOAC 2007.01 by GC MS MS/LC MS. Pesticides are usually used in agriculture to increase the yield, improve the quality and to extent the storage life of food crops. These are the deposits of pesticide active ingredients, its metabolites or break down products present in same component of environment after its application, spillage or dumping. residue analysis gives the nature and level of chemical contamination with the environment and of its persistence.

Sample preparation

The acetate buffered Quenchers sample preparation method was applied. After homogenization with a house hold mill a15gm portion of the homogenized sample was weighed into a 50 ml polytetrafluro ethylene tube (PTFE) and 100ml of surrogate standard solution in acetonitrile was added followed by 15 ml of aceto nitrile containing 1% acetic acid. Then 6gm of MgSO4 and 2.5 gm sodium acetate trihydrate were added.then centrifuge the sample at 4000rpm. Then transferred the supernatant and

filtered with PTFE filter. Then sample was transferred to auto sample vials and the extracts were evaporated to dryness under a steam of Argon. The analysis done by gas chromatography.liquid chromatography coupled to tandem mass spectroscopy with triple quadruple mass analysers GC MS MS/LC MS.

8. DETERMINATION OF MICROBIAL LOAD

The determination of microbial load as described below was crried out on sample 1 and 4 as per the WHO guidelines (Anonymous 1998).

Pre-treatment of the test material:

Depending on the nature of the crube herbal material grind, dissolve, dilute, suspend or emsulsify it using a suitable method and eliminate any antimicrobial properties by dilution, setralisation or filtration. Either phosphate buffer p^h 7.0 or fluid medium, used to suspend or or dilute the test specimen. Test procedure for the Enterobacteriaceae and certain other Gram-negative bacteria.

Detection of bacteria

Homogenise the pre-treated material appropriately and incubate at 30 - 37°c for a length of time sufficient for multiplication of the organisms. Shake the container, transfer aliquots equivalent to I gm or ml of the homogenised material to 100ml of enterobacterise enrichment boorth Mossel and incubate at 35 – 37°c for 18 – 48 hours. Prepare a subculture on a plate with culer red bile agar with glucose and lactose. Incubate at 35 - 37°c for 18-48 hours. The material process the test if no growth of colonies of Gram-negative bacteria is detected on the plate.

Test Procedure:

Plate Count:

For bacteria use peteri dishes 9-10 cm in diameter. To one dish add a misture of 1ml of the pre-treated herbal material and about 15ml of liquefied cascin-soyabean digest agar at a temperature not exceeding 45°c. Alternatively, spread the material on the surface of the sobdified medium in a peteri dish. If necessary, dilute the material to obtain an expected colony count of not more then 300. Prepare two dishes using the same dilution, invert them and incubate them at 30-35°c for 48-72 hours, unless a reliable count is obtained in a short period of time. Count the number of colonies formed and calculates

the result using the plate with the largest number of colonies, up to a maximum of 300. For fungi use peteri dishes 9-10cm in diameter. To one dish add a mixture of 1ml of pro-treated material and about 15ml of liquefied saborated ghucose agar with antibiotics at a temperature not exceeding 45°c alternatively, spread the pre-treated material as described above to obtain are expected coony count of not more than 100. Prepare at least two distinguishing the same dilution and incubate them upright at 20-25°c for 5 days, unless a more reliable count in obtained in a shorter period of time. Count the number of colonies formed and calculates the results using the dish with not more than 100 colonics.

Escherichis coli:

Transfer a quantity of the homogenised material in lactose both, prepared and incubated to described above, containing 1g or 1ml of the material being examined to 100ml of MaeConkey agar and incubate at 43-45°c for 18-24 hours. Prepare a subculature on plate with MacConkey agar and incubate at 43-45°c for 18-24 hours. Growth of red, generally non-mucoid colonies of Gram-negative tods, sometimes surrounded by a reddish zone of precipisation, indicates the possible of E.Coli. This may be confirmed by the formation of indole at 43.5-44.5°c or by other biochemical reactions. The material passes the test if no such colonies are detected or if the confirmatory biochemical reactions are negative.

Salmonella:

Incubaste the solution, suspension or emulsion of the pre-treated material,l prepared an described above at 35-37°c for 5-24 hours, as appropriate for enrichment.

Primary test

Transfer 10 ml of the enrichment culture to 100 ml of tetrachionats bide brilliant broth and incubate at 42-43° for 18 – 24 hours. Prepare subcultures on at least two of the following three agar media citrate agar, sylose, lysine deoxycholate agar, and birllen agar. Incultrate at 35 – 37° c for 24 – 48 hours.

Secondary test

Prepare a subculture of any colonies showing the characteristics on the surface of triple sugar iron agar using the deep moculation technique. This is done by first inoculating the needle and then, incubating at 35 – 37 c for 18 – 24 hours. The test is positive for the presence of salmonella spp. If a change of color from red to yellow is

observed in the deep culture (but not in the surface culture), usually with the formation of gas with or without productions of bydrogen sulphide in the agar. Confirmation is obtained by appropriate biochemical and scrological tests. The material being examined passes the test if culture of the type described does not appear in the primary test, or if the confirmatory biochemical and serological tests are negative.

Staphylococcus aureus:

Prepare an enrichment culture as described for Pseudomonas acurginos. Prepare a subculture on a suitable medium such as Baird – parker agar. Incubate at 35 - 37° c for 24-48 hours. The material passes the test if no growth of microrrganisms is detected. Black colonies of Gram positive cocci often surrounded by clear zones may indicate the presence Staphylococcus aureus. For catalase-positive cocci, confirmation may be obtained, for exam by coagulase and deoxyribonuclese tests.

9. TEST FOR AFLATOXIN

The procedures recommended for the detection of Aflatoxin as per WHO (2007).

Instrument Details:

Name of the Instrument	CAMAG (CAMAG - Automatic TLC sampler, Scanner and Visualiser)
Spray Gas	N2
Lamp used	Deuterium and Tungsten Lamp

The samples were processed as per procedures recommended in WHO 2007 and applied for the Thin Layer Chromatography and High Performance Thin Layer Chromatography study with suitable solvent systems. After development the plate was allowed to dry in air and examined under UV – 254nm, 366nm and visible light after derivatised using vanillin – sulphuric acid.

1.Physico chemical analysis:

Table no 1: Result of Physico-chemical analysis of Manosilai before and after purification with goat's urine and Black gram water.

S.No	PHYSICO-CHEMICAL PARAMEER	BEFORE PURIFICATION % in w/w (mg/g)	AFTER PURIFICATION % in w/w (mg/g)
1	Appearance	Dark orange colour fine powder	Light orange colour fine powder
2.	pH at 25º C (1% w/w solution)	7.54	7.79
3.	Loss on Drying at 105ºC	0.4481 %w/w	0.2953 %w/w
4.	Total Ash	4.088 %w/w	3.892 %w/w
5.	Acid Insoluble Ash	0.0809%w/w	Nil
6.	Water Soluble Extractive	1.028 %w/w	0.9300 %w/w
7.	Alcohol Soluble Extractive	0.2795 %w/w	0.5559 %w/w
8.	Colour	Dark orange colour fine powder	Light orange colour fine powder

.

2.BIOCHEMICAL ANALYSIS

Table no.2: Result of chemical analysis of Manosilai before and after purification

	Experiment	**Sample 1**	**Sample 2**
1	**Solubility**	--	+
2	**Action Of Heat**	+	+
3	**Flame Test**	+	+
4	**Ash Test**	_	_
	Test for acid radicals		
1	**Test For Sulphate**	_	_
2	**Test for chloride**	-	-
3	**Test for phosphate**	-	-
4	**Test for carbonate**	+	+
5	**Test for nitrate**	_	_
6	**Test For Sulphide**	+	+
7	**Test for fluoride & oxalate**	-	-
8	**Test for nitrite**	_	_
9	**Test for borate**	_	_
	Test for basic radicals		
1	**Test for lead**	_	_
2	**Test for copper**	+	+
3	**Test for aluminium**	_	_
4	**Test for iron**	_	_
5	**Test for zinc**	_	_
6	**Test for calcium**	+	+
7	**Test for magnesium**	-	-
8	**Test for ammonium**	_	_

9	**Test for potassium**	+	+
10	**Test for sodium**	_	_
11	**Test for mercury**	+	+
12	**Test for arsenic**	+	+
	Miscellaneous		
1	**Test for starch**	_	_
2	**Test for reducing sugar**	+	+
3	**Test for the alkaloids**	+	+
4	**Test for tannic acid**	-	-
5	**Test for unsaturated compound**	_	_
6	**Test for amino acid**	_	_
7	**Test for type of compound**	_	_

3. ICP-OES:

For before and after purification of Manosilai with goats urine and boiled Black gram water.

