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ORIGINAL RESEARCH ARTICLE -EXPERIMENTAL STUDY OPEN ACCESS

PRELIMINARYPHARMACEUTICO-ANALYTICAL STUDY OF DRONAPUSHPYADI GRANULES

ANAGHA K[1] SWAPNA KUMARY*[2] SUBRAHMANYA PADYANA[3]

ABSTRACT

Background– *Dronapushpi(Leucas cephalotes)* is an herb that has been used in fresh juice form for various disorders like asthma, cough, fever, cold, bleeding disorders, etc .*Tulasi(Ocimum sanctum)* and *Putiha(Mentha piperita)*are also a popularly used drugs in the form of fresh juice for illness such as fever, cold and cough. Conversion of formulation into more suitable form is essential for modern era with additional benefits of palatability and dosage is always essential. In present study an attempt is made to prepare a polyherbal formulation which includes*Dronapushpi* as a main ingredient adding*Tulasi,Putiha, Khanda sharkara & Trikatu [Shunthi (Zingiber officinale), Maricha (Piper nigrum), and Pippali (Piper longum)]* which are mainly having *kaphavatahara* action. Granule preparation known as *khanda*preparation in *Bhaishajya,* which is prepared out of *kwatha.* It is palatable by patients of all age groups & has an easy method of administration. The assimilation of granules starts from oral cavity, which effectively helps in the action against upper respiratory infection. Pharmaceutical standardization of this formulation is not established yet, which is first step towards research on the formulation. Materials &Methods- Granules was prepared as per general method of granule preparation.The attempt is made in the present article to assess its pharmaceutical and analytical aspect while processing the drug *dronapushpyadi* granules. Preliminary analytical study carried out to set the basic quality of formulation. Results – The final yield granules was 1500g and the total duration taken was 2 hour 20 minutes. Further details are explained in full paper.

Keywords: *Dronapushpyadi granules, Tulasi ,Putiha,Khanda sharkara,Trikatu,* Pharmaceutico-analytical study.

[1] IV year BAMS, *[2] Professor and HOD Dept. of shareera rachana, [3]Director, Alva's Traditional Medicine Archive (ATMA) & Research Centre, Alva's Ayurveda Medical College, Moodabidire, Karnataka

Corresponding Email id: dr.sapnakini@gmail.com Access this article online: www.jahm.co.in

INTRODUCTION

Khanda Kalpanas are modified form of *Avaleha* preparations. According to the textbook of *Bhaishajya kalpana vijnana* the root meaning of the term *'khanda'* or '*khandaka*' is a fragment or a piece. Since the '*khanda kalpana'* are in granular form it is called so. After obtaining *avaleha paka it is further boiled to obtain khandapaka, adding the prakshepaka i.e.* one step ahead from *avaleha*,1 to 2 string consistency of *'avaleha paka'* will yield granular *paka* material, which is called as '*Khanda Kalpana'.*

Dronapushpi is an annual plant which has an excellent therapeutic effect on diseases caused during monsoon season. Acts effectively in *Kaphaja*[1] conditions & helps in curing *kasa*[2].It contains chemical constituents such as Laballenic acid, B-sitosteol & its glycoside, olenolic acid etc. these active principles are having anti inflammatory, antimicrobial, antispasmodic property,which in turn is very effective in treating bronchial asthma,cough and cold [3]. It is a weed grown in fields or roadsides. It grows usually during the monsoon season.

***Tulasi* -**The plant with auspicious values, which is available in all houses & having a wide range of medicinal properties. *Tulasi swarasa* is best known for its *Kaphahara*property [4].

Putiha- *Putiha* is widely used due to its distinct aroma. It pacifies *Kapha*, remedy for *Mukharoga [5]*&*anorexia [6]*. It is proved to have antiviral, antifungal& anti inflammatory effect.

Khanda sharkara- Sweet in taste, which makes formulations more palatable.*Khandasharkara* is best known for *Kapha, Shwasahara [7]* property & prevents nausea.

