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PHARMACEUTICAL MODIFICATION OF TRADITIONAL KASISA BHASMA AND IT'S ADJUVANT TRIPHALA INTO A CANDY

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Abstract

Ayurveda has indicated use of various iron formulations for improving anemia. As per classics, *Kasisa* is the best drug for blood formation. Intake of iron formulations will cause gastric symptoms like nausea, vomiting, heartburn, constipation etc. Hence different iron forms like *kasisa*, *louha* etc. are usually prescribed to take with *triphalachoorna* which can cure all those side effects. *Kasisa* together with *triphala* is a suitable combination for iron deficiency anemia. Very small dose, fine *bhasma* form, necessity of mixing *anupana* etc. make the drug less acceptable to the people. In this study, *Kasisabhasma* and *triphala* were converted into candy form using palm candy to increase the palatability and make it convenient to administer. The measurement of each ingredient for candy preparation was fixed after trial-and-error method. Each candy prepared was equivalent to 125 mg *kasisabhasma* and 0.5 g *triphalachurna*. For its preparation no adjuvant are required other than the sugar base. It tastes better than *kasisa-triphala* mixture. This dosage form is safe to administer as it contains no chemicals.

Keywords: Anaemia, kasisabhasma, ayurvedic candy, drug modification

Introduction

Rasa sastra is considered as the divine branch in Ayurveda. Treatment using *rasa* drugs are superior to all other therapies because of small dosage, palatability and fast action of medicines. Different types of preparations like *parpati*, *potali*, *bhasma*, *pishti*, etc. are explained in Rasasastra. *Bhasmas* which is in fine powder form have superior level of efficacy and can be easily absorbed from the body.

Ayurveda has indicated use of various iron formulations for improving *rakthaalpatha*. *Kasisabhasma* is a widely used medicine for anemia in Ayurveda. *Kasisa* is the best drug for *rakthasanjananam* (blood formation). An animal study showedthat *kasisabhasma*has anti-anemic and hepato-protective activity and no toxic effects.

Intake of iron formulations will cause gastric symptoms like nausea, vomiting, heartburn, constipation etc. Hence different iron forms like *kasisa*, *louha* etc. are usually prescribed to take with *triphala choorna* which can cure all those side effects.

Kasisa together with *triphala* is a suitable combination for iron deficiency anemia. Very small dose, fine *bhasma* form, necessity of mixing *anupana* etc. make the drug less acceptable to the people. The most acceptable dosage forms for oral administration are tablets and capsules. But for the preparation of these two, non-herbal products like excipients and gelatine are required. Medicated Candy made with a sugar base will be convenient to administer and will taste better than *kasisa- triphala* mixture.

In this study *Kasisabhasma* along with its *anupana* (adjuvant) –*triphala*, was converted into candy formulations candy to increase the palatability and make it convenient to administer.

Methodology

Details about *kasisa*, its dose, *anupana* and *amayikaprayogas* were referred from API and various books in Rasa sastra.

Constituents of *triphala* and its proportion in the mixture were referred from classical Ayurveda books.

Relevant researches showing the anti anemic activity of *kasisa* and *triphala* were collected from online journals.

As the candy form of medicine can be considered as a variant of *khandakalpana*, its preparation was referred from Ayurveda books.

Kasisatriphala candy was prepared with various proportions of *kasisa bhasma* and *triphala churna* by taking palm candy as the base of candy. The combination in which candy of perfect consistency obtained was taken as the final one. It's procedure, precautions taken and observations noted while preparing were included in detail.

Discussions were made on the ingredients and candy preparation. Conclusions arrived at the end and limitations and recommendations were added in the last part of the article.

Result

I. Kasisa

Kasisa is Ferrous Sulphate (FeSO4. 7H2O) also known as Green vitriol, Copperas or melanterite mineral. *Kāśīśaka*and *Pushpakāśīśa*are synonyms of *kasisa*. As per API, *kasisa* can be used in various conditions like *Pandu, Plihavrddhi, Krimi, Gudabhramsa, Visarapa,Netra roga,* and *Sleshmaroga*[1].

- Dose of *kasisa bhasma*

1. Rasa Tarangini: ½ – 2 *ratti*[2]
2. Rasamrita: 1 – 2 *ratti*[3]
3. API: 60 – 250 mg[4]

In general, *kasisa* can be used along with *triphalachurna* and honey. As per the disease condition various other *anupanas* can also be used. For example, in pain due to *rajorodha, kasisa* can be given with *Tankana* and *kanyasara*[5].