Weight of Unpurified Manosilai : 0.30315 g

Weight of Purified Manosilai : 0.25310 g

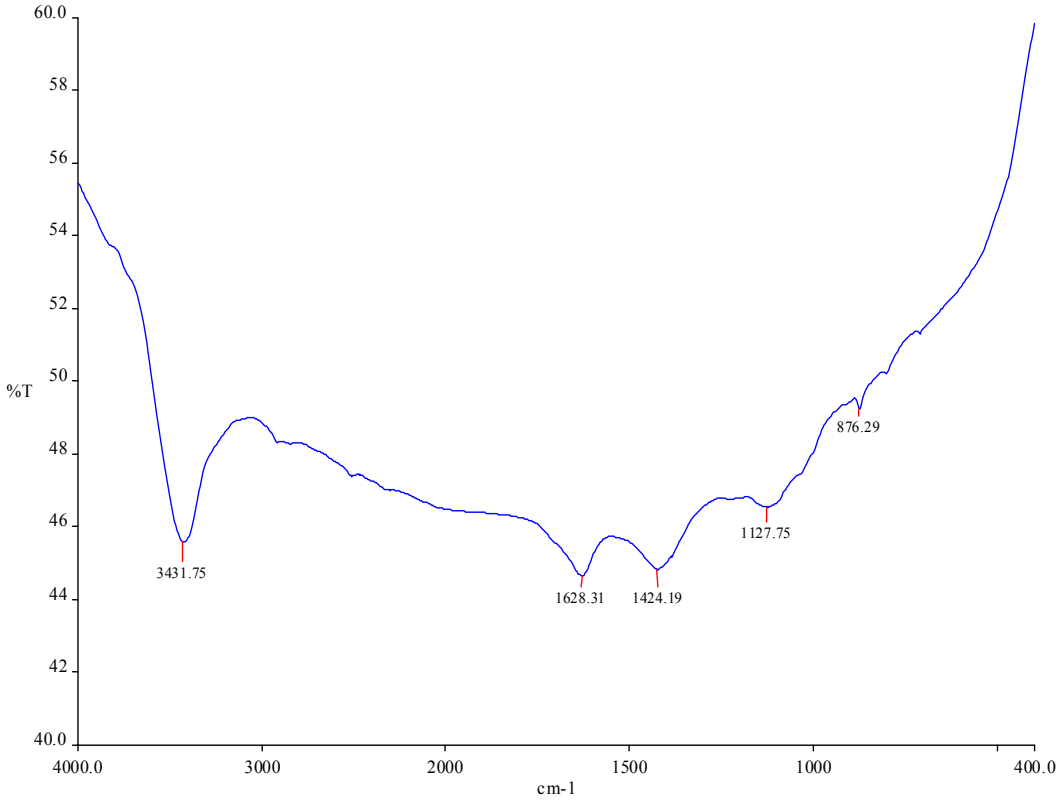
Table no:3 Result of Quantitative analysis by ICP-OES for both unpurified and purified raw drug Manosilai with Goat's urine and Ulundhu water.

S.No	ELEMENTS	WAVE LENGTH in nm	BEFORE PURIFICATION In mg\L(PPM)	AFTER PURIFICATION In mg\L(PPM)
1.	Arsenic	As 188.979	9207	7279
2.	Calcium	Ca 315.807	188.7	157.5
2.	Calcium	Ca 315.807	188.7	157.5
3.	Cadmium	Cd 228.802	122.8	100.8
4.	Copper	Cu 327.393	0.9610	0.9430
5.	Mercury	Hg 253.652	4.708	2.7404
6.	Magnesium	Mg 285.213	3.208	2.862
7.	Sodium	Na 589.592	4.762	3.172
8.	Nickel	Ni 231.604	0.014	0.002
9.	Lead	Pb 220.353	0.614	0.763
10.	Phosphorus	P 213.617	0.276	0.314
11.	Sulphur	S 180.731	264.8	182.8
12.	Potassium	K 766.490	2.200	0.48
13	Cobalt	C0228.616	0.042	O.014
14	Iron	Fe 238.204	13.62	11.87
15	Selenium	Sc 196.026	0.622	7.699
16	Chromium	Cr 267.716	0.005	0.016

4. FTIR

GRAPH: 1(A)

Characteristic IR absorption frequencies of Organic Functional Groups for unpurified raw drug MANOSILAI.



