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Research Article

PHARMACEUTICAL MODIFICATION OF *SAMASHARKARA CHURNA* INTO SYRUP FORM AND ITS ANALYTICAL STUDY

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ABSTRACT

Samasharkara churna is a classical formulation described in *Bhaishajya Ratnavali* and *Yogaratnakara* for treating various ailments. *Churna Kalpana* is known for its rapid absorption and utility. Although *Churna* has several advantages, it also has limitations such as inconvenient administration, unpleasant taste, and limited stability. In the present era, modifying classical formulations into new dosage forms can enhance palatability, convenience of dose administration, and acceptability. The present study was undertaken to modify the *Samasharkara churna* into syrup form and evaluate it through systematic analytical parameters. All the ingredients were authenticated. The ingredients of *Samasharakara churna* were divided into 2 categories based on water-soluble extractives and volatile active principles to prepare *Drava dravya* according to the traditional method. The *Kwatha* and *Arka* were used as a base for the preparation of *Samasharkara* Syrup. The prepared syrup was subjected to different analytical parameters like organoleptic characters, physicochemical analysis, microbial contamination, phytochemical analysis, HPTLC and shelf-life study. The syrup was palatable with acceptable organoleptic characters. The analytical evaluation like physicochemical, microbial contamination, was within the acceptable limits. The phytochemical analysis showed the presence of different phytoconstituents like alkaloids glycoside etc. The different bands on HPTLC showed matches with the raw material in the formulation. The shelf-life study conducted at 0, 6 and 12 months demonstrated the quality and stability of the final product. The pharmaceutical modification of *Churna* into syrup form offers better palatability, dose administration and acceptability. The physicochemical parameters, microbial contamination analysis etc. comply with the standards.

INTRODUCTION

Ayurveda is a traditional system of medicine offering a holistic approach to health. *Oushadha* is one among the *Trisutras* of Ayurveda, focusing on different formulations used to treat various ailments.[1] *Bhaishajya Kalpana* provides a systematic approach in converting raw material into a suitable dosage form. It consists of *Pachavidha Kashaya Kalpana* that includes *Swarasa, Kalka, Kwathaa, Hima* and *Phanta*.[2] The secondary preparations like *Vati, Khanda, Avaleha, Sharkara, Sneha* etc.

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Churna is considered as the fine powder of completely dried drugs obtained by filtering it through a cloth or a sieve of the required size.[3] The main principle involved in the preparation of *Churna* is pounding which leads to the reduction of particle size, increase bioavailability and produce therapeutic effect potentially. *Samasharkara churna* is the classical formulation described in *Bhaishaijya Ratnavali* and *Yogaratnakara* in treating *Arsha, Kasa, Aruchi* like conditions. It comprises *Shunthi, Pippali, Maricha, Nagakeshara, Tejapatra, Twak, Ela* and *Sita*.[4,5] The quantity of the ingredients in the formulation is such that it increases in the backward direction, that is, *Ela* is one part, and it increases till *Shunthi* that is seven parts. The *Sita* mentioned in the formulation is equal to the total quantity of all the ingredients.

Along with the advantages, the *Churna* also has certain limitation, it is more prone to deterioration when exposed to the external environment, drugs having a bitter taste and an unpleasant odour is difficult to dispense in *Churna* form, especially in the pediatric age group and its dose can be inaccurate due to variations in measurement. So, to overcome these limitations developing and modifying classical formulations into new dosage forms without deviating from the fundamental principle of *Bhaishajya Kalpana* is necessary to improve the palatability, accurate dose administration, acceptability and stability.

