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Research article

A Comparative Chemical analytical study of Ferroso Ferric Oxide (*Mandooram*) on before and after purification

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ABSTRACT

Introduction

Purified Ferroso Ferric Oxide (*Mandooram*) is being used in Siddha system of Medicine for curing anaemia , amenorrhoea, dysmenorrhoea, menorrhagia, chlorosis, diarrhoea, chronic bowel complaints, dyspepsia, intestinal worms, nervous diseases, trigeminal neuralgia, albuminuria, kidney diseases,etc. thus is no adverse effect during the use of this drug so far.

Objective

To find out the chemical compounds present in the *Mandooram*

Methodology

Physio-chemical parameters, preliminary tests, tests for Acid Radicals, Tests for Basic Radicals and Other constituents with international parameters.

Result

The chemical analysis also will helpful to find out the other heavy metals and unwanted compounds project in the *Mandooram* from this analysis the active pharmacological and toxic compounds may be identified.

Conclusion

The physio-chemical analysis shows that some chemical compounds disappeared after purification. So the purification. Process of raw drug applied applied in Siddha system of medicine is essential before drug preparation.This study will be altered to further research in *Mandooram*.

Keywords:

Mandooram(Ferroso Ferric Oxide),Purification, Qualitative Chemical Analysis.

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INTRODUCTION

Ferroso Ferric Oxide(*Mandooram)* occurs as the mineral magnetite in the form of magnetic, black or red-black crystals. It is prepared by passing steam over red-hot iron. It is prepared from iron rest consisting of small particles of iron (or) forge scales. Scattered round the black smith' s anvil, when hot iron is beaten on it. These by exposure to air become rusty brittle. Then they are considered fit for use.

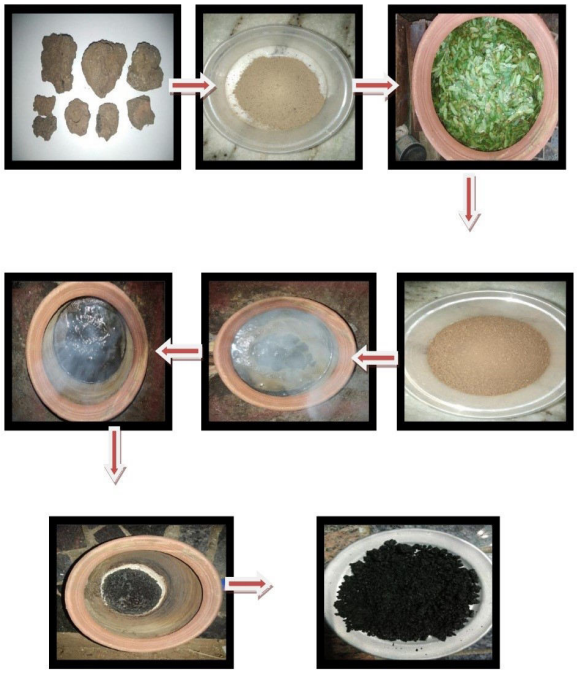
Purified *Mandooram* is being used in Siddha system of Medicine for curing anaemia , amenorrhoea, dysmenorrhoea, menorrhagia, chlorosis, diarrhoea, chronic bowel complaints, dyspepsia, intestinal worms, nervous diseases, trigeminal neuralgia, albuminuria, kidney diseases,etc. thus is no adverse effect during the use of this drug so far.

MATERIALS AND METHODS

Procurement and genuine of raw drugs

The Natural *Mandooram* were properly collected from country merchant shop, Nagarcoil and Animal & Mineral origin Drug Research Laboratory (AMDRI) of Siddha Central Research Institute, Chennai has authentication certified that the above raw materials were genuine one according to the physical and chemical nature of the compound.

Table 1. Purification of *Mandooram*



Purification of *Mandooram*

Mandooram (Raw-purified)

Puli ilai(Tamarind leaves)

Pasu neer(Cow's urine)

Water

Method of purification

Powdered *Mandooram* is taken in a pot and add four parts of Tamarind leaves and eight parts of water.This mixture is boiled for 3 hours and then the powder is washed and dried in sunlight. Tamarind leaves are removed.

The *Mandooram* is is grinded and put into a pot. Eight parts of cow's urine is added into the pot and boiled upto the cow's urine disappeared. Then the *Mandooram* is washed with fresh water and is dried in sunlight.