SR No 17-03-X-2536A-160317.pk

SR No 17-03-X-2536A-160317.005 3601 4000.00 400.00 44.65 59.95 4.00 %T 16 0.30

REF 4000 55.46 2000 46.49 600
3431.75 45.58 1628.31 44.65 1424.19 44.83 1127.75 46.54 876.29 49.23

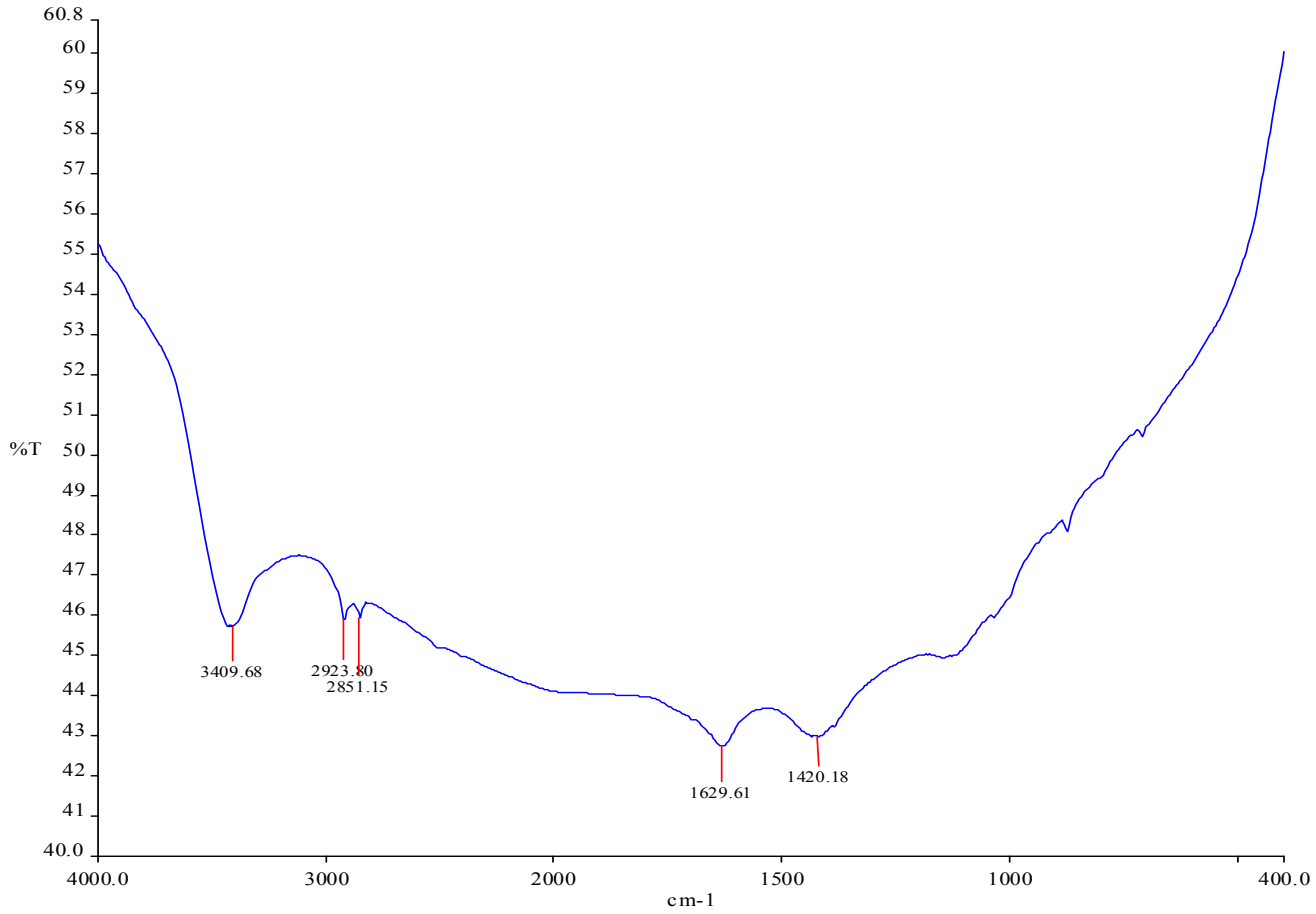
Result Analysis Interpretation

- IR absorption peak at 1127.75cm-1 may be due to the presence of =S
- Wide predominant peak at 3431.75cm-1 due to free O-H vibration
- Medium intensity peak at 1424.19 cm-1 and 876.29 due to presence of S=O functional group stretching
- IR absorption peak at 1628.31 cm-1 due to NH2 scissoring
- Absorption peak at 1127cm-1 due to presence of C-O stretching

FTIR

GRAPH: 1(B)

Characteristic IR absorption frequencies of Organic Functional Groups for purified raw drug MANOSILAI.



SR No 17-03-X-2536B-160317.pk

SR No 17-03-X-2536B-160317.003 3601 4000.00 400.00 42.74 60.20 4.00 %T 16 0.30

REF 4000 55.25 2000 44.10 600
3409.68 45.70 2923.80 45.89 2851.15 45.92 1629.61 42.74 1420.18 42.97

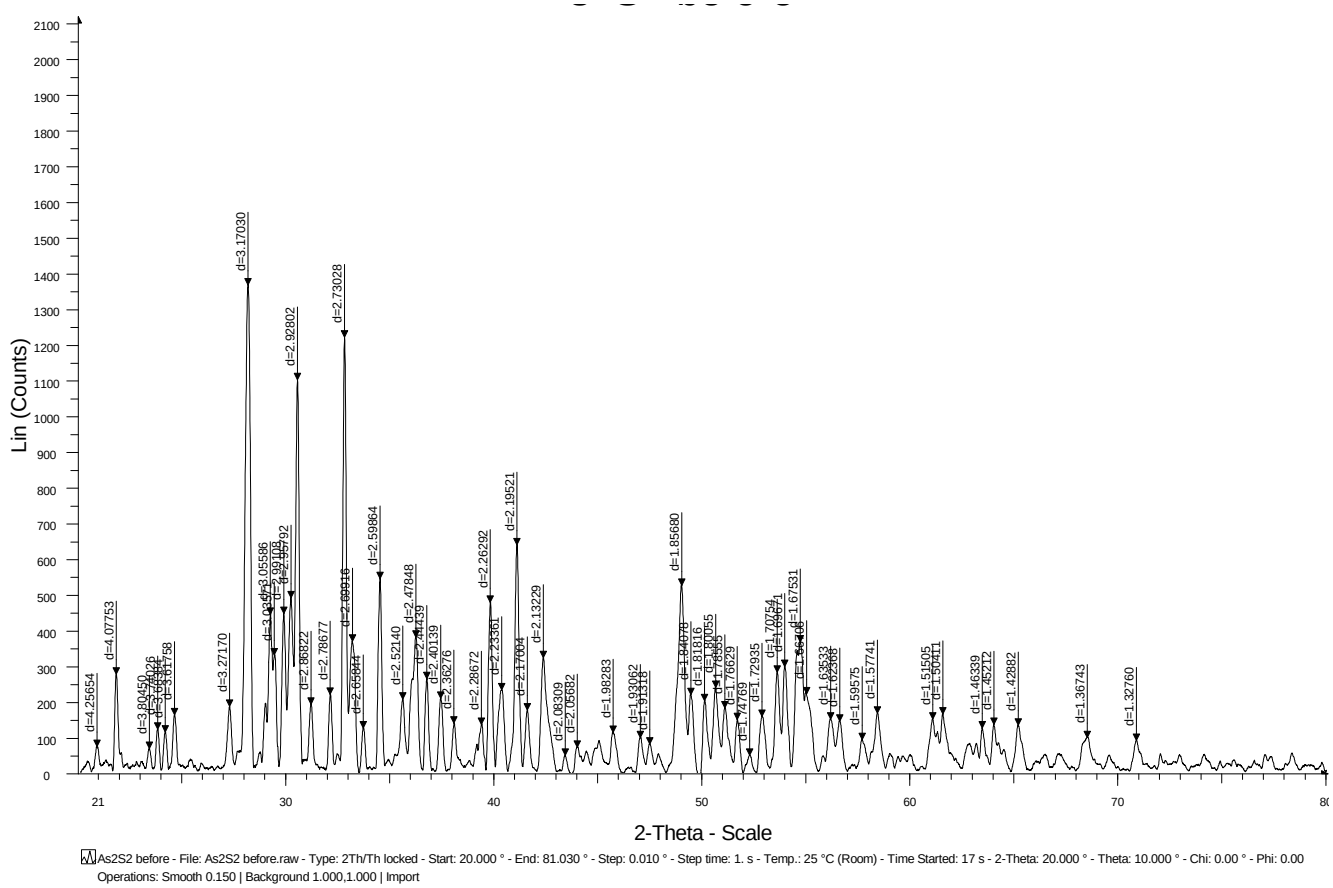
RESULTS

- IR absorption peak at 1420.18 cm-1 due to presence of S=O functional group stretching
- Vibrational peak at 3409.68 cm-1 maybe due to the presence of primary amine
- Sharp absorption peak at 2851 cm-1 due to presence of CH stretching
- Wide intense peak at 1629.61 cm-1 may be due to NH2 scissoring
- IR absorbance peak at 2923.80 cm-1 due to O-H overlapping
- Note the Di-sulfide bond has to be appears in the range of 500-540 but there is no evidence of disulfide bond

5.XRD

Figure 1(A)

Diffractogram showing peaks of crystalline phase of unpurified raw drug MANOSLAI.I