Syrups are the liquid dosage form that are sweet, viscous, concentrated aqueous solutions of sucrose in the liquid media containing 66.7% sugar concentration[6]. In Ayurveda, *Sharkara Kalpana* is a liquid preparation where *Kashaya, Arka, Swaras*, etc are processed with *Sharkara* to form a syrup consistency. In the Vedic period and Bruhatrayee's there is, no reference to *Sharkara Kalpana found*. It was first introduced in Ayurvedic Pharmaceutics in the 20th century by Yadavji Trikamji Acharya in the text Dravya Guna Vijnanam.[7] Later, after the 20th century, some more descriptions were obtained in *Siddha Bheshaja Manimala, Rasatantra Sara evam Siddha prayoga sangraha* and *Ayurveda Sarasangraha*.[8,9,10]

In syrup preparation, sugar serves as a prevalent component that impacts sweetness to mask bitter taste, enhances stability by inhibiting microbial growth through its osmotic effect and offers convenient dose administration.

Advantages of Syrup[11]

- It is more palatable due to the sweetness led by the sugar.
- It acts as a valuable vehicle for the administration of bitter, nauseous substances.
- It can be administered to any age group, i.e. from pediatric to geriatric
- Syrups have high osmotic pressure which prevents growth of bacteria, fungi and moulds which are the chief causes of decomposition in the formulation.
- Syrups retards oxidation as it is partly hydrolysed into reducing sugars like dextrose.
- Syrups can be administered easily in the specific dose.

The analytical evaluation is an essential component in the pharmaceutics for ensuring the quality, purity of the formulation. The syrup includes analytical parameters like organoleptic characteristics, pH, viscosity, specific gravity, reducing and non-reducing sugar analysis, phytochemical assay screening, microbial evaluation and HPTLC profiling. Integration of these modern analytical approaches with pharmaceutical study strengthens the scientific assessment of the modified dosage form.

MATERIALS AND METHODOLOGY

Authentication of Drugs

- All the raw materials are procured from authentic sources.
- All the raw drugs were identified and authenticated by the Department of Dravyaguna Vigyan, Gomantak Ayurveda Mahavidyalaya and Research Centre, Shiroda, Goa.
- Pharmaceutical preparation was carried out in the PG Department of Rasashastra and Bhaishajya Kalpana, Gomantak Ayurveda Mahavidyalaya and Research Centre, Shiroda, Goa.

Materials Used

- A stainless-steel vessel of suitable size.
- An electrical weighing machine
- The pulveriser for *Churna* preparation
- A clean cloth for filtering.
- Heating equipment.
- Measuring cylinder
- Amber colour bottle for storage

Ingredients

Table 1: Ingredients of *Samasharkara Churna*

Ingredients	Botanical names	Part used	Ratio
Ela	*Elettaria cardamomum* Maton	Seed	1 Part
Twak	*Cinnamomum zeylanicum* Blume	Bark	2 Parts
Tejapatra	*Cinnamomum tamala* Nees & Eberm	Leaf	3 Parts
Nagakeshara	*Mesua ferrea* Linn	Flower stamen	4 Parts
Maricha	*Piper nigrum* Linn	Fruit	5 Parts
Pippali	*Piper longum* Linn	Fruit	6 Parts
Shunthi	*Zingiber officinale* Roxb.	Rhizome	7 Parts
Sita	-	-	28parts

The ingredients of *Samasharkara churna* were classified into 2 categories:

***Arka* preparation**

Table 2: Ingredients Used for *Arka* Preparation

Ingredient	Botanical name	Part used	Part	Quantity
Ela	*Elettaria cardamomum* Maton	Seed	1 Part	10gm
Twak	*Cinnamomum zeylanicum* Blume	Bark	2 Parts	20gm
Tejapatra	*Cinnamomum tamala* Nees & Eberm	Leaf	3 Parts	30gm
Nagakeshara	*Mesua ferrea* Linn	Flower stamen	4 Parts	40gm
Water	-	-	10 times	1000ml

***Kwatha* preparation**

Table 3: Ingredients of *Kwatha* preparation

Ingredients	Botanical names	Part used	Ratio	Quantity
Maricha	*Piper nigrum* Linn	Fruit	5 Parts	50gm
Pippali	*Piper longum* Linn	Fruit	6 Parts	60gm
Shunthi	*Zingiber officinale* Roxb.	Rhizome	7 Parts	70gm
Water	-	-	8 times	1440ml

Arka and *kwatha* were prepared as per the method mentioned in the classics.

