

Stability study of *Ashtaguna manda* As Ready-To-Eat (RTE) form – An Ayurveda Based Therapeutic Diet Formulation

Research Article

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Abstract

This article discusses the standardisation of *Ashtaguna manda* as Ready-To-Eat (RTE) form, an Ayurveda-based therapeutic diet formulation used for conditions like *Jwara*, *Ajeerna* and *Agnimandya*. *Ashtaguna manda*, which is noted for its properties such as *deepana* (appetizer), *paachana* (digestive), *basti-shodhana* (cleansing of the urinary bladder), *rakta-varadhana* (blood enhancer), and *ruchikara* (taste enhancer), is known to restore normal digestive functions. *Ashtaguna manda* is subjected for usage in fresh form/ within 24 hours. So, the preparation of *Ashtaguna manda* was subjected to powder form as Ready-To-Eat (RTE) food. The preparation was standardised and analysed for its organoleptic, physical characteristics and physico-chemical properties. In terms of organoleptic characteristics, *Ashtaguna manda* in RTE form exhibited a whitish colour at initial month (0 day), which turned creamish white after three and six months of storage. The odour remained unchanged for up to six months. The pH value, indicating acidity and alkalinity was 6.45 at initial month (0 day), 5.26 at three month, and 5.39 at six month, showing slight acidity. The total solids ranged from 1.534% at initial month (0 day) to 1.746% at three month and 1.850% at six month. Specific gravity was 1.007 at initial month (0 day), 1.012 at three month, and 1.009 at six month. Non-reducing sugars were present, aiding in consistency and preservation, while reducing sugars were absent throughout the six month storage period. Carbohydrates, proteins, and fats were present throughout the six month storage. The sample showed no presence of *E. coli*, *S. aureus*, *P. aeruginosa*, and *S. abony* during the six month storage. The total bacterial count was 03 cfu/gm, 05 cfu/gm, and 07 cfu/gm and the total fungal count was 01 cfu/gm, 03 cfu/gm, and 05 cfu/gm at initial (0 day), three and six months respectively. The established parameters were found to be adequate for standardising *Ashtaguna manda* as RTE therapeutic food made available in sachet form.

Keywords: *Ashtaguna manda*, Physico-chemical, Phytochemical, Organoleptic, Nutritional, Standardisation.

Introduction

Diet plays a crucial role in both treating and preventing diseases. In Ayurveda, diet (ahara) is categorised under *pathya kalpana*, *krutanna varga* and *aharopayogi varga* by various scholars. The World Health Organization (WHO) has recognised the significance of medicinal plants and Ayurveda-based therapeutic diets in public health care, particularly in developing countries. The WHO has developed guidelines to assist member states in creating national policies on traditional medicine and to assess their potential benefits, including aspects of evaluation, safety, and efficacy(1).

Ayurvedic classical texts describe various *pathya-kalpanas* under the *krutanna varga* category, including preparations like *manda*, *peya*, *vilepi*, *yavagu* and *yusha*. In the context of *vyadhi chikitsa* (disease

treatment), there is a focus on *pathya ahara*, which includes different food groups such as *dhaanya* (cereals and pulses), *shaaka* (vegetables) and *masala vyanjana varga* (spices and condiments). The field of therapeutic diet preparation and its standardisation is extensive and complex. For research on nutraceutical standardisation, in-depth knowledge of dietary therapeutic efficacy in disease conditions is essential. This understanding can be achieved by evaluating and analysing therapeutic diets using advanced modern standardisation techniques.

Ashtaguna manda kalpana is a notable *pathya kalpana* that includes ingredients like *shashtika shaali*, *mudga*, *trikatu*, *hing* and *saindhava lavana*. It is named for its eight ingredients and its eight therapeutic benefits, such as *deepana* (appetizer), *paachana* (digestive), *basti-shodhana* (purification of the bladder), *rakta-varadhana* (blood enhancement), *jwarahara* (fever reduction), and *tri-doshaghna* (balancing the *thri-doshas*). This preparation is recommended for conditions like *jwara* (fever), *ajeerna* (indigestion) and *agnimandya* (digestive fire deficiency), where properties like *deepana*, *paachana* and *ruchikara* (enhancing taste) are needed. The current study aimed

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to analyze the Quality Control (QC) of the *Ashtaguna manda* RTE therapeutic food product in powder form. Ready-to-eat (RTE) foods require no cooking and are pre-cleaned, pre-cooked and packaged for immediate consumption. Objective of the study is to develop “*Ashtaguna manda*” as RTE therapeutic food form.