Reference : Gunapadam Thadhu Jeeva Vagupu, Dr.R.Thiyagarajan L.I .M, Page.no108,Edition 1952.Publication- Chennai.

Sample design :

Sample 1: Raw *Mandooram* (Unpurified)-before purification

Sample 2: Purified *Mandooram* -after purification.

Chemical Analytical Methods :

In this research , only analysis the physico, chemical and qualitative bio-chemical analysis only comparative with both Unpurified *Mandooram* in Biochemistry Laboratory , Department of Biochemistry , Govt.Siddha Medical College , Tirunelveli and VS Clinical Research and Hospital Private LTD.,Taramani,Chennai.

Physico-chemical parameters :

Determination of Total Ash

2 to 3 g of drug was weighed in the pre weighed and tared Gooch crucible was kept in the muffle furnace at a temperature not exceeding 450ºC until free from carbon then cooled and weighed and the percentage of the total ash content were calculated with reference to the air dried drug.

Determination of Acid Insoluble Ash

The ash obtained from total ash was boiled with 25ml of dilute hydrochloric acid for 5 minutes and insoluble matter were collected in an ash less filter paper, washed with hot water and ignited to constant weight. Later the percentage of the acid insoluble ash content was calculated with reference to the air dried drug.

Determination of Water Soluble Ash

The ash obtained from total ash content was boiled with 25 ml of water for 5 minutes and insoluble matter were collected in an ash less filter paper, washed with hot water and ignite for 15 minutes at a temperature not exceeding 450ºC the weight of the insoluble matter were subtracted from the weight of the ash. The difference in weight represents the water soluble ash and the percentage of the water soluble ash content were calculated with reference to the air dried drug.

Determination of alcohol soluble extractive

5g of coarsely powdered air dried drug was macerated with 100ml of absolute alcohol in a closed flask for twenty-four hours, shaken frequently during six hours and allowed to stand for eighteen hours. After filtering the solution 25ml of this filtrate was evaporated in a tared flat bottomed shallow dish, and dried at 105ºC until a constant weight was obtained. Later the percentage of alcohol-soluble extractive with reference to the air-dried drug was calculated.

Determination of water soluble extractive

5g of coarsely powdered air dried drug was macerated with 100ml of chloroform-water in a closed flask for twenty-four hours, shaken frequently during six hours and allowed to stand for eighteen hours. After filtering the solution 25ml of this filtrate was evaporated in a tared flat bottomed shallow dish, and dried at 105ºC until a constant weight was obtained. Later the percentage of water-soluble extractive with reference to the air-dried drug was calculated.

Determination of Moisture Content (Loss on Drying)

5 g of the drug without preliminary drying was weighed accurately in a tared evaporating dish, dried at 105ºC for 5 hours, cooled in dessicator and weighed. Later the drying and weighing process was continued at one hour interval until difference between two successive weighing of sample corresponds to not more than 0.25 percent. When the constant weight was obtained the percentage of moisture content were calculated with reference to the air dried drug.

Preparation of solution for physiochemical analysis of *Mandooram*

5gm of unpurified *Mandooram* (M1) and purified *Mandooram* (M2) were taken in a 250ml of clean beaker and 50ml of distilled water was added to it. Then it was boiled well for about 10 min. Then it is allowed to cool and filtered in a 100 ml volumetric flask and made up to 100ml with distilled water. This preparation is used for the qualitative analysis of acidic/ basic radicals and biochemical constituents in it.

In tests and analysis where applied;

- A preliminary test for Copper, Sodium, Silicate and Carbonate:
- Test for silicate, action of heat, Flame test, Ash test
- Test for Acid Radicals: Test for; Sulphate, Chloride, Phosphate,
- Carbonate, Nitrate, Sulphide, Fluoride & Oxalate, Nitrite,
- Test for Basic Radicals: Test for; Lead, Copper, Aluminum,
- Ferrous & Ferric, Zinc, Calcium, Magnesium, Ammonium,
- Potassium, Sodium, Mercury, Arsenic,Ferrous iron and Ferric iron.
- Other constituents: Test for; starch, reducing sugar, alkaloids,
- tannic acid, unsaturated compound and amino acids