Syrup Preparation

Table 4: Ingredients Used for Syrup Preparation

S. No.	Ingredients	Quantity
1.	*Arka*	600 ml
2.	*Kwatha*	360 ml
3.	*Sita*	641 gms

Method of Preparation

- The *Arka* and *Kwatha* were used as *Drava dravya* in the quantity mentioned in the table 4.
- To the *Drava dravya* 66.7% of *Sita* was added and subjected to mild heat with continuous stirring.[12]
- After complete melting of *Sita*, the filtration was done using a clean cloth.
- After filtering, the mixture was subjected to mild heat with continuous stirring till syrup consistency was obtained.
- The syrup was later kept for self-cooling, after cooling stored in amber-coloured bottles.

Total quantity obtained: 940 ml

Total time taken for preparation

- *Arka* preparation – 2hrs 10 mins
- *Kwatha* preparation – 1 hr 15 mins
- Syrup preparation- 40 mins

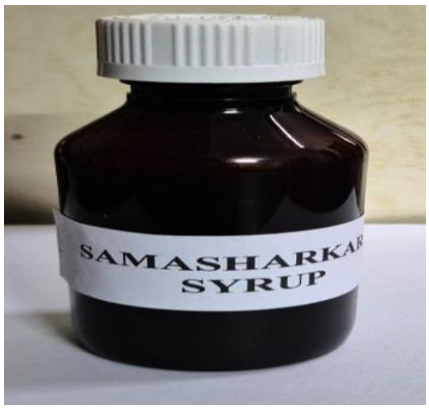
Observations

- The dark brown colour syrup with characteristic odour and taste was obtained.
- The consistency of syrup was noted.

Precautions:

- The mild heat was maintained throughout the preparation.
- The continuous stirring was done to aid dissolution and to avoid caramelisation.
- The syrup was stored in the amber colour bottles to avoid direct contact of sunlight.

Fig 1: Images of the final products



***Samasharkara* Syrup**

Results

Organoleptic Characters

S.No.	Sample	Colour	Odour	Consistency	Taste
1.	*Samasharkara* Syrup	Dark brown	Pleasant	Liquid	Sweet

Physico-Chemical Analysis

***Samasharkara* Syrup**

Analytical parameters	*Samasharkara* Syrup
pH	6.4
Water – Soluble extractive	64.44%
Alcohol soluble extractive	11.95%
Reducing sugar	15.53%
Non–reducing sugar	1.58%
Specific gravity	1.21
Viscosity	715 cps

Phytochemical Analysis

Phytochemicals	Flavones	Alkaloids	Tannins	Glycosides
Samasharkara syrup	14.56%	0.16%	0.20%	32.78%

