



## Qualitative Chemical analysis of a Siddha Polyherbal Formulation : Bringaraja Chooranam

Sudha V<sup>\*1</sup>, Sabarmathi S<sup>1</sup>, Sasirekha R<sup>2</sup>, Anbu N<sup>3</sup>

<sup>1\*</sup> PG Scholars, <sup>2</sup>Lecturer, <sup>3</sup>Professor, Department of Pothu Maruthuvam (General Medicine), Government Siddha Medical College, Tamilnadu, India.

### ABSTRACT

According to the WHO, Iron deficiency is the most common Micro Nutrient deficiencies (MND) in the world among children and leads to Microcytic anaemia, decreased capacity for work, as well as impaired immune and endocrine function. Anaemia affects approximately 2.36 billion of individual's globally. There are various intermixed factors may cause Anaemia but poor intake of nutrients and fibrous food in diet seem to be the ultimate reason behind it. Correcting anaemia requires an integrated holistic approach based on identifying and addressing the contributing factors. In Siddha system of medicine, *Paandu* was classified into five types and *Pitha Paandu* is one of the types among them.

The features of '*Pitha Paandu noi*' can be correlated to Iron Deficiency Anaemia (IDA). *Paandu noi* is characterized by the pallor of the skin which occurs due to the quantitative and qualitative deficiency of *rathathaathu* (blood tissue) by vitiation of *Pithathodam*. There are so many medicines discussed in Siddha classical literatures. Among those, a poly - herbal preparation "*Bhringaraja chooranam (BRC)*" as referred in '*Anubava vaithiya deva rasasiyam* part III has potent empirical clinical relevancy to the anaemic patients and studied. The qualitative chemical analysis of the drug indicates the presence of fluoride & oxalate, iron, starch and reducing sugar. It revealed that the enhancement of therapeutic actions of *Pitha Paandu*.

### Keywords:

Iron deficiency, Pitha Paandu, Bhringaraja Chooranam, Qualitative analysis

### Address for correspondence:

**Sudha V**

PG Scholar,

Department of Pothu Maruthuvam  
(General Medicine)

CODEN : IJRPHR

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## INTRODUCTION

Anaemia is a condition in which the number of red blood cells (RBCs), and consequently their oxygen-carrying capacity, is insufficient to meet the body's physiological needs vary with a person's age, gender, residential elevation above sea level (altitude), smoking behavior and different stages of pregnancy<sup>1</sup>.

According to the World Health Organization (WHO), Iron deficiency is the most common Micro Nutrient Deficiencies (MND) in the world and leads to microcytic anaemia, decreased capacity for work, as well as impaired immune and endocrine function<sup>2</sup>. Anaemia affects approximately 2.36 billion of individual's globally<sup>3</sup>.

Adolescent girls and young women are still at high risk of developing iron deficiency because of increased iron demands during puberty, menstrual losses and limited dietary iron intake<sup>4</sup>. Several programmes like National Nutritional Anaemia Control Programme (NNACP), National Iron Plus Initiative for Anaemia Control etc., have been running out in order to provide equal nourishment to each and every individual in the society. Even though, over half of the women in the country suffer due to nutritional anaemia, the idea of "Health for all" seems to be an illusion<sup>5</sup>.

Correcting anaemia requires an integrated holistic approach based on identifying and addressing the contributing factors<sup>6</sup>. Being a woman, the author has the intention and social responsibilities to overcome these issues, taken the potent drug for research.

Our *Siddhars* explained the classification, clinical features and treatment of *Pitha Paandu* in their texts. According to *Yugimunivar*, *Paandu* was classified into five types and *Pitha Paandu* is one of the types among them. The features of '*Pitha Paandu noi*' can be correlated to Iron Deficiency Anaemia (IDA)<sup>7</sup>. *Paandu noi* is characterized by the pallor of the skin which occurs due to the quantitative and qualitative deficiency of *rathathaathu* (blood tissue) by vitiation of *Pitha thodam*. *Rathathaathu* is the responsible for blood components in our body<sup>8</sup>. Due to nutritional defect *rathathaathu* deranged and leads to '*Pitha Paandu noi*'.

There are so many regiments administered along with adverse drug reactions. A scientific invention may bring many effective medicines from the vegetable kingdom; now a day's people are shifting over to herbal medicine to avoid side effects. So, considering all the above facts in mind, I had chosen a classic poly - herbal preparation "*Bhringaraja chooranam*" in the treatment of '*Pitha Paandu noi*' as referred in '*Anubava vaithiya deva ragasiyam* part III'<sup>9</sup>. The drug was analyzed for inorganic and organic chemical composition qualitatively.

