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PRELIMINARY PHARMACEUTICO ANALYTICAL STUDY OF *TRISUGANDHA ARKA*

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ABSTRACT

Introduction: *Trisugandhi* (*Trijataka*) contains three aromatic herbal drugs namely, *Twak* (*Cinnamomum zeylanicum Blume*), *Ela* (*Elettaria cardamomum Maton*) and *Patra* (*Cinnamomum tamala Nees*) which are rich source of volatile oil content. '*Trisugandhi*' is the name mentioned by Acharya Vagbhata for *Trijataka* and the reference of *Trijataka* was first enlisted by him. '*Trisugandha Arka*' is the *Trijataka Arka* mentioned in fourth *shataka* of *Arka Prakasha*, useful in *mukhadourgandha* (halitosis) and *malabhedana*. As no studies have been done on this Arka, an attempt was made in this study to prepare *Trisugandha Arka* and to assess its organoleptic and physico-chemical parameters. **Materials and Methods**: *Trisugandha Arka* prepared by taking 1:4 ratio of drug and water by considering the mrudu nature of the drugs as mentioned in the *Arka Prakasha*. Process was continued till 40% of the distillate was collected to avoid charring of drugs. Organoleptic and physico-chemical parameters were assessed according to the protocol. Procedure was repeated thrice and average value was tabulated. **Observations and Results**: *Trisugandha Arka* is a colourless liquid with characteristic odour and taste. pH, specific gravity, refractive index, total suspended solids, viscosity, volatile oil percentage; these parameters falls within standard limit. **Discussion**: Its physico-chemical analysis shows that *Trisugandha Arka* was highly acidic in nature and other parameters were analyzed further. Organoleptic characters are similar to that of *Arka* standard protocol. **Conclusion:** *Trisugandha Arka* is a colourless liquid with characteristic odour and taste. Physico-chemical parameters tested falls under standard limits.

Keywords *Trijataka Arka, Arka Kalpana, Arka Prakasha*

INTRODUCTION:

Trisugandhi/ *Trijataka* are a group of three herbal drugs; includes *Twak* (*Cinnamomum zeylanicum Blume*), *Ela* (*Elettaria cardamomum Maton*) and *Patra* (*Cinnamomum tamala Nees*) which are aromatic in nature. '*Trijataka'* as a combination is first mentioned by Acharya Vagbhata and also named them as '*Trisugandhi'* [1]. Individually, they possess different characteristics but in combination has *katu* (pungent)-*madhura* (sweet) *rasa*, *ruksha* (dry)-*tikshna* (high potency) *guna*, *ushna* (hot) *virya*, *kapha-vatahara* (alleviates *kapha* and *vata*), *deepana* (digestive), *varnya* (complexion promoter), *vishaghna* (anti- poisonous) properties [2]. *Trijataka Arka* is mentioned in fourth *shataka* of *Arka Prakasha* as '*Trisugandha Arka*' useful in *mukhadourgandha* (halitosis) and *malabhedana* action [3]. Individual descriptions of *Trijataka* are seen in many authenticated books of *Ayurveda* which mentions their habitat, properties, chemical constituents, etc. *Arka* is a unique preparation where through distillation method, essential oils from herbal drugs are extracted [4]. In this study, an attempt

was made to prepare *Trisugandha Arka* and its organoleptic and physico-chemical parameters were performed and analysed.

MATERIALS AND METHODS

Trisugandha Arka was prepared by taking 1:4 (drug: water) ratio by considering the mrudu (soft) nature of the drugs as mentioned in the *Arka Prakasha*.

Ingredients: *Twak* - 50g
Ela - 50g
Patra - 50g

Method of preparation [5]:

Raw drugs were procured from C K Kumaran Memorial (CKKM) Pharmacy, Tripunithura, Kerala. Authentication was done from the same. *Trisugandha Arka* was prepared by considering 1:4 (drug: water) ratio, following w/v method of measurement. Initially the mentioned quantity of coarse powder (by following sieve size of 10/24) of *Twak*, *Ela* and *Patra* were taken in a round bottom flask and soaked with 300ml of water and kept overnight. Next day morning, remaining quantity of water i.e., 300ml was added and the *Arka Yantra* (Distillation apparatus) was set and heating was started. The heat given was 60^0 Celsius initially; once it started boiling the temperature was reduced to 30^0 C and maintained between 30^0- 60^0 Celsius. Initial few drops of *Trisugandha Arka* were discarded as it may not contain therapeutically potent substance and the process of distillation of *Trisugandha Arka* was continued till 40% of the distillate was collected to avoid charring of drugs.

Fig 1: *Twak*

Fig 2: *Ela*

Fig 3: *Patra*

Fig 4: *Twak*- Coarse powder

Fig 5: *Ela*- Coarse powder

Fig 6: *Patra*- Coarse powder

Fig 7: Soaking of drugs

Fig 8: Process of distillation

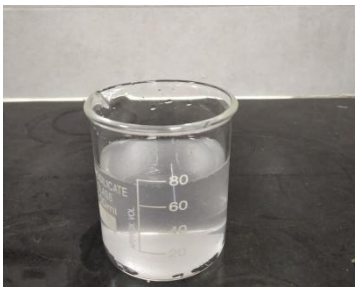

Fig 9: *Trisugandha Arka*

Dose: 12-24ml

Anupana: Water

Indication: *Trisugandha Arka* is indicated in *mukhadourgandha* (halitosis), also does *malabhedana*

