



Physico-chemical properties of Ash gourd and Amla based soups

Sailaja S¹, Parameshwari S²

¹ Department of Clinical Nutrition and Dietetics, Periyar University, Salem, Tamil Nadu, India

² Associate Professor, Department of Clinical Nutrition and Dietetics, Periyar University, Salem, Tamil Nadu, India

Abstract

Beverages play an important role in the diet. Most of the fruits and vegetables have a wholesome therapeutic effect and they can be consumed as refreshing drinks. With this background an attempt was made to standardize the soup samples using different variations of ash gourd and amla to prepare beverages. The purpose of this study is to analyse the changes for the main physico-chemical characteristics: pH values, colours, acidity and moisture of soup. This research work aims at development of a ready to drink ash gourd and amla based soup. So, the developed ash gourd and amla based soup is nutritionally superior to locally available and sufficient to meet day-to-day nutritional requirements as a supplement.

Keywords: product development, ash gourd soup, value added products

Introduction

Ash gourd (*Benincasa hispida*), a member of the family Cucurbitaceae is one of the familiar crops that are grown primarily for its use as a vegetable and usually recognized for its nutritional and medicinal properties especially in Asian countries. As a rich source of functionally important bioactives and therapeutics such as triterpenes, phenolics, sterols, glycosides and soluble dietary fiber the vegetable has been widely used for therapeutic treatments. (Gupta & Premavalli, 2010^[12]; Sivarajan & Balachandran, 1994^[15]; Aslokar *et al.*, 1992)^[1]. Ash gourd (*Benincasa hispida*), is also one of the locally available vegetable, belongs to the family cucurbitaceae. It is an annual, climbing herb producing large fruits, which are fleshy, succulent and densely hairy when young, but thickly covered with white waxy coating on maturity.

It has several alternate english names viz. wax gourd; white gourd; ash pumpkin; winter melon; chinese water melon; tallow gourd; white pumpkin; gourd melon (Morton *et al.*, 1971). The Sanskrit word for *Benincasa hispida* "Kumbaphala" means "water pot fruit". *Benincasa* appears in mythology rituals and idioms, perhaps due to the life-giving properties sometimes ascribed to "gourds" (Trankell, 1995). In some rituals of Nepal (Majupuria, 1988) and India (Prabhakar, 1995) the fruit may take the place of animal sacrifice. It is grown in Uttar Pradesh, Madhya Pradesh, Maharashtra, Kerala, Karnataka, Andhra Pradesh and Tamil Nadu.

Amla also known as Indian gooseberry (*Emblica officinalis*), belongs to the family of Euphorbiaceae and is native to India, Sri-Lanka, Malaysia, Thailand and China (Bhattacharjee *et al.*, 2013). Amla is an underutilised fruit because its contribution towards the fruit production sector and the overall economy is small (Pathak, 2003)^[11]. Amla is known for its medicinal and therapeutic properties from ancient time in India and is considered as a wonder fruit for health conscious population.

Amla tree grows in the mixed-deciduous dry forests of India, from northwest Himalayas (Jammu and Kashmir, Himachal Pradesh and Uttaranchal) to eastern Himalayas in Assam, Meghalaya, Manipur and Tripura.

According to an estimate, the area under amla in India is 49,620 ha (Singh, 2003)^[14]. Production of amla in India is 250,000 tons most of which is processed (Nagarajan, 2005)^[7]. Karnataka is the fourth largest producer of amla in India (Pathak, 2003)^[11]. About 500 Tonnes of amla is being exported under the category of ayurvedic and unani herbs (Pathak *et al.*, 2003)^[11].

Objectives

- To standardize the procedure for preparing soup from the selected samples.
- To develop the ash gourd and amla based soup by using different variations.
- To assess the physio-chemical properties of the formulated soups.

Review of Literature

Ash gourd (*Benincasa hispida*) and mint leaves (*Menta spicata*) soups were blended (75:25) to obtain beverages that have functional properties as well as nutritional value. The physico-chemical, microbiological stability and sensory characteristics of the ash gourd – mint leaves blended soups in glass bottle were evaluated during 6 months at room temperature (28± 2°C). The result revealed that the blended juice was acceptable for 6 months and was microbiologically safe (Majumdar *et al.*, 2010)^[6].