## MATERIALS AND METHODS

### Required raw drugs:

Purified *Karisaalisamoolam* : 3 part  
Purified *Kadukkaihoal* : 1 part  
Purified *Nellivtral* : 1 part  
Purified *Thaandrikaaithoal* : 1 part  
Country sugar : 6 part

### Source of raw drugs:

The whole plant of *Karisaalai* was bought from the *koyembedu* market and the required raw drugs were procured from a reputed indigenous raw drug shop. The raw drugs taken for study were authenticated by the concerned Botanist of Medicinal Botany Department, Government Siddha Medical College, Chennai.

### Purification of raw drugs:

1. Whole plant of *Ecliptaalba* (*karisaalai*) – whole plant of *karisaalai* was cleaned in running water without any dirt and dried in shade.
2. Skin of *Terminaliachebula* (*Kadukkai*) - Whole fruit was soaked in rice water (*kazhuneer*) and yellow water was discarded. Then fruit was deseeded and dried in sunlight.
3. Skin of *Terminaliabelirica* (*Thandrikkai*) - It was purified by removal of seed and dried it in sunlight.
4. Dried fruit of *Emblicaofficinalis* (*Nellivtral*) - It was boiled in milk and then the fruit was deseeded and dried it in sunlight<sup>10</sup>.

### Preparation of drug:

All the dried and purified ingredients were made into fine powder separately. Then mixed it well and sieved by using a cloth (*Vasthirakayam*). Then equal amount of sugar was added. And the obtained fine powder was stored in air-tight container.

### Qualitative inorganic and organic chemical analysis for radicals:

This study was carried out in Department of Chemistry, Siddha Central Research Institute, Chennai – 600106, Tamilnadu, India.

### Preparation of Sodium Carbonate extract:

2 gm of the sample drug is mixed 5 gm of Sodium carbonate and taken in a 100 ml beaker and 20 ml of distilled water is added. The solution is boiled for 10 minutes, cooled and then filtered. The filtrate is called sodium carbonate extract.

## RESULTS AND DISCUSSION

The qualitative inorganic and organic chemical analysis for radicals of the drug *Bringaraja Chooranam* (BRC) was tabulated above in table 1.

The drug possesses, Iron, Fluorides & Oxalate, Reducing sugar and Starch.

The mechanisms of action of the drug BRC which stores the Iron (due to presence of iron), enhance the iron metabolism (due to presence of fluoride)<sup>11</sup> and its bioavailability (due to presence of reducing sugars)<sup>12</sup> for correcting iron deficiency.

**Figure.1. Ingredients & Bhringaraja chooranam*****Karisalaisamoolam******Kadukkaithol******Nellivatral******Thandrikkaithol******Country sugar******Bhringaraja chooranam***

EXPERIMENT	OBSERVATION	INFERENCE
<b>TEST FOR ACIDIC RADICALS (ANIONS)</b>		
<b>1. Test for Sulphate:</b> 2 ml of the above prepared extract is taken in a test tube. To this add 2ml of 4% Ammonium oxalate solution.	Absence of White Precipitate	Absent
2ml of extract is added with 2ml of dilute hydrochloric acid (HCl) until the effervescence ceases off. Then 2ml barium chloride solution is added.	Absence of White Precipitate	Absent
<b>2. Test for Chloride:</b> 2ml of extract is added with dilute nitric acid till the effervescence ceases. Then 2ml of silver nitrate solution is added.	No white precipitate is obtained	Absent
<b>3. Test for Phosphate:</b> 2ml of the extract is treated with 2 ml of Ammonium Molybdate solution and 2ml of Concentrated nitric acid (HNO <sub>3</sub> ).	No Yellow precipitate obtained	Absent
<b>4. Test for Carbonate:</b> 2ml of the extract is treated with 2ml of Magnesium Sulphate solution.	Absence of white precipitate	Absent
<b>5. Test for Sulphide:</b> 1 gm of the substance is treated with 2ml of concentrated HCl.	Absence of Rotten egg smelling	Absent
<b>6. Test for Nitrate:</b> 1 gm of the substance is heated with copper turnings and concentrated Sulphuric acid and viewed the test tube vertically down.	Absence of reddish brown gas.	Absent
<b>7. Test for Fluoride and oxalate:</b> 2ml of the extract is added with 2ml of dilute acetic acid and 2ml of calcium chloride solution and heated.	White precipitate is obtained	Present
5 drops of clear solution is added with 2ml of dilute sulphuric acid and slightly warmed to this, 1 ml of dilute potassium permanganate (KMNO <sub>4</sub> ) solution is added.	KMNO <sub>4</sub> solution Discolourisation observed	Present
<b>8. Test for Nitrite:</b> 3 drops of the extract is placed on a filter paper. On that, 2 drops a Acetic Acid and 2 drops of Benzidine solution is placed.	Absence of yellowish red colour	Absent
<b>9. Test for Borate:</b> 2 pinches of the substance is made into paste by using Sulphuric acid and Alcohol (95%) and introduced into the blue flame.	Absence of Green tinged flame	Absent