Kasisabhasma prepared as per API guidelines showed no toxicity at a dose of 2mg/kg in acute toxicity study conducted in albino rats. *Kasisabhasma* showed protective activity in carbon tetrachloride induced hepato toxicity. *Bhasma* produced a significant reduction in

CCl_4 induced elevated levels of SGOT, SGPT, ALP, and total bilirubin as well as increase in the levels of TP when compared to the control group, that received CCl_4 alone. Increased Hb levels after 60 days of *kasisabhasma* administration shows its anti-anemic activity[6].

II. Triphala

Triphala is the name given for 3 most important fruits – *phala* used in Ayurveda. It constitutes *Amalaki*, *vibeethaki* and *hareethaki*. In *triphala*, their dried fruit rinds should be taken in equal quantity.*Triphala* also known as *vara*. It is *kaphapittaharam* in nature. It is *saram*, *chakshushyam*, *deepanam*, *ruchyam*, and *vishamajwaranasanam*[7].

A Comparative Clinical Study to evaluate the effect of *HaritakiChurna* and *AmalakiChurna* in 1.5g/day dose in iron Deficiency Anemia shows that both are effective in relieving the symptoms of *Pandu Roga*. But *Amalaki Churna* is slightly significant than the *Haritaki Churna* in the management of IDA. Hb% and PCV increased in both groups[8].

A clinical study in IDA with *Amalaki churna* in 3 gms/day noticed symptomatic improvement and increase in Hb% at the end of 30 days[9].

III. Candy preparation

Candy preparation can be considered as a variant of *Khanda Kalpana*. *Khanda Kalpana* is a modification of *Avaleha Kalpana*. These are sugar-based preparations. Various sweetening agents like sugar, jaggery or rock candy are being used in *Avaleha* and *Khandakalpanas*. For its preparation, sweetening agents are dissolved in prescribed liquid medium and heated till the sugar syrup condenses to required consistency. To this syrup, powdered or pasted medicines and other substances like ghee or oil are added and mixed well.

The consistency of the sugar syrup while adding other ingredients decide the consistency of the final product. For preparing *Avaleha*, the sugar syrup should show a thread like consistency while pressing the syrup between thumb and index finger. For *Khandakalpanas*, this should reach thick thread consistency[10]. In candy preparations, sugar syrup should attain three thread consistencies before adding the other ingredients. Then this mixture should be soon transferred to the candy mould.

Sugar gives desired texture to *Avaleha* like preparations. Increased shelf life and palatability of such preparations are attributed by this sugar base.

IV. Preparation of Kasisa-triphala candy

A. Fixing the amount of palm candy for preparation.

- Initially a silicone mould was selected.
- Sugar syrup was prepared with 150g palm candy. When it attained the consistency for candy preparation, mould was filled with enough syrup.
- After solidifying of the syrup to candy, its weight was measured.
- The whole candy bar was of 98 g.
- Final candy will be containing *kasisabhasma* and *triphala* in addition to palm candy.
- So 90g was fixed as the measurement of palm candy for preparing one batch of candy in that specific mould.

B. Fixing the amount of *kasisabhasma*

- The average dose of *kasisabhasma*, is 125 mg, that is 1 *ratti*.
- 24 candies can be prepared in one batch with the selected mould.
- If each candy shall be equivalent to 125 mg *kasisabhasma*, 3g of it should be taken for the preparation of each batch.

C. Fixing the amount of *triphala*

- The quantity of powders added to the sugar base determines the consistency of the candy.
- As the measurement of *kasisa bhasma* was fixed according to its dose, measurement of *triphala* should be the sufficient amount to reach a good consistency.
- Candy was prepared with various amounts of *triphala* as a trial-and-error method.

Table 1: consistency of candy according to the amount of triphala added

Trial no.	Quantity of *triphala* used in preparation	Consistency of candy
1	5 g	Hard
2	10 g	Good
3	15 g	Easily breakable
4	20 g	Easily became powdered
5	12 g	Good

- As 12 g was the maximum amount of *triphala* which gave candies that are not too hard or too fragile, it was fixed as the measurement for candy preparation.