Table 1: Properties of drugs of *Trisugandha Arka*

Sl. No	*Dravya*	*Rasa*	*Guna*	*Veerya*	*Vipaka*	*Karma*	*Doshaghnata*
1	*Twak*[6]	*Katu* (pungent), *Tikta* (bitter), *Madhura* (sweet)	*Ruksha* (dry), *Laghu* (light), *Tikshna* (high potency	*Ushna* (hot)	*Katu* (pungent)	*Vishaghna* (anti-poisonous), *Kantashuddhikara* (good for throat), *Ruchya* (improves taste)	*Kaphavatahara* (alleviates *kapha* and *vata*)
2	*Ela*[7]	*Katu* (pungent), *Madhura* (sweet)	*Laghu* (light), *Ruksha* (dry)	*Shita* (cold)	*Katu* (pungent)	*Dipana* (digestive), *Hridya* (cardiotonic)	*Kaphavatahara* (alleviates *kapha* and *vata*)
3	*Patra*[8]	*Katu* (pungent), *Madhura* (sweet)	*Laghu* (light), *Picchila* (slimy), *Tikshna* (high potency	*Ushna* (hot)	*Katu* (pungent)	*Ruchya* (improves taste), *Arshoghna* (useful in piles)	*Kaphavatahara* (alleviates *kapha* and *vata*)

Analytical study [9]**:**

Organoleptic characters and also physico-chemical parameters of *Trisugandha Arka* were assessed and tabulated. Includes color, appearance, odour, taste and also pH, specific gravity, refractive index, total suspended solids, viscosity, volatile oil estimation were done.

Using pH meter with the help of electrodes and buffer solutions; pH value was noted.

By calculating W1 (empty pycnometer), W2 (pycnometer with distilled water) and

W3 (pycnometer with sample) values; Specific gravity was determined.

Using Abbe's refractometer, refractive index was calculated for the sample. On the measurement prism using dropper, sample was put and light focus was adjusted for proper illumination then reading was noted.

30ml of the sample was taken in a dried and pre-weighed china dish for the calculation of total suspended solids. Content was evaporated to dryness on a water bath and dried at 105^0 C for 3 hours in a hot air oven. The dish with residue was kept in desiccators for 30 minutes to cool and it was weighed. Final weight of residue should comply with the requirements stated under the individual monograph.

25ml of sample liquid was poured into the bulb with a pipette. Liquid was released to flow back into the bulbs and time taken to flow from A to B was noted. Then the procedure was repeated for water and time was noted. With the help of pycnometer, density of water and sample was calculated and viscosity was determined. This procedure was performed using Viscometer.

Volatile oil estimation was done using Clevenger's apparatus. Volume of the oil collected on the surface of water in the graduated tube was measured. The volatile oil content expressed as a percentage v/w.

All these procedures were repeated for thrice and average value was calculated and noted.

OBSERVATIONS AND RESULTS

Table 2: Observations on preparation of *Trisugandha Arka*

Sl. No.	Observations	*Trisugandha Arka*
1	Quantity of raw drugs	50g each
2	Quantity of water	600ml
3	Proportion	1:4 (drug: water)
4	Date of preparation	15/12/2020
5	Initial temperature (^{0} Celsius)	60^0
6	Maintenance temperature (^{0} Celsius)	30^0- 60^0
7	Started time of *Arka*	10:15am
8	Time of first drop	10:40am
9	Finished time	12:30pm
10	Total distillate collected	240ml (40%)

Table 3: Organoleptic characters of *Trisugandha Arka*

Sl. No.	Parameters	*Trisugandha Arka*
1	Colour	Colourless liquid
2	Appearance	Volatile contents suspended in *Arka*
3	Odour	Aromatic
4	Taste	*Madhura* (sweet) *pradhana kashaya* (astringent)

Table 4: Physico-chemical parameters of *Trisugandha Arka*

Sl. No.	Parameters	*Trisugandha Arka*
1	pH	2.61
2	Specific gravity	1.0502

3	Refractive index	1.34
4	Total suspended solids	0.1
5	Viscosity	0.0056
6	Volatile oil estimation (%)	0.09%

DISCUSSION

Trisugandha Arka mentioned in *Arka Prakasha* indicated for *mukhadourgandha* and useful in *malabhedana* action. *Arka* obtained is a colorless liquid possess characteristic odour and taste of drugs added. *Trisugandha Arka* was prepared in 1:4 ratio of drug: water; following the mrudu nature of drugs as mentioned in the classics. Soaking of drugs was done to make the drugs soft and for dissociation of the water soluble principles from drug to water [10]. Distillation was carried out in mandagni (low flame) to facilitate the extraction of active principles and allow sufficient time for *toya* and *agni samskara* and for the active principles to get dissociated in the distillate.

pH of *Trisugandha Arka* is 2.61 suggestive of more acidic nature of the *Arka* as the constituents of the drugs being transferred to the water on distillation. Specific gravity is 1 which indicates the preparation is a water distillate; specific gravity is that of water. Refractive index is 1.34, viscosity is 0.0056 and total suspended solids are 0.1 suggestive of negligible solid particles as it is a distillate. *Arka* contains 0.09% of volatile oil as the drugs are rich in volatile oil content.

CONCLUSION

Trisugandha Arka prepared in 1:4 ratio is a colourless liquid with characteristic odour and taste. Physico-chemical parameters tested such as pH, specific gravity, refractive index, total suspended solids, viscosity, volatile oil estimation falls under standard limits. These physico-chemical values can be taken as preliminary standards. The preparation is easy to carry out with mentioned proportion to get a clear liquid *Arka*. No works on this *Arka* have been carried out thus it opens new area for research and practice.

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