TEST FOR BASIC RADICALS (CATIONS)		
<b>10. Test for lead:</b> 2 ml of the extract is added with 2 ml of Potassium iodide solution.	Absence of Yellow precipitate	Absent
<b>11. Test for Copper:</b> One pinch of substance is made into paste with concentrated Hydrochloric acid in a watch glass and introduced into the non-luminous part of the flame.	Absence of Bluish green colored flame.	Absent
2ml of the extract is added with excess of Ammonia solution	Absence of deep Blue	Absent
<b>12. Test for Aluminium:</b> To the 2 ml of extract. Sodium Hydroxide solution is added in drops to excess	Absence of White Precipitate.	Absent
<b>13. Test for Iron (Ferrous):</b> To the 2 ml of extract, 2 ml of Ammonium Thiocyanate solution is added.	Blood red colour is obtained	Present
To the 2 ml of extract, 2 ml of Ammonium Thiocyanate solution and 2 ml of concentrated $\text{HNO}_3$ is added.	Blood red colour is obtained	Present
<b>14. Test for Zinc:</b> To the 2 ml of extract Sodium Hydroxide solution is added in drops to excess.	Absence of White precipitate.	Absent
<b>15. Test for Calcium:</b> 2 ml of the extract is added with 2 ml of 4% Ammonium Oxalate solution.	Absence of White precipitate.	Absent
<b>16. Test for Magnesium:</b> 2ml of extract, Sodium Hydroxide solution is added in drops to excess.	Absence of White precipitate.	Absent
<b>17. Test for Ammonium:</b> 2 ml of extract few ml of Nessler's Reagent and excess of Sodium Hydroxide solution are added.	Absence of Reddish brown precipitate	Absent
<b>18. Test for Potassium:</b> A pinch of substance is treated with 2 ml of Sodium Nitrite solution and then treated with 2 ml of Cobalt Nitrate in 30% glacial Acetic acid.	No Yellow precipitate is obtained	Absent
<b>19. Test for Sodium:</b> 2 pinches of the substance is made into paste by using HCl and introduced into the blue flame	No Yellow colour flame is obtained	Absent
<b>20. Test for Mercury:</b> 2 ml of the extract is treated with 2 ml of Sodium Hydroxide solution.	Absence of yellow precipitate	Absent
<b>21. Test for Arsenic:</b> 2 ml of extract is treated with 2 ml of silver Nitrate solution	Absence of Yellow precipitate	Absent
<b>22. Test for Starch:</b> 2ml of extract is treated with weak iodine solution	Presence of Blue colour	Present
<b>23. Test of reducing Sugar:</b> 5ml of Benedict's qualitative solution is taken in a test tube and allowed to boil for 2 minutes and added 10 drops of the extract and again boiled for 2 minutes. The colour changes are noted.	Presence of Green colour	Present
<b>24. Test of the alkaloids:</b> 2ml of the extract is treated with 2ml of potassium iodide solution.	Absence of Red colour	Absent
<b>25. Test of the proteins:</b> 2ml of the extract is treated with 2ml of 5% Sodium Hydroxide (NaOH), mix well and add 2 drops of copper sulphate solution.	Absence of Violet colour	Absent



## CONCLUSION

Bhringaraja chooranam is a classic poly herbal preparation referred as in Siddha literature used in the treatment of *Pitha paandu* (Iron Deficiency Anaemia). The drug was screened for qualitative inorganic and organic chemical analysis for its radical properties. The author chooses this drug because all the ingredients in this drug were from the Mother Nature, which doesn't have any complications. The drug was also very cost effective. By taking ferrous sulphate orally, there will be presence of metallic taste and odour which will be disliked by the patients. But *Bhringaraja chooranam* is palatable because of its sweet taste. Further comprehensive pharmacological analyses are to be initiated to evaluate its potency.

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## CONFLICTS OF INTEREST

None declared.

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