D. Final preparation

- Materials required: palm candy, *kasisabhasma*, *triphalachurna*
- Apparatus: weighing apparatus, vessels, spoon, gas stove, cloth, silicone mould.
- Procedure: 90 g palm candy was added to 110 ml water and heated on a gas stove till the palm candy completely dissolved in it. This syrup was filtered through a cloth into a new vessel. It was again heated till the syrup attained three thread consistencies. Then 3gm *kasisa bhasma* and 15 gm *triphalachurna* was added to this mixture and mixed well until it became a uniform mixture. This mixture was soon transferred into a silicone mould that can mould 24 candies at a time. The mixture was allowed to cool and harden. Then the candies were stored in an airtight container.
- Observations:

- It took 7 minutes for the palm candy to dissolve in water on a medium flame on gas stove. Another 7 minutes was required for the palm candy solution to attain three thread consistencies.
- Prepared candy was of maroon colour.
- It was sweet and astringent in taste with a slight iron flavour.

➢ Precautions:

- A thick cloth should be used for filtering as palm candy may contain sand and other wastes like small twigs.
- *Kasisa bhasma* and *triphala* should be added only at three-thread consistency. If the powders were added before it, the candy will be semisolid. If powders were added after the three-thread consistency, the whole mixture will get granule form.
- As both *kasisa* and palm candy are hydrophilic in nature, candies should be preserved in airtight containers. Otherwise, it will become soft or wet.

➢ Results:

- Total weight of ingredients – 105 g
- Weight of 24 candies obtained in a single batch – 99.5 gm
- Loss – 5.5 g

Figure 1: Palm candy

Figure 2: Kasisabhasma

Figure 3: Triphalachurna

Figure 4: Kasisa-Triphala candy

Discussion

A. Discussion on ingredients

kasisa-triphala candy is a modified form of *khandakalpana*. It is made with palm candy, *kasisabhasma* and *triphala churna*. *Kasisa* is a proven drug for iron deficiency anemia. Various research papers are available on the efficacy of *kasisabhasma* in iron deficiency anemia.

Deepana and *sara* properties of *triphala* will reduce the gastric problems caused by iron compounds. *Amalaki* and *hareethaki churnas* have anti-anemic acivity. These properties make *triphala* a best adjuvant for *kasisa*.

Base of *khandakalpana* and similar preparations are sugar. For preparing candy, palm candy was used instead of sugar as it is a natural product which is available in raw form, without much chemical treatment.

B. Candy preparation

Each candy prepared was equivalent to 125 mg *kasisabhasma* and 0.5 g *triphala churna*. Dose of *kasisabhasma* is ½ *ratti* to 2 *ratti*. So the average dose, 1 *ratti* was selected for candy preparation. Quantity of *triphala* was selected by checking the consistency of the

candy prepared with various measurements of *triphala churna*. 0.6-0.7 g was the maximum amount of powder that can be added to 1 candy. It was found out after preparing candy in various proportions. If the measurement exceeds this, candy will break easily or it will lose its hardness.

Candy preparation was very sensitive to heat applied. Colour, taste and texture of the candy was found varying with the intensity of heat applied. Candy prepared in high flame had blackish maroon colour and its taste was slightly different. It may easily transform into granular form even if we were few seconds late to transfer the syrup-medicine mixture into mould. If we transfer them few seconds early to prevent granulation, the candy will be solid, but flexible as well as sticky.

It is better to prepare Candy in mild heat. Candy prepared in mild fire was maroon in colour. It will let us enough time to notice stepwise changes in *paaka*.

Conclusion

Kasisabhasma was successfully modified into sweet candy form along with its adjuvant *triphala*. For its preparation no adjuvant are required other than a sugar base like palm candy. This dosage form is safe to administer as it contains no chemicals. Addition of palm candy will mask the taste of *triphala* and *kasisa bhasma* to an extent and make it palatable. It is easy to administer as the patients don't have to mix the *anupana* with *bhasma* before consuming it.

Limitations and Recommendations

Candy will taste better if it is made with less than 60 mg *kasisa bhasma* and 250 mg *triphala churna* per candy as the proportion of palm candy will be more in it.

This dosage form is not suitable for people with diabetes.

This candy can be used for clinical study in iron deficiency anemia among children as well as adults.

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Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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