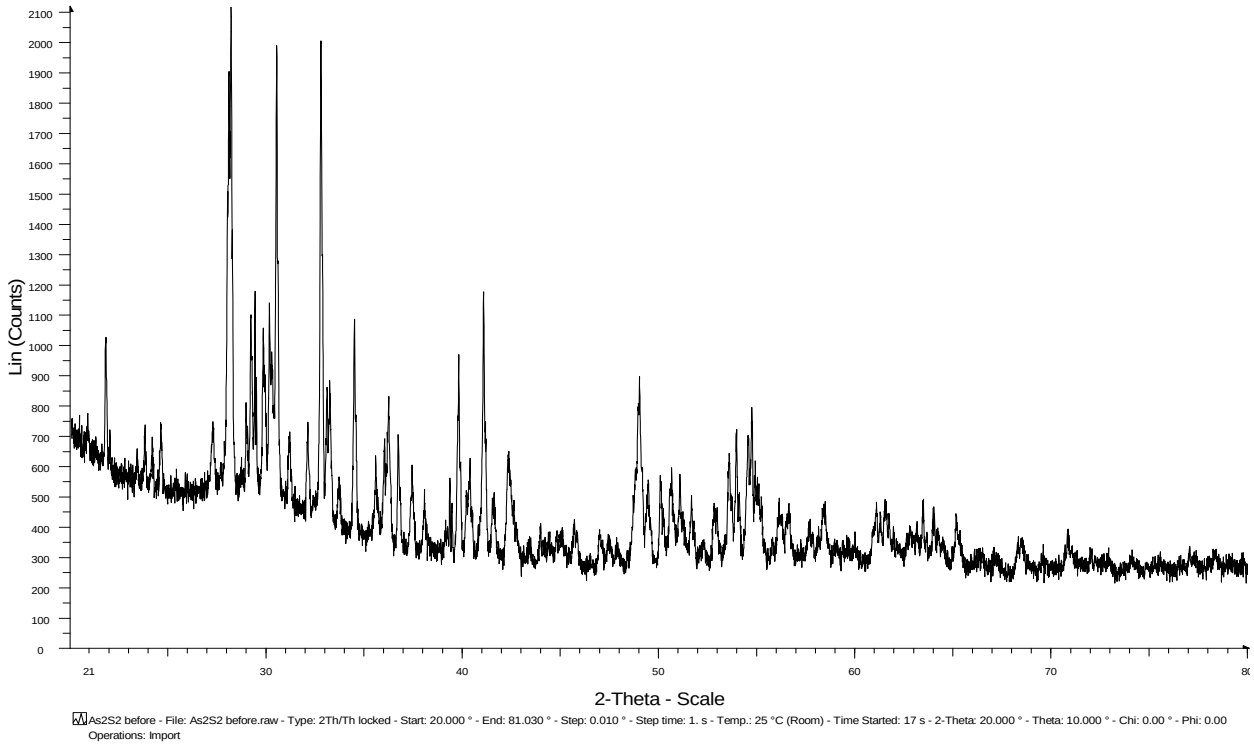


Crystalline

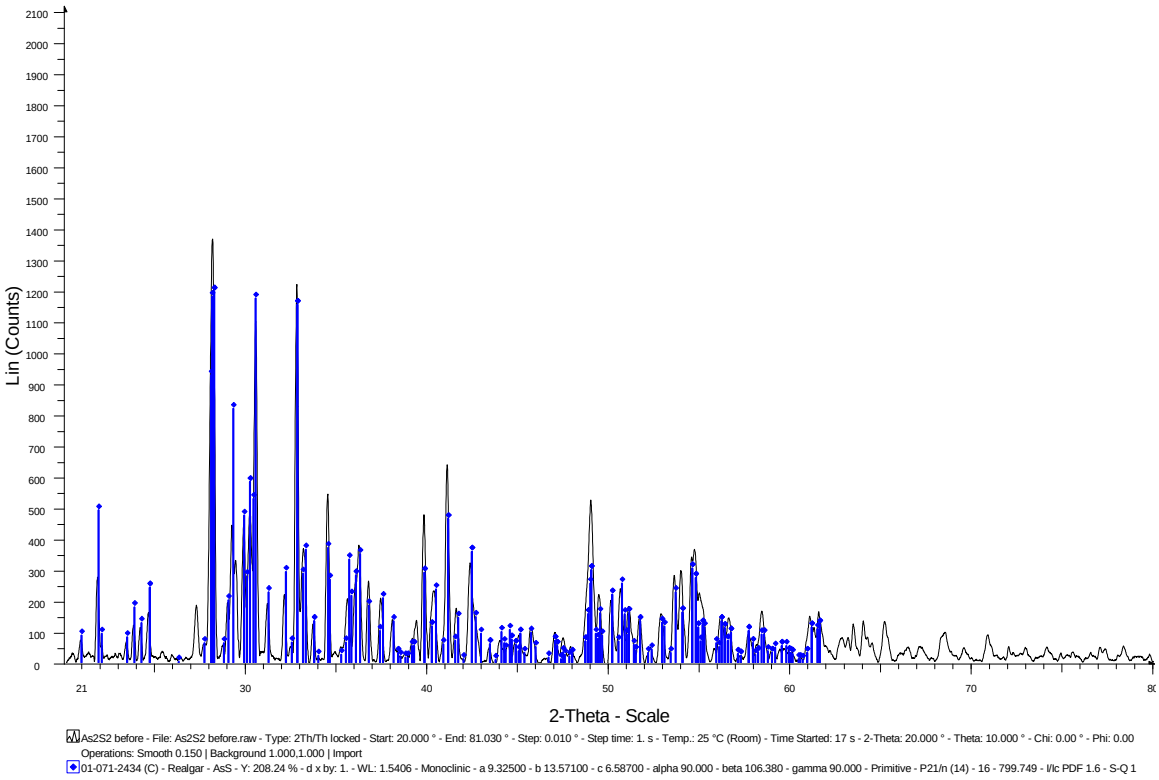
Sample Name	Left Angle	Right Angle	Left Int.	Right Int.	**Obs. Max**	d (Obs. Max)	Max Int.	Net Height	**FWHM**	Chord Mid.	I. Breadth	Gravity C.	d (Gravity C.)	Raw Area	Net Area
	2-Theta °	2-Theta °	Cps	Cps	**2-Theta °**	Angstrom	Cps	Cps	**2-Theta °**	2-Theta °	2-Theta °	2-Theta °	Angstrom	Cps x 2-Theta °	Cps x 2-Theta °
As2S2 before	28.020	28.220	993	993	**28.125**	3.17026	1371	378	**0.134**	28.123	0.129	28.123	3.17048	247.4	48.74

Figure 1(B)

Diffractogram showing peaks of crystalline phase of purified raw drug MANOSLAI.



XRD Pattern of Reference Material

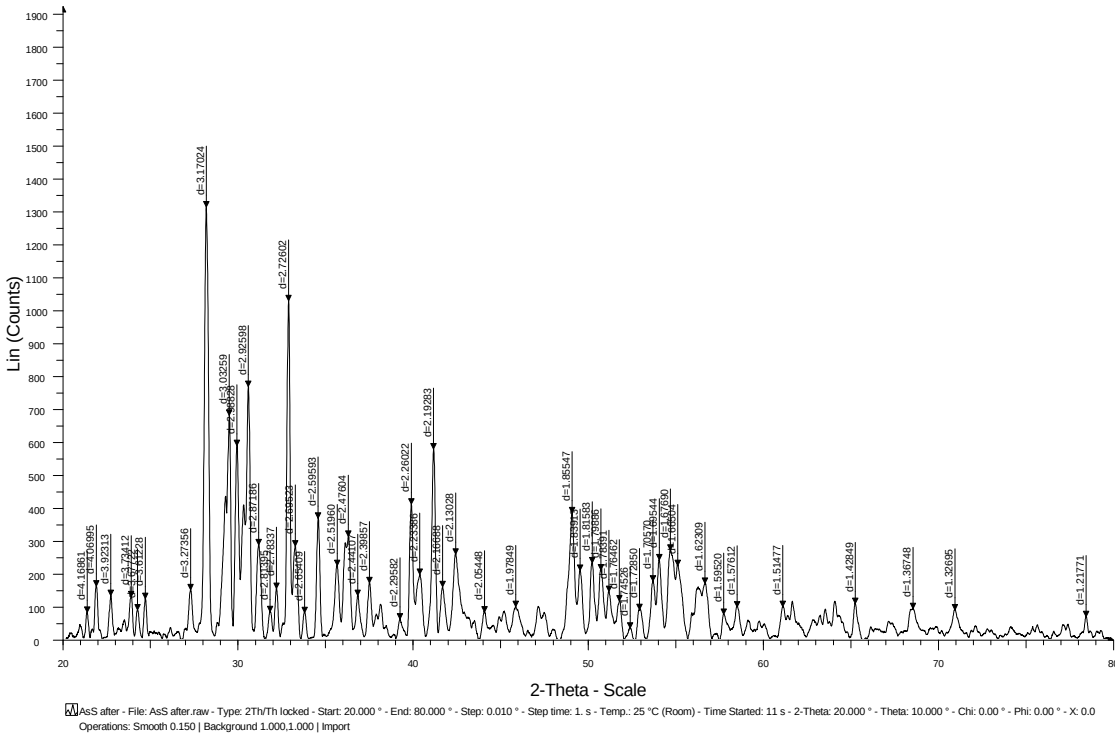


Result Analysis of XRD pattern of Sample As_2S_3 Before

- The X-ray diffraction pattern of the of the prepared formulation AsS (Before) reveals the presence of major peak with 2- Theta value of 28.12 which exactly matches to the ICDD (International Centre for Diffraction Data) 71- 2434. ICDD 71- 2434 corresponds to the crystalline pattern of Arsenic Sulfide (AsS)
- Hence the reference matching material was conformed as Arsenic Sulfide (AsS)
- Major peaks observed in Test sample AsS (Before) with 2-theta values of 28.12 and their corresponding intensities were 1370.The major peak observed in the reference matching material was 28.10 with the intensity value of 415.
- The XRD pattern of the test sample AsS (Before) exactly matches with the reference material AsS, which justifies the presence of stable and purified AsS in the formulation.
- From the result of the present XRD analysis it was concluded that the elemental composition of sample AsS (Before) confirms the presence of AsS at its stable state. Further Mercury being the major component of the sample AsS (Before).