RESULTS

Table 1. Physicochemical parameters of Ferroso Ferric Oxide-(*Mandooram)*

Test performed	Results	
Sample	M1	M2
Color	Sandy	Dark
Odour	Odourless	Smoky smell
Moisture Content (Loss on Drying)	2.05%	3.50%
Total Ash	0%	0%
Acid Insoluble Ash	-	-
Water soluble Ash	-	-
Alcohol soluble extractive	1.76%	2.03%
Water soluble extractive	1.22%	0.32%
Ph	7.06	7.13

DISCUSSION AND CONCLUSION

Color-(Sandy)was unpurified *Mandooram* and (Dark Black)was purified *Mandooram*. Unpurified *Mandooram* was odourless and purified *Mandooram* was Smoky smell. Unpurified *mandooram* was tasteless and purified *mandooram* was salty taste. Moisture Content (Loss on Drying)unpurified *Mandooram* was 2.05% and purified *Mandooram* was 3.50%. Both of the *Mandoorams* Total Ash was 0% Ash content Alcohol soluble extractive unpurified *Mandooram* was 1.76% and purified *Mandooram* was 2.03%. Water soluble extractive of unpurified *Mandooram* was 1.22% and purified *Mandooram* was 0.32%. pH of unpurified *Mandooram* was 7.06 and purified *Mandooram* was 7.13.

Table 2. A preliminary test for Copper, Sodium, Silicate and Carbonate

S. No	Chemical Test	Observation		Inference	
		M1	M2	M1	M2
1	**Test for Silicate** A little (500mg) of the sample is shaken well with distilled water.	Sparingly soluble	Sparingly Soluble	Presence of Silicate	Presence of Silicate
2	**Action of Heat:** A small amount of the sample is taken in a dry test tube and heated gently at first and then strong.	White fumes not evolved	White fumes not evolved	Absence Of Carbonate	Absence Of Carbonate
3	**Flame test:** A small amount (500mg) of the sample is made into a paste with con .HCl in a watch glass and introduced into the non luminous part of the Bunsen flame.	Bluish green flame not appeared.	Bluish green flame not appeared.	Absence of Copper	Absence of Copper
4	**Ash test:** A filter paper is soaked in to a mixture of sample and dil. cobalt nitrate solution and introduced in to the Bunsen flame and ignited.	Yellow colour Flame not appeared	Yellow colour Flame not appeared	Absence of sodium	Absence of sodium

Table 3:- Test for Acid radicals

S. No	EXPERIMENTS	Observation		Inference	
		M1	M2	M1	M2
1	**Test for Nitrate:** 01gm of the substance was heated with copper turning and concentrated H2SO4 and viewed the test tube vertically down.	Brown gas was not evolved	Brown gas was not evolved	Indicates the absence of Nitrate.	Indicates the absence of Nitrate.
2	**Test for Sulphide**: 1 gm of the substance was treated with 2ml of con.HCL.	Rotten egg smell was not evolved	Rotten egg smell was not evolved	Indicates the absence of Sulphide	Indicates the absence of Sulphide
3	**Test for Fluoride & Oxalate:** 2ml of extract was added with 2ml of dil. Acetic acid and 2 ml dil. Calcium chloride solution and heated.	Absence of Cloudy appearance.	Absence of Cloudy appearance	Indicates the absence of Fluoride & Oxalate	Indicates the absence of Fluoride & Oxalate
4	**Test for Nitrite:** **3** drops of the extract was placed on a filter paper, on that 2 drops of dil. acetic acid and 3drops of dil. Benzidine solution were placed	No Characteristic changes appeared	No Characteristic changes appeared	Indicates the absence of Nitrite	Indicates the absence of Nitrite
5	**Test for Sulphate:** 2ml of the extract is added to 5% barium chloride solution	No white precepitate is formed	A white precepitate is formed	Absence of Sulphate	Indicates the Presence of Sulphate
6	**Test for Chloride:** The extract is treated with silver nitrate solution	A white precepitate is formed	A white precepitate is formed	Indicates the Presence of Chloride	Indicates the Presence of Chloride