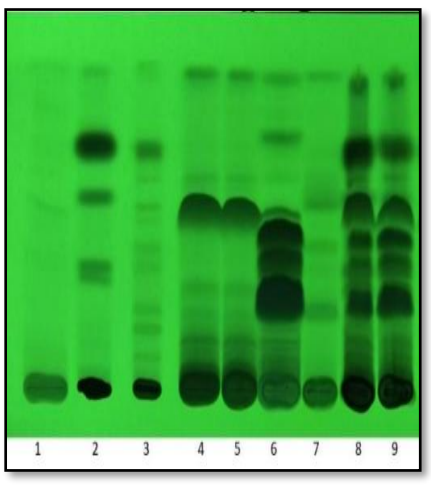
Microbial Contamination Analysis

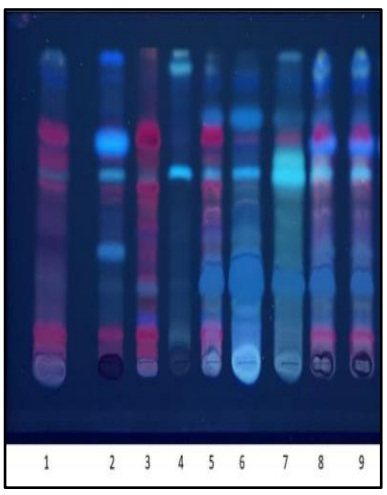
Sample	Total microbial count CFU/gm	Pathogen E. Coli	Salmonella SP	S.Aureus	Pseudomonas Aeruginosa
Samasharkara syrup	214	Absent	Absent	Absent	Absent

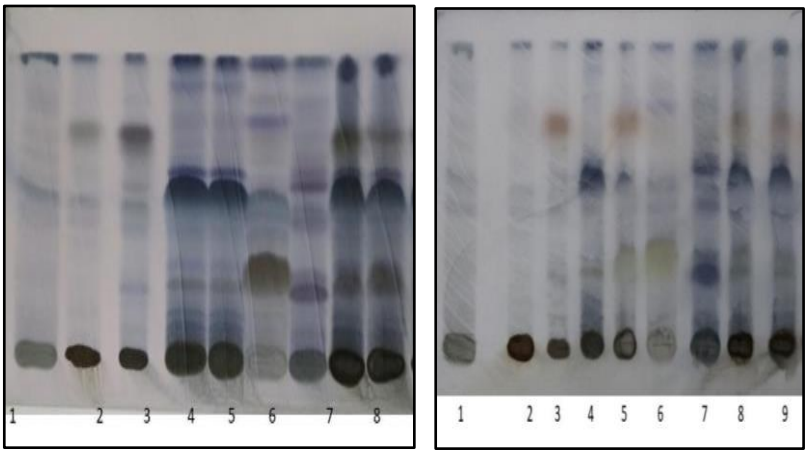
Instrumental analysis: HPTLC

Details of Tracks:

1. *Ela*
2. *Twak*
3. *Tejapatra*
4. *Nagakeshara*
5. *Maricha*
6. *Pippali*
7. *Shunthi*
8. *Samasharkara Churna*
9. *Samasharkara* Syrup