XRD Pattern of Test Sample As_2S_3 After

FIGURE :2(a)



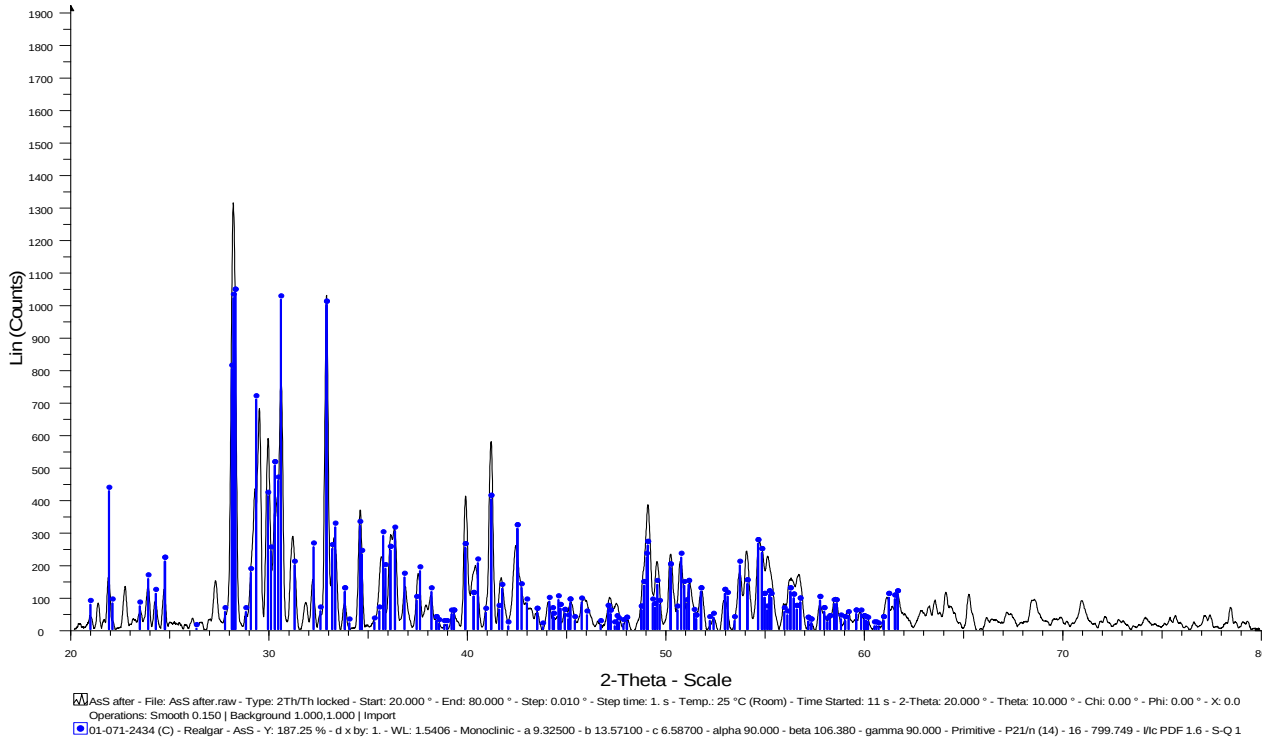
Crystalline

Sample Name	Left Angle	Right Angle	Left Int.	Right Int.	**Obs. Max**	d (Obs. Max)	Max Int.	Net Height	**FWHM**	Chord Mid.	I. Breadth	Gravity C.	d (Gravity C.)	Raw Area	Net Area
	2-Theta °	2-Theta °	Cps	Cps	**2-Theta °**	Angstrom	Cps	Cps	**2-Theta °**	2-Theta °	2-Theta °	2-Theta °	Angstrom	Cps x 2-Theta °	Cps x 2-Theta °
AsS after	28.000	28.260	682	682	**28.124**	3.17036	1313	631	**0.173**	28.124	0.164	28.125	3.17026	280.8	103.5

XRD Pattern of Reference Material

- AsS(After) reveals the presence of major peak with 2- Theta value of 28.12 which exactly matches to the ICDD (International Centre for Diffraction Data) 71-2434. ICDD 71- 2434 corresponds to the crystalline pattern of Arsenic Sulfide (AsS)
- Hence the reference matching material was conformed as Arsenic Sulfide (AsS)

Major peaks observed in Test sample AsS (After) with 2-theta values of 28.12 and their corresponding intensities were 1316.The major peak observed in the reference matching



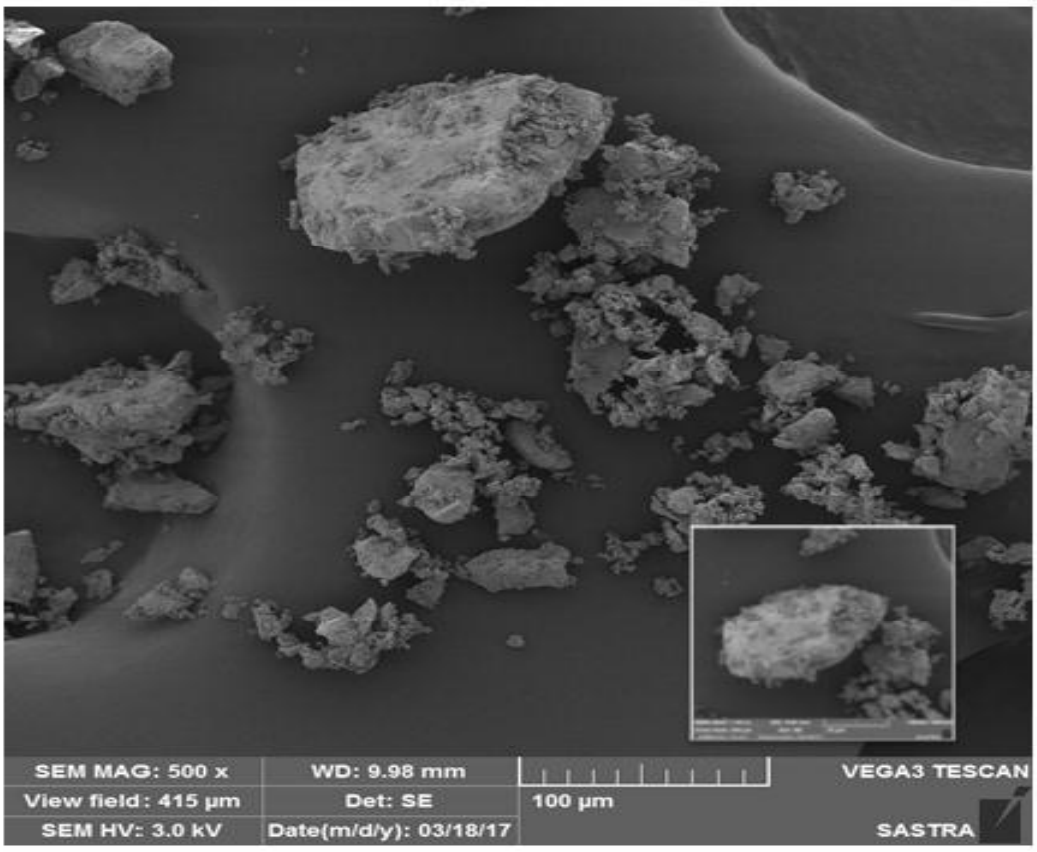
Result Analysis of XRD pattern of Sample As_2S_3 (After)