Trikatu *-Shunthi, Maricha & Pippali* together these 3 are called as *Trikatu*. These act as a remedy for *Shwasa, Kasa &Kapha [8]* related disorders.

Due to similarities in the properties such as anti-microbial, anti-oxidant, anti-spasmodic & anti-inflammatory and a wide variety of usage of these drugs in the folklore medicine was observed. Hence these drugs are taken together and modified in the form of granules, have better taste & acting effectively on the cough due to synergistic effects this study was undertaken.

AIMS & OBJECTIVES

1. To prepare *dronapushpyadi* granules
2. To carry out physicochemical analysis of *dronapushpyadi* granules.

MATERIALS & METHODS

Study Design: *Pharmaceutical and Analytical study.*

Pharmaceutical study includes stepwise preparation of *Dronapushpyadi granules*& analytical study includes carrying out physicochemical analysis of the final product.

Raw drug Identification & Collection

The raw materials required for preparation of *Dronpushpyadi* granules like *Dronapushpi*

plant, *Tulasi* leaves &mint leaves were collected from local fields in & around Moodbidire, certified by *Dravyaguna* dept. Ingredients such as *Khanda sharkara* & *Trikatu sukshma churna* were obtained from Alva's Pharmacy.

Ingredients Required are-

Dronapushpi panchanga – whole plant of *Leucas cephalotes*, *Tulasi swarasa* – fresh juice prepared from leaves of *Ocimum sanctum*&*Putiha swarasa*- fresh juice obtained from leaves of *Menthe piperata.*