Table 4. Test for basic radicals

EXPERIMENTS	Observation		Inference	
	M1	M2	M1	M2
Test for Lead: 2 ml of the extract was added with 2 ml	No Yellow precipitate formed	No Yellow precipitate formed	Indicates the absence of Lead	Indicates the absence of Lead
Test for Copper One pinch(50mg) of substance was made into paste with con.HCL in watch glass and introduced into the non-luminuous part of the flame	Blue colour precipitate was not formed	Blue colour precipitate was not formed	Indicates the absence of Copper	Indicates the absence of Copper
Test for Aluminium: In the 2 ml of extract dil. Sodium hydroxide was added in 5 drops to excess	Yellow colour Not formed	Yellow colour Not formed	Indicates the absence of Aluminium	Indicates the absence of Aluminium
Test for Magnesium In 2 ml of extract dil. Sodium hydroxide solution was added in drops to excess	White precipitate not formed	White precipitate not formed	Indicates the absence of Magnesium	Indicates the absence of Magnesium
Test for Ammonium: In 2ml of extract 1 ml of Nessler's reagent and excess of dil. Sodium hydroxide solution were added	Brown colour not formed	Brown colour not formed	Indicates the absence of Ammonium	Indicates the absence of Ammonium
Test for Potassium: A pinch (25mg) of substance was treated with 2 ml of dil. Sodium nitrite solution and then treated with 2 ml of dil. cobalt nitrate in 30% dil. glacial acetic acid	Yellowish precipitate not formed	Yellowish precipitate not formed	Indicates the absence of Potassium	Indicates the absence of Potassium
Test for Sodium 2 pinches (50mg) of the substance was made into paste by using HCL and introduced into the blue flame of Bunsen burner	Yellow colour flame not appeared	Yellow colour Flame not appeared	Indicates the absence of Sodium	Indicates the absence of Sodium
Test for Mercury 2ml of the extract was treated with 2ml of dil. sodium hydroxide solution	Yellow precipitate Not Formed	Yellow precipitate Not Formed	Indicates the absence of Mercury	Indicates the absence of Mercury
Test for Arsenic 2ml of the extract was treated with 2ml of dil. sodium hydroxide solution	Brownish red precipitate not formed	Brownish red precipitate not formed	Indicates the absence of Arsenic	Indicates the absence of Arsenic
Test for Ferric Iron: The extract is acidified with glacial acetic acid and potassium ferro cyanide	No blue Colour is Formed	No blue Colour is formed	Absence of Ferric Iron	Absence of Ferric Iron
Test for Ferrous iron: The extract is treated with concentric nitric acid ammonium thiocynide solution.	Blood red colour is formed	Blood red colour is formed	Indicates the Presence of Ferrous Iron	Indicates the Presence of Ferrous Iron

Table 5. Other constituents

EXPERIMENTS	Observation		Inference	
	M1	M2	M1	M2
Test for the Alkaloids a)2 ml of the extract is treated with 2 ml of dil. potassium Iodide solution b)2ml of the extract is treated with 2ml of dil. Picric acid	Reddish brown precipitation not formed Yellow precipitation not formed	Reddish brown precipitation not formed Yellow precipitation not formed	Indicates the absence of Alkaloids Indicates the absence of Alkaloids	Indicates the absence of Alkaloids Indicates the absence of Alkaloids
Test for Unsaturated Compounds Potassium permanganate solution is added to the extract	It does not get decolourised	It gets decolourised	Indicates the Absence of unsaturated compounds	Indicates the Presence of unsaturated compounds

DISCUSSION AND CONCLUSION

In the preliminary test for this both *Mandooram* performed were same in action of heat by carbonate, and Ash test by Sodium as presence of elements. Flame test were same by copper as absence in both sample of *Mandooram* . Test for silicate, Chloride,Ferrous iron,were performed presence was found in both unpurified *Mandooram* and purified *Mandooram.*

In test for acid radicals were same in both unpurified and purified *Mandooram* in specially; nitrate, sulphide, fluoride & oxalate and nitrite. But test for Sulphate and Unsaturated compounds were performed presence in purified *Mandooram* and absence in unpurified *Mandooram.*

In test for basic radicals were found same result in both of *Mandooram* as absences of lead, copper, magnesium, ammonium, potassium and Arsenic and presence of Sodium and Mercury.

It is concluded as; that the aim of research is to find out the any physiochemical changes occur in the purification process of *Mandooram* as per Siddha literature. The physiochemical analysis shows that some chemical compounds presence after purification like silicate, Sulphate and unsaturated compounds. So, the purification process of raw drug applied in siddha system of medicine is essential for before drug preparation. This study will be alerted to further research in *Mandooram*.

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CONFLICTS OF INTEREST

None declared.

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