- The X-ray diffraction pattern of the of the prepared formulation material was 28.10 with the intensity value of 415.
- The XRD pattern of the test sample AsS (After) exactly matches with the reference material AsS, which justifies the presence of stable and purified AsS in the formulation.
- From the result of the present XRD analysis it was concluded that the elemental composition of sample AsS (After)confirms the presence of AsS at its stable state. Further Mercury being the major component of the sample AsS (After)

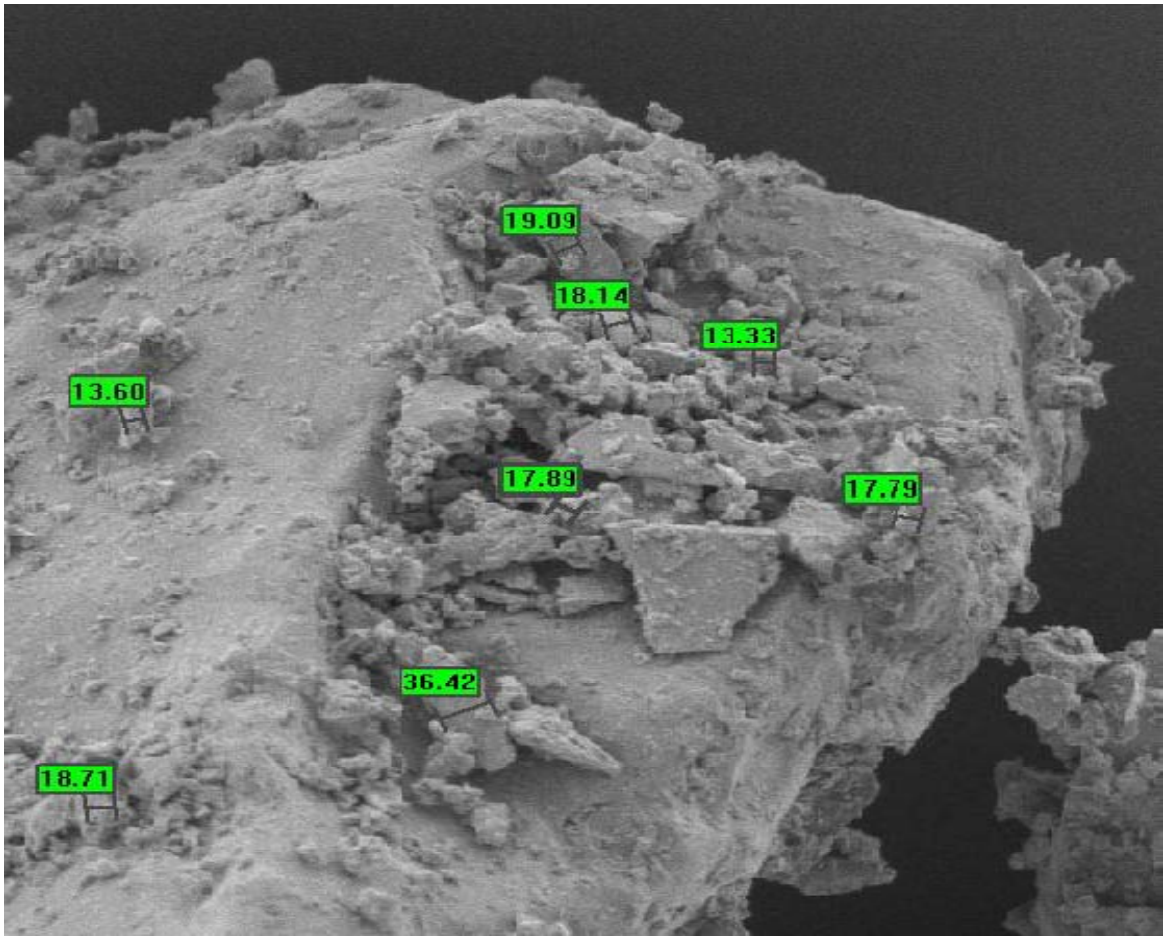
6. SEM

Figure 2(a)

SEM image of Arsenic Disulphide (Before) – Cluster View



SEM image of Arsenic Disulphide (Before) – Categorised View



Particle Size ranges from 13.33 to 36.42 µm Average Particle size

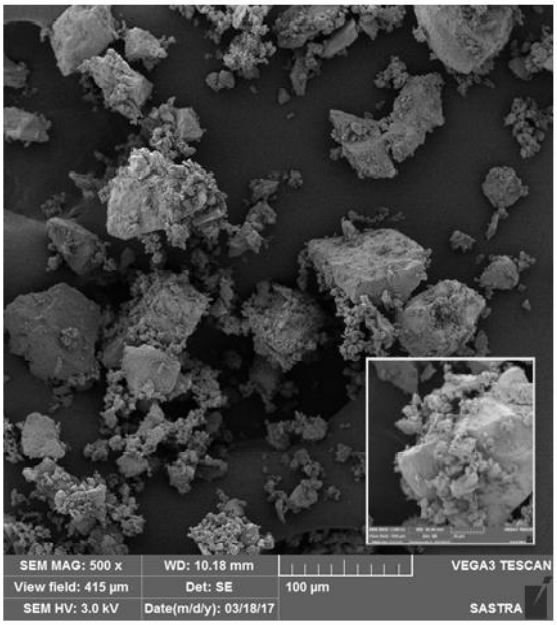
Shape : Irregular

Surface : Smooth

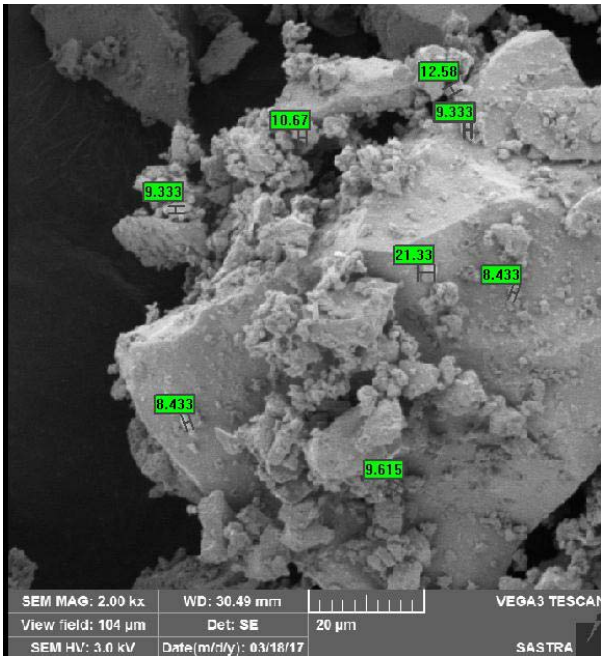
Distribution : Evently Distributed

Figure: 2(b)

SEM image of Arsenic Disulphide (After) – Cluster View



M image of Arsenic Disulphide (After) – Categorised View



Particle Size ranges from 8.4 to 21.33 µm

Shape : Irregular

Surface : Smooth

Distribution : Evently Distributed

7.DETERMINATION OF MICROBIAL LOAD

TABLE:4

Result of microbial load of raw drug Manosilai before and after purification with goat's urine and boiled Black gram water.