Pharmaceutical preparation of *Dronapushpyadi* granules

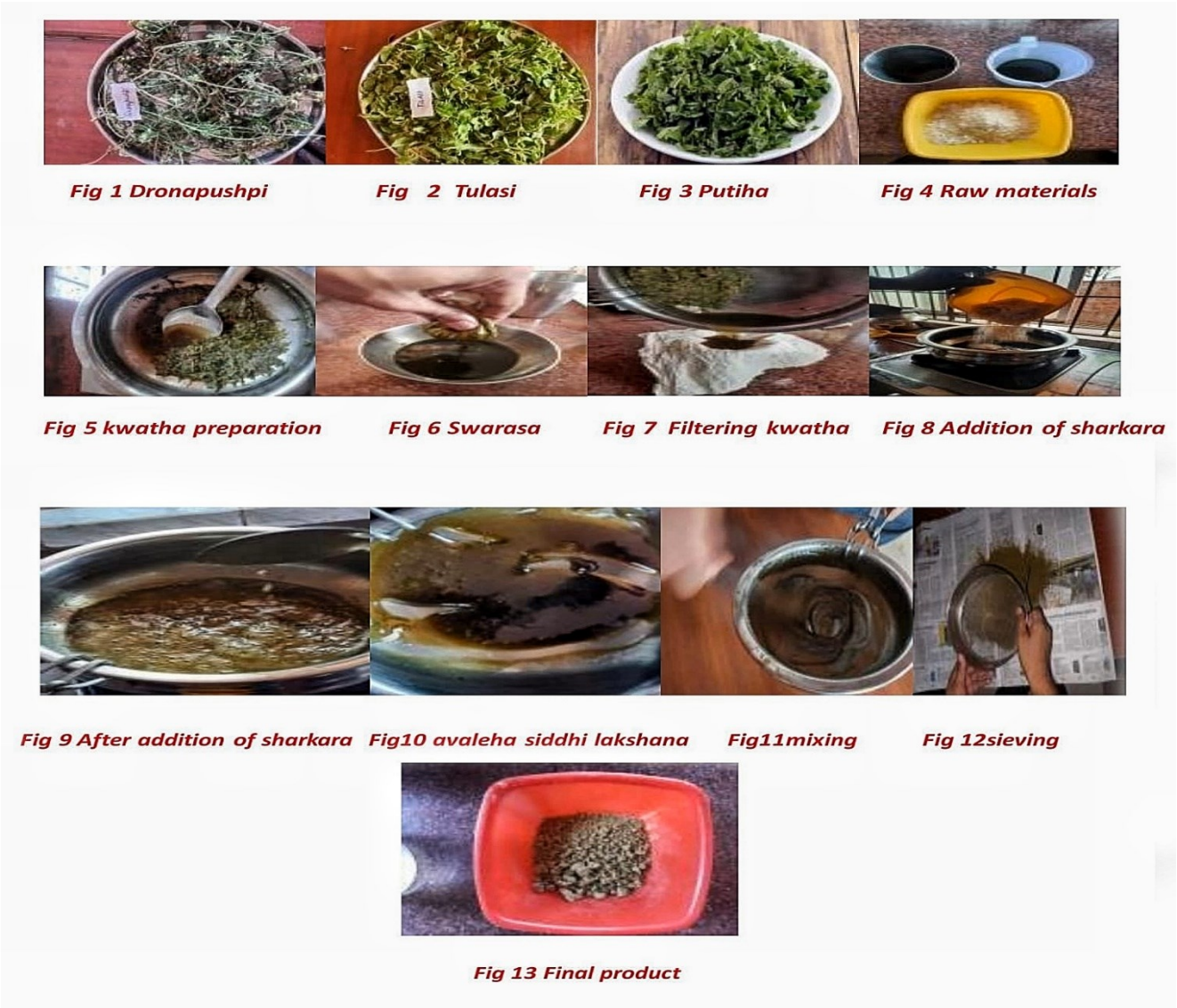

Fig.1-Fig.13- Step 1 to step 13 - Pharmaceutical preparation of *Dronapushpyadi* granules

The preparation of *Dronapushpyadi* granules was done adopting general method of preparation of granules under expert Guidance at *Rasa Shastra* and *Bhaishajya Kalpana* Lab of Alva's Ayurveda Medical College, Moodbidire.

Whole fresh plant of *Dronapushpi[*Fig 1] weighing 70g, fresh leaves of *Tulasi* weighing 500g[Fig 2]& fresh leaves of *Putiha* weighing 250g[Fig 3] were collected & cleaned with running water .Each drugs were pounded separately well in *khalvayantra*[Fig 4].Pounded *Dronapushpi* was added into a vessel containing 16 parts of water i.e. 1120ml& kept for boiling on mild fire(90-100^{o} C) to prepare *kwatha* in classical method[Fig 5]& reduced to1/4 parts i.e.280ml. Leaves of *Tulasi* and *Putiha* was pounded well separately, to obtain *swarasa* of 280mL&140mL respectively [Fig 6].The *Dronapushpi kwatha* is filtered [Fig 7] & further subjected to boiling at moderate fire. To this 280mL of *Tulasi swarasa* & 140mL of *Putiha swarasa* is added & boiled. Added pounded *khanda sharkara* weighing1500g [Fig 8 & 9]&continuous stirring is done till it attains *avaleha siddi lakshana*[Fig 10].After crossing the stage of *avaleha*, the vessel was removed from the fire and stirred continuously. Fine powders of *trikatu* weighing 140g [Fig 11] were added with thorough stirring till homogenous blend. After cooling it is sieved in sieve no. 2 to obtain granules [Fig 12],later kept for drying at room temperature and *Dronapushpyadi* granules was weighed as 1500g [Fig 12]. The dried granules were packed and *stored in an air tight container.*

Observations & Results

After adding *Khanda Sharkara* (sugar) to the decoction, effervescence was observed, which subsided on constant stirring. Gradual thickening of syrup, consistency of *Tantumatwa* (threadlike) and *Darvi pralepa* (adhesion of syrup to spoon), was observed after 1hour of heating. Later after 30min of heating, the syrup was found to be in two-thread consistency with *Apsumajjan* (dipping in water). *Bindu paka* (settled drop of syrup in water) with *Paititastu na Shriyate* (not instant dissolution in water) was observed. The total duration taken for whole preparation was 2 hours 20 minutes.