Kapaleshwar, 2010 studied the therapeutic values of ash gourd (*Benincasa hispida*) by developing ash gourd Ready-To-Serve (RTS) beverage with salt and pepper. RTS beverage was bottled, refrigerated (5±2°C), and studied for changes in the quality and stability beyond two hours at ambient temperature (28±2°C) during storage of three months. The stored RTS

beverage was organoleptically acceptable and microbiologically safe up to 60 days. As storage period continued, RTS beverage turned sour with decline in sensory scores. The TSS, acidity and reducing sugars increased, while ascorbic acid and total sugars decreased at the end of storage. They concluded that, availability and utility of the ash gourd fruit can be enhanced by standardization and characterization of value added RTS beverages which can be effectively stored at refrigerated conditions.

Amla has played an important therapeutic role since time immemorial and is frequently recommended for its synergistic effects in both the ayurvedic and unani systems of medicine (Jain *et al.*, 1983) [4]. Being a very rich source of vitamin C and other nutrients like polyphenols, pectin, iron, calcium and phosphorous (Nath *et al.*, 1992 [8] and Khopde *et al.*, 2001), the fruit is a potent antioxidant, hypolipidemic, antibacterial, antiviral and antacid. However like other tropical fruit amla has a short shelf life as fruit is sensitive to bruises, browning, desiccation and various post-harvest diseases. Moreover the fresh amla fruit is highly acidic and astringent, it is not popular as table fruit. Amla has a great potential in processed forms (Tripathi *et al.*, 1988) [17].

Moisture content of the fresh amla fruit (85.6%) decreases on processing (Nayak *et al.*, 2012) [9]. High temperature processing reported a greater decrease in the moisture content of the final product particularly in the development of powders (3.24%) (Thankitsunthorn *et al.*, 2009; Mishra *et al.*, 2013) [16, 11], amla supari and mouth freshner (9.1 per cent) (Barwal *et al.*, 2010) [2]. Processing techniques like osmotic dehydration decreased the moisture content of the fruit to

3. Standardization of soups in different variations

Table 1: Standardization of Soups in Different Variations

Variations	Ash gourd juice (ml)	Amla juice (%)	Ginger juice (%)	Onion (%)	Potato (%)	Tomato (%)	Corn starch (%)	Water (ml)
Ash gourd soup(Standard)	100	-	-	-	-	5	10	150
Ash gourd soup (Sample1)	300	20	2	30	30	15	10	150
Ash gourd soup (Sample2)	400	20	2	40	40	20	10	150

4. Physico-chemical components

Final products were analysed for physico-chemical components such as pH, colour, titrable acidity, moisture as indicated below.

Estimation of colour

The colour of the reconstituted juice and soup samples was also compared with Horticultural colour chart (The British colour council in collaboration with the Royal Horticultural Society Acc. No: 6942)

Estimation of pH

pH of the samples was measured using digital pH meter.

Estimation of Titrable acidity (AOAC, 1980)

10g of samples were boiled in distilled water (50ml) for 10 min in hot water bath. Cooled and make up the volume into 100ml and filtered. A suitable aliquot of the filtrate was titrated against the standard 0.1 N NaOH solution using

27.78 per cent in amla segments (Panwar *et al.*, 2013) [10] and 68.56 per cent in amla preserve (Priya and Khatkar, 2012) [13].

Methodology

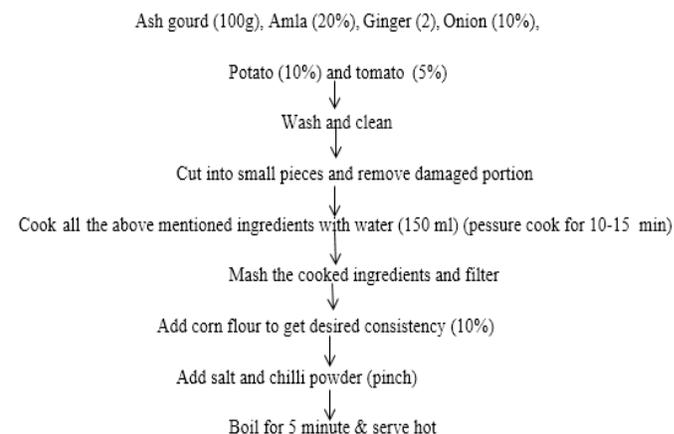
1. Procurement of Raw Materials

The Raw Materials were procured from the local market namely Ash gourd, amla, potato, ginger, tomato, pepper, corn starch and other spices.