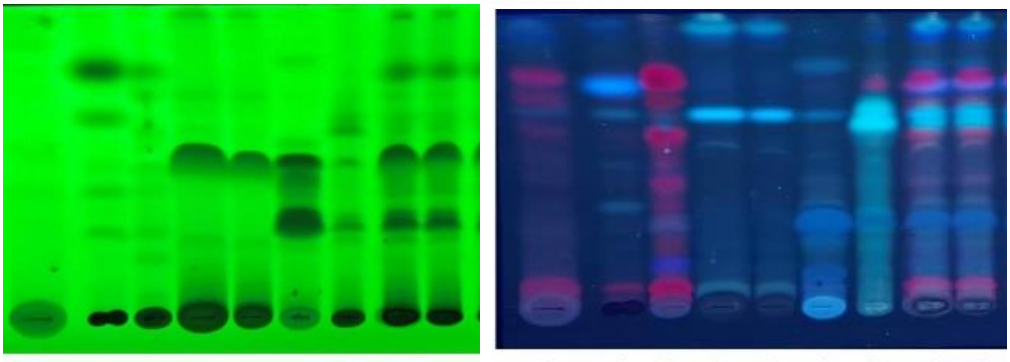


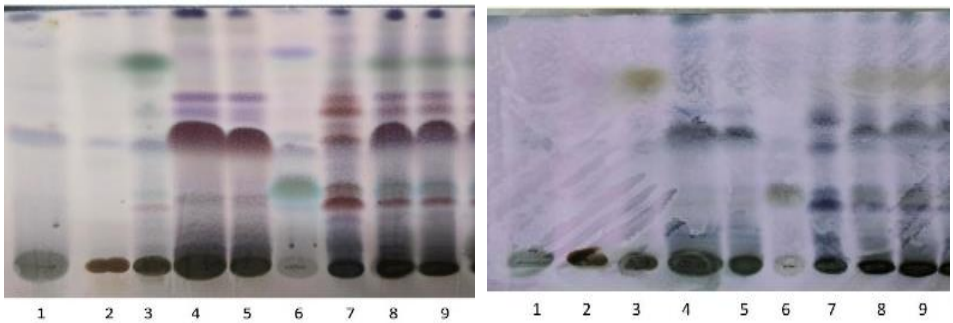
Shelf – life study

Table: Illustrating Results of the Shelf-Life Study of *Samasharkara* Syrup At 0, 6 and 12 Months

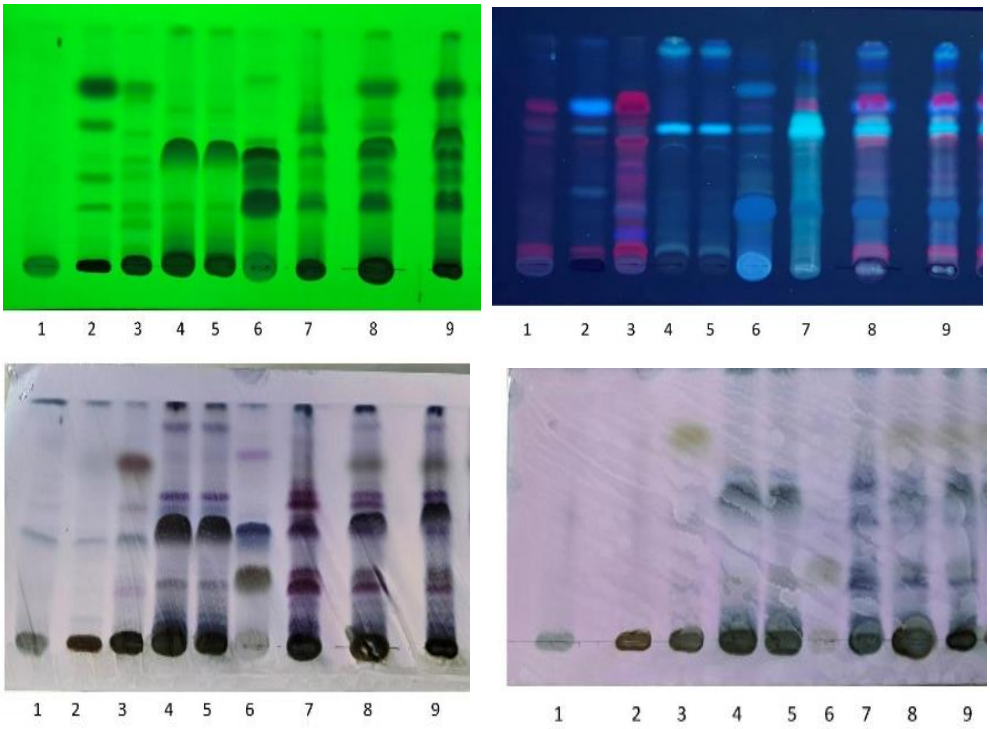
S.No	Analysis	0 month	6 months	12 months
Physico-chemical Analysis				
1	pH	6.4	6.3	6.4
2	Water-soluble extractive	64.44%	65.13%	65.31%
3	Alcohol-soluble extractive	11.95%	12.01%	12.12%
4	Reducing Sugar	15.53%	16.28%	16.66%
5	Non- reducing sugar	1.58%	1.44%	1.53%
6	Specific gravity	1.21	1.25	1.22
7	Viscosity	715 cps	725cps	721cps
Microbial Contamination Analysis				
8	Total microbial count	214 CFU/gm	245 CFU/gm	243 CFU/gm
9	Pathogens: E.Coli, Salmonella, S. Aureus and Pseudomonas	Absent	Absent	Absent

HPTLC Profiling At 6 months





HPTLC profiling at 12 months



DISCUSSION

The present study mainly aims at pharmaceutical modification of *Samasharkara churna* into Syrup form to fulfil the present requirements like:

- Palatability
- Dose accuracy
- Acceptability

Need of preparation of *Drava dravya*

The *Drava dravya* was prepared to ensure the proper extraction, dissolution and uniform distribution of active components. The ingredients of *Samasharkara churna* were classified into two categories for optimum extraction of water-soluble active principles and volatile oils.