Materials & Methods

Ingredients of *Ashtaguna manda*

1. *Dhaanyaka*
2. *Naagara*
3. *Maricha*
4. *Pippali*
5. *Saindhava lavana*
6. *Mudga*
7. *Raktashaali*
8. *Hingu*

Rasa-panchaka of the ingredients of “*Ashtaguna manda*” (2)

Table 1: Showing Rasa-panchaka of *Ashtaguna manda*

Drugs	Latin name	Family name	Rasa	Guna	Veerya	Vipaka	Dosha karma	Therapeutic actions
<i>Dhanyaka</i>	<i>Coriandrum sativum</i> Linn	Apiaceae	Kashaya, Tikta, Katu	Laghu, Snigdha	Ushna	Madhura	Tri-doshahara	Deepana, Pachana, Mootrala
<i>Nagara</i>	<i>Zingiber officinale</i> Rosc.,	Zingiberaceae	Katu	Ruksha, Teekshna, Guru	Ushna	Madhura	Vata-kaphahara	Agnideepana, Jwarahara, Kasa-Shwasahara
<i>Maricha</i>	<i>Piper nigrum</i> Linn	Piperaceae	Katu	Laghu, Teekshna	Ushna	Katu	Kapha-vatahara	Deepana, Jwaraghna, Arshoghna
<i>Pippali</i>	<i>Piper longum</i> Linn	Piperaceae	Katu	Laghu, Snigdha, Teekshna	Ushna	Katu	Vata-kaphahara	Deepana, Jwaraghna, Rasayana
<i>Saindhava Lavana</i>	<i>Sodium chloride</i>	-	Lavana, Madhura	Laghu, Snigdha, Sookshma	Sheeta	Madhura	Tri-doshahara	Deepana, Pachana, Ruchya, Chakshushya
<i>Mudga</i>	<i>Phaseolus radiates</i> Linn	Leguminosae	Madhura	Laghu, Ruksha	Sheeta	Madhura	Tri-doshahara	Deepana, Brimhana, Shukrala, Jeevaneeya, Chakshushya
<i>Raktashali</i>	<i>Oryza sativa</i> Linn	Poaceae	Madhura, Kashaya	Laghu, Snigdha	Sheeta	Madhura	Tri-doshahara	Deepana, Brimhana, Mootrala, Balya, Jwarahara
<i>Hingu</i>	<i>Ferula foetida</i> Regel	Apiaceae	Tikta, Katu	Laghu, Teekshna, Snigdha	Ushna	Katu	Vata-kaphahara	Pachana, Anulomana, Ruchya

Methodology (3)

Collection and Authentication of ingredients of “*Ashtaguna manda*”

Raktashali was obtained from a well-known grocery store in Belagavi, while other ingredients, such as *mudga*, *trikatu*, *hingu*, and *saindhava lavana*, were sourced from the KLE Ayurveda Pharmacy Unit in Khasbhag, Belagavi. The “*Ashtaguna manda*” was prepared in the FSSAI registered “*Pathyahara unit*” of the hospital section at KLE’s Shri B.M.Kankanawadi Ayurveda Mahavidyalaya, Shahapur, Belagavi, following traditional Ayurvedic methods and standard operating procedures. Authentication and Quality Control (QC) analysis were performed at the Central Research Facility (CRF) of KAHER’s Shri B.M. Kankanawadi Ayurveda College, Belagavi.

Analytical Parameters of “*Ashtaguna manda*” (4, 5, 6, 7)

The analytical parameters of powdered “*Ashtaguna manda*” included its organoleptic characteristics (color, appearance, and consistency), phytochemical properties, nutrient content (carbohydrates, proteins, and fats), and overall nutritional value. Additionally, safety standards and the

stability of the product were evaluated. The Quality Control (QC) analysis of powdered “*Ashtaguna manda*” was conducted at the Central Research Facility (CRF) of KAHER’s Shri B.M. Kankanawadi Ayurveda College, Belagavi.

Method of Preparation of “*Ashtaguna manda* as RTE Food”

Proportion of the Ingredients

Ingredients	Quantity	Metric equivalent
<i>Raktashali</i>	4 pala	192 gm
<i>Mudga</i>	1 pala	48 gm
Other ingredients:		
• <i>Dhanyaka choorna</i>	2 gm	
• <i>Trikatu choorna</i>	2 gm	
• <i>Saindhava lavana</i>	2 gm	
• <i>Shuddhi Hingu</i>	1 gm	

A clean vessel was used for preparing *Ashtaguna manda*. 4 parts of *Raktashali*, 1 part of *Mudga*, along with 2 grams each of *Tri-katu churna*, *Dhanyaka churna*, *Saindhava lavana* and 1 gram of *Hingu* were taken. *Raktashali* and *Mudga* were fried in ghee and

then ground into a fine powder. The powdered contents from the sachets were then added to the boiling water and stirred thoroughly.