Table No. 1: Organoleptic parameters of individual drugs

Drug	Taste
Dronapushpi	Pungent
Tulasi	Pungent , Bitter
Putiha	Pungent

Table No. 2: Organoleptic Parameters of Formulation

Tests	Results
Color	Brown
Taste	*Madhura& Katu*

Odor	Characteristic odor
Consistency	Rough

Table No. 3: Analytical Parameters

Parameters	**Results**
Loss on drying on 105°C	**0.275%**
Total ash	**6.20%**
Water soluble extract	**71.6%**
pH	**6.69**
Total solids	**1.2%**

DISCUSSION

Dronapushpi is said to be having antibacterial properties which acts against many bacteria such as Staphylococcus aureus, Escheria coli, Proteus vulgaris &Pseudomonas aeruginosa [9].

In the recent era numerous studies have also proven that *Tulasi* has many functions such as immunomodulator, anticancer, anti-inflammatory, antioxidant, hepatoprotective &antimicrobialaction [10].

The scientific studies have proven the use of *Mentha piperata* for biological effects such as anti-oxidant, anti-microbial, anti-viral & anti-inflammatory action [11].

*Dronapushpyadi granule*is a formulation prepared using *Dronapushpi kwatha.* While preparing it had brownish green color & a characteristic odor. It took 30 minutes to prepare the decoction of 280ml from 70g of *Dronapushpi* plant. Decoction was prepared on mild fire (90-100ºC). Later this decoction was cooled & filtered in a cloth. This was shifted to a wide mouth vessel & further subjected to boiling to which the fresh juice of extracted from *Tulasi&Putiha* was added & boiled in moderate fire. After addition of fresh juices the color turned out to be greener as fresh samples were used. Later after 5-8 minutes of boiling green sediment was observed on the supernatant layer of the decoction which signifies the immense presence of chlorophyll in the fresh juices.

This sediment was cleared to the sides using spatula & it was further subjected to boiling for 10-15 more minutes. These fresh juices are not supposed to be boiled for long time in a high temperature as they contain large amount of volatile constituents.

Khandasharkara was added after 25 minutes of boiling of the decoction. Excessive frothing was observed after adding sugar to decoction which need continuous observation &stirring. As the moisture content reduces in syrup cohesive force increase and further application of heat imparts kinetic movement to sugar molecules,when it was cooled loss of kinetic

movement makes the sugar molecules to coalesce. This explains the reasoning behind thickening & solidifying on cooling.

The mixture is taken out of fire when about to solidify &*trikatu churna* is gradually added little by little & stirred continuously to facilitate homogenous mixing of the drugs.

Even though *Dronapushpi & Tulasi* have excellent therapeutic effects,it cannot be consumed throughout the year due to its enormous availability only during monsoon. As *Dronapushp*i has a characteristic strong odor & taste, it cannot be consumed in the form of *swarasa or kwatha* as mentioned in the classical reference due to palatability issues. Hence it can be preserved in the form of granules which is having better shelf life, convenient in handling, storage, palatability & is easy to administer.

Analytical study shows Loss on drying at 105°C signifies the amount of moisture content present in the formulation. Hence if the moisture content is more it signifies that the medicine is prone to fungal attacks. The value of this formulation is less as it is in the form of granules & hence has a long shelf life.

Total ash value is used to determine the authenticity & purity of the medicine .Higher the value pure the medicine. The given sample found to be having value of total ash as 6.20%.

Water soluble extracts indicate the amount of active constituent present in the given amount of plant material. So the active constituent is easily soluble in medium like saliva which in turn helps in faster absorption from oral cavity itself. This also makes it easily soluble in both milk & water.

pH of *Dronapushpyadi* granules was 6.69 (with 10 % aqueous solution) which is a weak basic i.e. *dronapushpyadi granules* is gastric friendly, does not cause harm to the gastric mucosa and maintains integrity of gastric mucosa.

CONCLUSION

Khandapaka preparations help in fixing the dose, easy for administration, and also increase the shelf life of the formulation. In the present study, *Dronapushpyadi* granules found to have acceptable product features. The analytical data of the formulation provides baseline analytical quality profile for the formulation.

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Conflict of interest – Declared. Financial declared as above.

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