The *Arka* was prepared to extract the volatile oils by means of the distillation process. Whereas the *Kwatha* was prepared to extract the aqueous-soluble extractives.

Syrup Preparation

Syrups are widely used liquid dosage forms that offer several advantages. The pharmaceutical preparation of *Samasharkara* syrup was carried out with an objective of converting *Churna* into a convenient liquid dosage form. For syrup preparation the extract that were used in the form of *Kwatha* and *Arka* that facilitate the extraction of water- soluble and volatile oils into the liquid phase separately. The controlled heat during addition and dissolution of *Khand sharkara* avoid the thermal degradation of active components. Proper filtration and mixing ensure the acceptable appearance and homogeneity of the developed syrup form.

Analytical study

The organoleptic characters demonstrated dark brown colour, pleasant odour and sweet taste. The *Samasharkara* syrup shows a pH value of 6.4 which is mildly acidic in nature. The water-soluble extractive value is 64.44% and the alcohol-soluble extractive value of *Samasharkara* syrup is 11.95% this shows that therapeutic plant component are highly soluble in water and suitable for water-based syrup. The reducing and non-reducing sugar values exhibited by the *Samasharkara* syrup is 15.53% and 1.58%, high reducing sugar indicates sweet taste of the syrup. The specific gravity value is 1.21 and the viscosity value is 715 cps this shows that syrup is thick and dense, helping in accurate dosing and stability. All the values obtained are within the acceptable limits.

The phytochemical analysis of *Samasharakara* syrup shows the presence of flavones, alkaloids, tannins and glycosides which are responsible for the efficacy and therapeutic action like antioxidant, anti-inflammatory etc. of the formulations.

The total microbial count in *Samasharakara* syrup was 214 CFU/gm, which was within the normal limit of 1000 CFU/gm. The pathogens like E. Coli, Salmonella SP, S. Aureus and Pseudomonas were absent in all the samples indicating the safety and stability of the formulations.

The Instrumental analysis, HPTLC showed different bands, suggesting the preservation of phytoconstituents in the products. The HPTLC analysis confirmed the identity and consistency of phytochemicals in the formulations.

Shelf-life Study

The *Samasharkara* Syrup was analysed at 0,6 and 12 months. The physico-chemical parameters like pH, viscosity, specific gravity etc., were checked along with microbial contamination and HPTLC. The result of physicochemical analysis and microbial contamination analysis were within the normal and acceptable range. The HPTLC showed the presence of raw material in significant quantity. The minor variations in the readings were noted at 0, 6 and 12 months but are accepted as it can be because of the nature of ingredients and interaction of phytoconstituents.

CONCLUSION

The study, pharmaceutical modification of *Samasharkara churna* into syrup form and its analytical study highlights the integration of traditional pharmaceutical principles with contemporary analytical techniques to develop the new dosage form. The laboratory evaluation of syrup exhibits acceptable organoleptic and physicochemical characteristics, contributing in improving palatability and acceptability. The phytochemical screening and HPTLC screening showed the presence of chemical constituents like glycosides, flavonoids etc. The microbial contamination evaluation ensured the safety of the formulation meeting the specification of the pharmacopoeia, and the shelf-life study ensured the stability of the formulation at 0, 6 and 12 months.

Further, the pre-clinical study, clinical trials and comparative study be conducted to evaluate the therapeutic efficacy of the formulation.

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