Image 1: showing final developed product of Ashtaguna manda as RTE Therapeutic food



Organoleptic Evaluation

Powdered *Ashtaguna manda* was evaluated for its organoleptic characteristics, including *varna* (colour), *gandha* (odour), and *ruchi* (taste), which were analysed and recorded. The authenticity of each ingredient was confirmed by comparing their characteristics with those described in the literature.

Physico-chemical Investigations

Physico-chemical tests were conducted on powdered *Ashtaguna manda* to determine total solids, specific gravity, and pH value.

Phytochemical Investigations

Phytochemical tests were performed to identify various functional groups, including tannins, mucilages, sterols/terpenoids, ascorbic acid, alkaloids, saponins, starch, flavonoids, glycosides, and carbohydrates. (8,9,10,11)

Microbial Overload (12).

A study was conducted to assess bacterial and fungal growth.

Reagents and Chemicals

All reagents and chemicals used in the study were of analytical grade.

Results and Discussion

Analytical study results

The analytical study results for powdered *Ashtaguna manda*, including organoleptic, physico-chemical, phytochemical, nutrient, and microbial evaluations, are listed below.

Table.2: Organoleptic parameters of Ashtaguna manda powder

Test Attributes	Analytical Results		
	0' month	3' month	6' month
Colour	Whitish	Creamish white	Creamish white
Odour	Faint	Faint	Faint
Form	Powder	Powder	Powder

The organoleptic parameters form the basic criteria for selecting a raw drug and also to confirm the finished product.

Table 3: Physico-chemical parameters of Ashtaguna manda powder

Test Attributes	Analytical Results		
	0' month	3' month	6' month
pH value	6.45	5.26	5.39
Specific gravity	1.007	1.012	1.009
Total solid content (%w/w)	1.534%	1.746%	1.850%

Different physico-chemical parameters of *Ashtaguna manda* such as total solids, specific gravity, and pH were evaluated using standard pharmacopoeial methods.

Table 4: Phytochemical parameters of Ashtaguna manda powder

Test Attributes	Analytical Results		
	0' month	3' month	6' month
Tannin	-ve	-ve	-ve
Reducing sugar	-ve	-ve	-ve
Steroids	-ve	-ve	-ve
Pentose sugar	-ve	-ve	-ve
Non-reducing sugar	+ve	+ve	+ve
Hexose sugar	-ve	-ve	-ve
Alkaloids	-ve	-ve	-ve
Saponin Glycosides	-ve	-ve	-ve
Flavonoids	-ve	-ve	-ve
Cardiac Glycosides	-ve	-ve	-ve
Anthraquinone Glycosides	-ve	-ve	-ve

Phytochemical analysis reveals the presence of tannins, mucilage, ascorbic acid, alkaloids, saponins, glycosides, flavonoids and carbohydrates in the formulation.

Table 5: Nutritional Profile of Ashtaguna manda powder

Test Attributes	Analytical Results		
	0' month	3' month	6' month
Carbohydrates	+ve	+ve	+ve
Proteins	+ve	+ve	+ve
Fats	+ve	+ve	+ve

The powdered *Ashtaguna manda* was analyzed for its nutritional and physical properties (Kjeldahl method) were determined according to the method described by AOAC (2002) (13).

Medicinal plant matters normally carry bacteria and moulds often originating in soil in high numbers. In the present formulation, the microbial count was within permissible limits (14,15,16,17), which indicates the proper hygiene norms followed during the preparation of formulation and packing.

Table 6: Effect on Total microbial count and pathogens

Test attributes		Results		
Test for specified Micro-organisms (Qualitative)	Limits (As per API)	0' month	3' month	6' month
E. coli	Absent/100gm	Absent	Absent	Absent
S. aureus	Absent/100gm	Absent	Absent	Absent
P.aeruginosa	Absent/100gm	Absent	Absent	Absent
S. abony	Absent/100gm	Absent	Absent	Absent
Microbial limit test				
Total Bacterial Count	30 – 300 cfu /gm	03 cfu / gm	05 cfu / gm	07 cfu / gm
Total Fungal Count	10 – 100 cfu /gm	01 cfu / gm	03 cfu / gm	05 cfu / gm

Discussion

Ashtaguna manda is a liquid preparation intended for internal use and is part of the therapeutic food preparations described under *pathya-kalpna*. In its powdered form, *Ashtaguna manda* offers additional benefits such as palatability, ease of preparation, instant use with warm water and the presence of nutrients like carbohydrates, proteins, and fats. Organoleptic parameters, which are crucial for selecting raw materials and confirming the finished product, showed desirable features.