S. No.	Parameters	Reference Limits as per WHO (2007)	Results		
			Sample -2 (Unpurified)	Sample -1 (Purified)	Remarks
1	**Total Bacterial Count (TBC)**	10^5CFU/gm	Absent	Absent	Within permissible limits
2	**Total Fungal Count (TFC)**	10^3CFU/gm	Absent	Absent	
3	**Enterobacteriaceae**	10^3	Absent	Absent	
4	***Escherichia coli***	10	Absent	Absent	
5	**Salmonella Spp**	None	Absent	Absent	
6	***Staphylococcus aureus***	None	Absent	Absent	

8.ESTIMATION OF PESTICIDE RESIDUE

TABLE :5

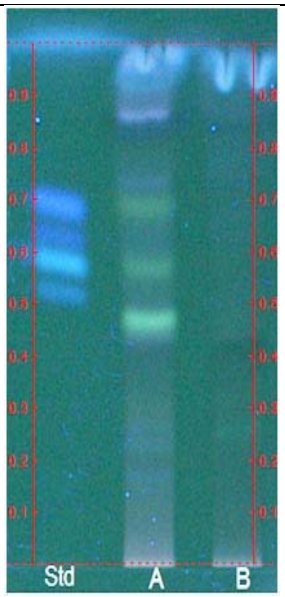
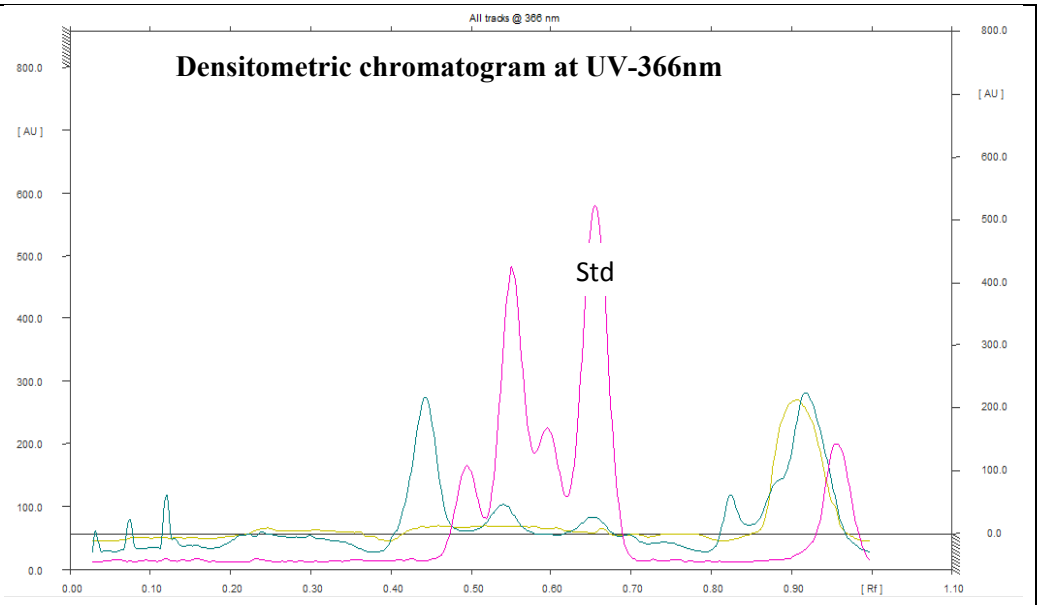
Result of pesticide residue of raw drug Manosilai before and after purification with goat's urine and boiled Black gram water given in table:5

S.No	Parameter Test	Before Purification of Manosilai	After Purification of Manosilai
Organochlorine Pesticides			
1	Alpha HCH	ND	ND
2	HCB	ND	ND
3	Beta – HCH	ND	ND
4	Gamma – HCH	ND	ND
5	Delta –HCH	ND	ND
6	Heptacholr	ND	ND
7	Aldrin	ND	ND
8	Hepachlor Epoxide	1.779	0.413
9	Chlordane (cis & trans)	ND	ND
10	Endosulfan (alpha)	ND	ND
11	Endosulfan sulphate	ND	ND
12	O,p' & p,p'-DD	ND	ND
13	Dieldrin	ND	ND
14	O,p' & DDD	ND	ND
15	Endrin	ND	ND
16	Endosulfan – Beta	ND	ND
17	O,p' & p,p' DDT	ND	ND
18	Mehoxychlor	ND	ND
Organophosphorous Compounds			
19	Phorate	ND	ND
20	Methyl parathion	ND	ND
21	Malathion	ND	ND
22	Chlorphyrifos	ND	ND
23	Ethion	ND	ND

9. TEST FOR AFLATOXINS

Result of Aflatoxin analysis of raw drug Manosilai before and after purification with goat's urine and boiled Black gram water is given in table 5.

The sample A(Processed 8 µl) ; Sample B(Unprocessed 10µl) and Standard Std - G2,G1, B2 and B1(20 µl) were applied on TLC aluminium sheet silica gel 60 F 254 (E.MERCK) and plate was developed using the solvent system Chloroform : acetone: water (14 : 2 : 0.2). After development the plate was allowed to dry in air and examined under UV – 254 nm, 366 nm and Visible light (Vanillin –Sulphuric acid).

	
UV-366nm	Standard – G2, G1, B2 & B1 The test sample (A & B) does not show the evidence for the presence of any of the aflatoxins.

Aflatoxin level in sample 1 and sample 2 was measured by AOAC 2008.02, and this result indicated

TABLE :6

Result of Aflatoxin analysis of raw drug Manosilai before and after purification with goat's urine and boiled Black gram water is given in table 6.

PARAMETER	RESULT
Aflatoxin	
Aflatoxin B1	ND
Aflatoxin B2	ND
Aflatoxin G1	ND
Aflatoxin G2	ND

DISCUSSION

The drug Manosilai of mineral origin was selected for Standardization of purification. The method of purification with goat's urine and boiled black gram water was selected from the Siddha literature "Agathiyar vaithiya kaviyam 1500".

Metals and minerals are held in hand to hand in Siddha Pharmaceuticals with suitable as well as various process of purification. Manosilai contain a large number of essential minerals in it. Therefore it has to be purified before using in the medicine preparation.

Manosilai is also included in the following preparations like Sivanar amirtham, Kasthuri karuppu, Vishnu chakkaram, Bramananda bairavam, Gandaga sudar thailam. Arsenic disulphide has a therapeutic potency in the treatment of Sarma kuttam (skin leprosy) , Nalir suram(fever with chill), Iraippu(asthma), Kannoigal(eye disease), Moothira kiricharam(urinary tract infection), kapha diseases. . It also has many indications as an external application in the form of ointment for various types of wounds. Purification of Manosilai is recommended before its application in the pharmaceutical preparation as mentioned in the Siddha literature.

Mineral arsenicals have long been used in traditional medicines for various diseases yet arsenic can be highly toxic and carcinogenic. Orpiment are less soluble and poorly absorbed from gastrointestinal tract while the bioavailability of arsenic trioxide is similar to in organic arsenic salts like sodium arsenate.

Arsenic preparations were used by many physicians in the treatment of malignant diseases such as leukemia, Hodgkin disease and pernicious anemia, as well as non malignant diseases such as psoriasis, eczema and asthma for centuries [41]

In Siddha literature, purification will be done before medicine preparation from Manosilai. In this study, the method of purification of Manosilai was taken from the text, "Aagathiyar vaithiya kaaviyam 1500 For the purpose of Standardization, the powdered samples of both unpurified and purified were taken and labeled as such and the following analysis were chosen.

Physico-chemical analysis

Chemical analysis

Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)

Fourier Transform Infra Red Spectroscopy (FTIR)

X-Ray Diffraction (XRD) and

High Resonance Scanning Electron Microscopy(HR-SEM).

Microbial Load

Pesticides

Aflotoxin

The **Physico-chemical** analysis of drug Manosilai before and after purification reveals the following results.