$$\text{Moisture per cent} = \frac{(W_1 - W_2) \times 100}{W_1 - W}$$

2. Preparation of Ash gourd and Amla blended soup

Ash gourd (100g), Amla (20%), Ginger (2), Onion (10%),



phenolphthalein as an indicator. Results were expressed as acidity as anhydrous citric acid

$$\text{Acidity as Anhydrous Citric acid} = \frac{\text{title value} \times \text{N of alkali} \times 70 \times \text{volume make up}}{\text{filtration taken for titration(ml)} \times \text{wt. of sample} \times 1000} \times 100$$

Estimation of Moisture

Moisture was determined by taking about 10g of sample in petri dish and dried in an oven at 600C till the weight of the petri dish with its content was constant. Each time before weighing, the petri dish was cooled in desiccators. Moisture content of the sample was expressed in g/100g of sample.

Results and Discussion

The optimization of ash gourd and amla based soup depends on the concentration of various ingredients and process sing conditions. The results of optimization of Ash gourd soup sample 1 and Ash gourd soup sample 2 in terms of its physico

chemical properties are discussed in this section.

1. Physico Chemical Properties of Ash Gourd and Amla Based Soups

The physio-chemical properties of soup products were evaluated. The parameters such as Moisture, Acidity and pH were studied, and the results were presented in table -2

Table 2: Physico Chemical Properties of Ash Gourd and Amla Based Soups

Parameters	Standard soup	variation-1 100 (ml)	variation-2 100 (ml)
Moisture (g)	91.34	95.09	93.95
Acidity (g)	0.43	0.65	0.76
pH	4.30	4.95	4.64

The standard ash gourd soup results that 100ml contain 91.34 g of moisture, 0.43g of acidity and 4.30 g of pH. In Variation-1, 100ml of ash gourd and amla based soup contains 95.09g of moisture, 0.65g of acidity and 4.95g of pH. In Variation-2, 100ml of ash gourd and amla based soup contains 93.95g of moisture, 0.76g of acidity and 4.64g of pH. Compared with standard soup, Variation-1 showed good results.

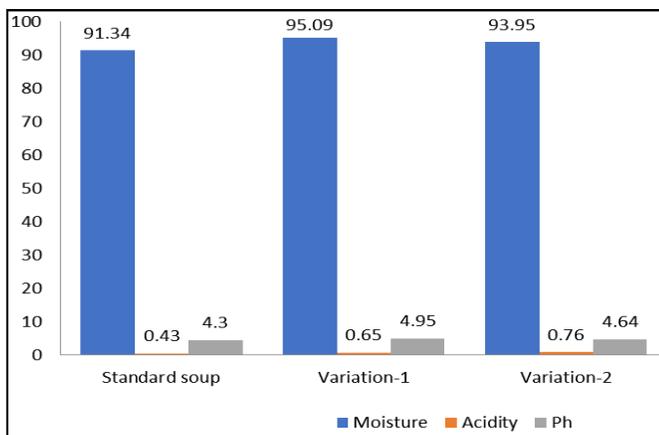


Fig 1: Comparison of Physico-Chemical Properties of Value Added Soups with Standard Soup

The physico chemical properties of different variations of soups compared with standard soup showed that the moisture content was highly present in Variation-1, acidity was highly presented in Variation-1 soup and the pH value was little high in Variation-2 soup.

2. Statistical Analysis for Physico- Chemical Properties of Ash Gourd and Amla Based Soups

It is used as a test statistic in testing the hypothesis that provides a set of theoretical frequencies with which observed frequency (or) compared in soups.

Table 3: statistical analysis of formulated soups

Parameters	Soup -1	Soup -2	Total	χ^2
Moisture	95.09	93.95	189.04	0.2505*
Acidity	0.65	0.76	1.41	
pH	4.95	4.64	9.59	
Total	100.69	99.35	200.04	

Significant at 0.5% * level.

The above table explained that the physical properties of soup were significant at 0.5% level. Hence the null hypothesis was rejected, and the research hypothesis was accepted.

Conclusion

The study concluded that the present study can be serve as a successful dietetic drink with or without addition of salt and sugar to the all group of peoples and suitable for those who are having obesity, diabetes, cardiovascular problems and general health problems. This product can also be recommended to maintain electrolyte balance and as a refreshing drink. Therefore, steps should be taken to make sure that ash guard and amla based soups are included in the daily diets. The physico chemical information of ash gourd and amla based soups especially in Variation-1 (moisture, acidity and pH) highlighting that it could be a good source of nutrients.

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