Standardising Ayurveda-based therapeutic diet preparations is crucial for assessing the quality of both the food and the drugs used in these preparations, focusing on the concentration of their active principles. Ensuring quality in therapeutic diet preparations involves stringent quality control of the ingredients and adherence to good manufacturing practices. In terms of organoleptic characteristics, *Ashtaguna manda* in powder form exhibited a whitish colour at initial month (0 day), which turned creamish white after third and six months of storage. The odour remained unchanged for up to six months and the sample retained its initial form.

Physico-chemical Analysis

The pH value, indicating acidity and alkalinity was 6.45 at initial month (0 day), 5.26 at third month and 5.39 at six month, showing slight acidity. The total solids ranged from 1.534% at initial month (0 day) to 1.746% at third month and 1.850% at six month. Specific gravity was 1.007 at initial month (0 day), 1.012 at third month, and 1.009 at six month. Non-reducing sugars were present, aiding in consistency and preservation, while reducing sugars were absent throughout the six month storage period. Total alkaloids were not detected in the sample, indicating their absence. Monosaccharides, pentose sugar, hexose sugar, flavonoids, tannins, cardiac glycosides, anthraquinone glycosides, and saponin glycosides were also absent.

Carbohydrates, proteins, and fats were present throughout the six month storage.

Microbial Load Analysis

The sample showed no presence of *E. coli*, *S. aureus*, *P. aeruginosa*, and *S. abony* during the six month storage. The total bacterial count was 03 cfu/gm, 05 cfu/gm, and 07 cfu/gm, and the total fungal count was 01 cfu/gm, 03 cfu/gm, and 05 cfu/gm at initial (0 day), three months & six months respectively.

Stability and Shelf Life

The concept of stability is crucial for Ayurvedic formulations, although specific guidelines are lacking. Despite the Ayurvedic lexicon and a Gazette notification from the Government of India on November 26, 2005, which provided shelf life guidelines, advancements in packaging and storage technology necessitate a revision of these guidelines. The International Conference on Harmonisation (ICH) and World Health Organization provide stability study parameters for pharmaceutical products, with ICH guidelines from Q1 to Q11 being commonly followed. A well-designed stability protocol includes information on batch selection, sample attributes, analytical procedures, acceptance criteria, storage conditions, testing frequency, sampling plan, container closure, and various stability testing methods.

In Ayurvedic texts, the term "*Saviryata avadhi*" refers to the shelf life during which the potency of a drug remains above a certain threshold, beyond which it may partially lose potency but not entirely, provided proper storage conditions are maintained.

Stability data, including selected parameters, form the stability profile, which is the basis for assigning storage conditions and shelf life to pharmaceutical products. The stability program design should be based on the knowledge of the drug substance's behaviour and properties and the dosage form.

The adoption of modern packaging and storage technologies by Ayurvedic industries necessitates reassessment of stability periods based on scientific studies. This study found that *Ashtaguna manda* remained stable under accelerated conditions for up to 6 months, with minimal changes in physicochemical and phytochemical parameters, indicating high stability and shelf life.

Conclusion

Standardisation of Ayurvedic therapeutic diets involves establishing precise criteria and values to ensure quality, efficacy, and safety. This process entails developing technical standards and conducting experiments to define the characteristics of the therapeutic diet formulation. Standardisation serves as a crucial tool in the quality control process. Unlike herbal medicines, which often contain multiple unknown active compounds, foods contain a wide range of known nutrients. Therefore, standardisation of therapeutic diet formulations is essential for ensuring consistency of active principles and therapeutic efficacy while

guaranteeing quality. The Ayurveda classical therapeutic diet formulation, *Ashtaguna manda*, has undergone standardisation using various modern scientific quality parameters. The results obtained from this study can serve as a reference for establishing pharmacopial standards for *Ashtaguna manda*, thus ensuring the medicine's quality. *Ashtaguna manda* RTE therapeutic food, remained stable for six months, showing very favourable results in stability studies. The demand for RTE Therapeutic Food products has increased significantly, especially in modern times where people's spare time and time spent in the kitchen are limited.

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