The pH of the drug Manosilai before purification was 7.64, which is slightly alkaline[43] .The pH of the raw drug Manosilai after purification was changed to 7.79, which is alkaline

The loss on drying test is to determine to measure the amount of water and volatile matter in a sample when the sample is dried under the specified conditions. Moisture is one of the major factors responsible for the detoriation of the drugs and formulations. Low moisture content is always desirable for higher stability of the drugs [43]. The percentage of loss on drying of raw drug Manosilai before and after purification was changed from 0.4481 % w/w to 0.2953%w/w. The drastic change in loss on drying from before to after purification process depicts the extensive shelf life of the drug[44]

The Ash limit tests are to determine the measure the amount of the residual. A high ash value is an indication of contamination, substitution, adulteration or carelessness in preparing the drug and the less Total ash value indicates the purity of the drug.

The Total ash values of Manosilai for before and after purification process was 0.4481%w/w and 0.2953%w/w respectively. As the Total ash value is much reduced in after purification, it implies that the inorganic constituents are much reduced after purification.

The acid - insoluble ash limit test is to measure the amount of ash insoluble to diluted hydrochloric acid[43]. Acid-insoluble ash value of Manosilai before and after purification was 0.0809 %w/w and nil respectively. This indicates the greater physiologic availability of the drug[46] and also indicates the purity of the drug after purification.

Extraction value determines the amount of active constituents in a given amount of the formulation when extracted with a solvent media such as water and alcohol. The water soluble and alcohol soluble extract values provides indication of the extent of polar and non-polar compounds respectively[43].The extract value of water is changed from 1.028%w/w to 0.9300 %w/w during purification. It indicates that water solubility is slightly decreased after purification. The extract value of Alcohol is changed from 0.2795 %w/w to 0.5559 %w/w. There is a reducing Alcohol extract value in after purification, which indicates that the alcohol solubility is increased. Hence it is concluded that alcohol not is better solvent of extraction than water.'[44].

The **Chemical analysis** of the drug before and after purification shows the presence of arsenic, copper, calcium, magnesium, and carbonate

The presence of arsenic which is required for syphilis, psoriasis, un common blood cancer like acute promyelocytic leukemia property found in manosilai.

Copper is chief function is hemopoiesis,helps in synthesis of haemoglobin and maturation of red blood cells ,property found in drug manosilai

The presence of Calcium required for development of bones and teeth, muscle contractions, also regarded as the second messenger which facilitates the release of hormones from endocrine glands[45] found in the drug Manosilai may be attributed to the rejuvenating property of the medicine prepared Manosilai.

The presence of Carbonate and Magnesium are essential for maintenance of acid-base balance[46].

The **Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)** analysis of raw drug Manosilai before and after purification showed that the presence of physiologically important minerals like Calcium, Magnesium, Sodium and Phosphorus. Heavy metals such as Mercury, Lead, Arsenic and Cadmium were slightly reduced than unpurified Manosilai.

The **Fourier Transform Infra Red Spectroscopy (FTIR)** analysis of Manosilai purified with goat's urine and boiled Black gram water shows the presence of vibrational band observation around ~ 1420 to 1629 cm^{-1} and confirms is attributed to the presence of Sulphide [47]. Also shows the presence of functional groups such as Alcohol, Amine, CH, and NH2.[48]

The **X-Ray Diffraction (XRD)** analysis of the drug samples shows intensity peaks of various places. The peaks were identified as crystalline peaks

The **High resonance scanning Electron microscopy (HR-SEM)** analyses of raw drug Manosilai before and after purification were done. The micrograph shows the shapes of the Manosilai powder were of evently distributed, irregular shapes and size ranges from 13.33to 36.42 Reduced to 8.4 to 21.33 the micrograph reveals the information on external morphology, texture and orientation of materials making up the sample[50].

Pesticide residue "Any substance or mixture of substances in food for man and animals resulting from the use of a pesticide and includes any specified derivatives, such as degradation and conversion products, metabolites, reaction products, and impurities that are considered to be of toxicological significance." level were quantitatively measured in the raw Manosilai, the result indicated the absence of pesticides .[51]

Aflotoxin is related to mycotoxins produced by a species of Aspergillus, commonly A. flavus, found as a contaminant in moldy grains and meals, as in rice and peanut meal, and suspected of causing liver cancer in humans and other animals. Level were quantitatively measured in the raw manosilai, the result indicated the absence of Aflotoxin.[52]

The microbial load was detected in both samples to ensure safety and efficacy of drug during ingestion .It was noted that microbial count found to absent in both samples.[53]

SUMMARY

Siddha system of medicine emphasis, before going to medicine preparation every raw drug must be purified. The concept of *Shuddhi (*purification) in Siddha is not only a process of purification / detoxification, but also a process to enhance the potency and efficacy of the drug. There is no scientific evidence what all the changes occur during the purification process are.

The Purification method of the chosen drug had been selected from the Siddha literature "Aagathiyar vaithiya kaaviyam 1500". The classic method of purification was said by the famous Siddhar Aagathiyar who is known for his excellence in various realm of Siddha medicine.

For the purpose of study, 500gm of raw drug Manosilai was procured from renowned country drug shop in Chennai. The authentication for raw drug was obtained from siddha central research institute, Chennai- 06. Ulunthu was procured from Market and authenticated by, Botanist, Plant Anatomy Research centre, Chennai-5

Then the raw drug was divided into two equal quantities of 250gm. One of the part of the raw drug was taken and powdered well and kept as such labelled as un purified raw drug Manosilai. The other part of the raw drug Manosilai was subjected to purification procedure Manosilai is made into small pieces and make in to a bundle, The above bundle is boiled with goat's urine by using thula appliances and then the bundle is take out and kept in black gram boiled water after that the bundle is opened and dried it.

Then it was powdered and labelled as purified drug Manosilai the qualitative and quantitative analyses were done for both the samples of unpurified and purified raw drug Manosilai.

The physico-chemical analysis of the purified Manosilai reveals state of better absorption in the intestine, higher stability, purity, and Water solubility.

The chemical analysis shows the presence of physiologically important metals and minerals such as arsenic, copper, Calcium, Magnesium,, Carbonate and mercury

The results of ICPOES analysis indicates the presence of increased concentration of physiologically important minerals in purified Manosilai and also slightly lower limits of heavy metals such as Mercury, Lead, Arsenic and Cadmium After purification.

The results of FTIR analysis show the presence of Sulfide, Alcohol, Amine, CH, and NH2 [48] functional groups.

The HR-SEM analysis consists of agglomerates of various shapes and sizes in reduction with increase in magnification from before to after purification. The agglomerates were found leaving pores in between which would permit the circulation of body fluid throughout the coating, when it is used as a medicine.

The XRD analysis results depicts clearly that the crystalline phase is increased with increase in intensity, which indicates that purified Manosilai is attributed for better bioavailability and dissolution rate.

Pesticide residue, Microbial load& aflatoxin level were quantitatively measured in the raw Manosilai the result indicated the absence of them.

CONCLUSION

The following inferences are drawn based on qualitative and quantitative analysis of before and after purification of Manosilai with goat's urine and .boiled black gram water.

a. Before purification the total ash value is 4.088% w/w w After purification the total ash value reduced to 3.319 % w/w. It denotes the impurities are removed.
b. Before purification the moisture content is 0.4481 % w/w. After purification the moisture content reduced to 0.2953 % w/w. It denotes that the shelf life is increased after purification.
c. ICP-0ES results suggest Mercury, Arsenic and Cadmium level reduced after purification.
d. Crystalline is increased which enriches better bioavailability and dissolution of the drug.

Siddha system insists on Purification before using them in the pharmaceutical preparations. The present study of purification process of Manosilai the impurities is removed and the quality of the drug is improved. Therefore the purified drug when used in medicine preparation may increase the efficacy and potency of the medicine. The changes found in after purification of Manosilai indicates the necessity of purification. This purification process of Manosilai with Goat's urine and Boiled Black Gram water can be set as one of the standard purification process of Manosilai.

Therefore it can be concluded that after the purification of Manosilai, through the above purification Method, has more efficacy and safety.

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மனோசிலை

வெள்ளாட்டு மூத்திரம்

உளுந்து