



Physico-chemical properties of Ash gourd and Amla based juices

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Abstract

The consumption of beverages and ready to drink products has emphasized the need to enhance the research and development of beverages industry. The purpose of this study is to analyse the changes for the main physico-chemical characteristics like pH values, colours, acidity and moisture of juices. This research work aims at development of a ready to drink ash gourd and amla based juice thereby replacing the existing vegetable juices. From a detailed research on the Ash gourd and amla based products available in the market, this new product has been developed. In this research, the Response Surface Methodology (RSM) is applied to optimize the composition and process conditions of the juices. Based on the results, it was inferred that the juices prepared from the ash gourd with amla could be useful in providing health benefits to the consumers.

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

Introduction

Blending of fruit and vegetable juices is a recognized process in fruit and vegetable technology for improving the beverage qualities such as to impart body to the blend and to render it more attractive besides to regulate the brix to acid ratio to accepted level (Mathur Krishna (2003) [5]. Ash gourd is traditionally grown in India, Japan and South-East Asia, even though it's native is China. It is generally cultivated for its nourishing and medicinal qualities. "Raja Nighantu" one of the ancient Indian book on therapeutics, provides a long list of medicinal virtues of this herb. In India the fruit, leaf and seed is declared to be laxative, diuretic, tonic, aphrodisiac, antiperiodic, antidiarrheal, specific for haemoptysis and other haemorrhages from internal organs. The fruit juice is administered (with or without liquorice) in cases of insanity, epilepsy and other nervous disorders and valued as an antidote for mercurial and alcoholic poisoning. The raw flesh is said to relieve prickly heat, cure facial eruptions, skin softening agent, anti-wrinkle agent and an ash made from the fruit is applied to painful wounds (Morton *et al.*, 1971(b) [6]. The whitish bloom of the Ash gourd covers only the fully matured fruit and it enhances the keeping quality of the fruit. It has been used as a food and medicine for thousands of years in the orient. Besides this, it is used in traditional oriental medicine for treatment for various ailments such as gastro intestinal, respiratory, heart problems, vermin fuge, diabetes mellitus and urinary diseases. (Mathad *et al.*, 2005) [4].

In spite of numerous health benefits, the consumption of the fresh amla fruit remains low. Amla is highly acidic and astringent in taste due to which they are unpalatable and unsuitable for direct consumption. The excellent nutritive value and therapeutic value of the amla fruit offers an untapped potential for processing into several quality products. Hence, they are consumed mainly in the processed forms (Gudapaty *et al.*, 2010) [3]. Amla fruit is processed into

murabbas, candy, dried chips, jelly, squash and syrup (Barwal *et al.*, 2010) [1]. To make amla a fruit of mass, products need to be developed which are attractive, tasty and which can be consumed as food items, but at the same time retain its nutritive and therapeutic values (Pathak, 2003) [7]. Among various amla food products, murabba (whole fruit preserve) is very popular.

Objectives

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

Review of Literature

Ash gourd is bland in taste and pale in colour, hence it is not consumed widely for the table purpose. The excellent nutritive and therapeutic value of this fruit offers a great potential for processing of Ash gourd fruits into quality products. To overcome degenerative diseases like diabetes mellitus, obesity, coronary heart problem and other general health problems we must consume higher proportions of fruits and vegetables. Gopalan *et al.*, (2007) [2] reported that, Ash gourd has a high moisture content of (96.5 %), less fat (0.1 g) content and yielded less energy (10 k.cal), 30 mg of calcium and niacin content of 0.4 mg/100g of fruits. Singh *et al.*, (1987) [8] compared the physico-chemical constituents of amla fruits of different varieties like Banaras, Chakaiya, Deshi and Harpharori (Star gooseberry). They reported that Banaras showed high fruit weight (38.25 g) starch (1.54 %), vitamin C (636.8mg/100g) and per cent edible portion (91.92). while 'Harpharori' and 'Deshi' varieties showed higher amount of acidity and total soluble solids respectively.

Methodology

The processing steps for the formulation and processing of ash gourd and amla based juices are discussed here. Process flow chart are provided in below.

1. Preparation of Ash Gourd and Amla Blended Juice

Take required quantity of juices from the extraction of Ash gourd (100ml), Amla (20%) and ginger (5%)

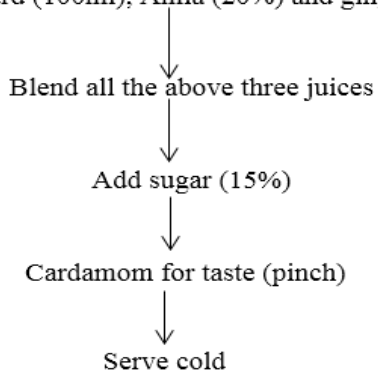


Table 1: Standardization of Juices

Variations	Ash gourd juice (ml)	Amla juice (%)	Ginger juice (%)	Sugar (%)	Water (ml)	Juice Yield (ml)
AGJ	100	-	-	15	20	135
AGJ1	300	40	5	45	60	450
AGJ2	400	50	5	60	80	600

2. Physico –Chemical Components

Final products were analysed for physico-chemical constituents such as PH, colour, acidity and moisture as indicated below.

Estimation of colour

The colour of the reconstituted juice 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 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 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.

Result and Discussion

The optimization of ash gourd and amla based juice depends on the concentration of various ingredients and processing conditions. The results of optimization of AGJ1 and AGJ2 in terms of its physico chemical properties are discussed in this section.

2. Physico Chemical Properties of Ash Gourd and Amla Based Juices

The physico-chemical properties of juice product were evaluated. The parameters such as Moisture, Acidity and pH were studied, and the results were presented in table -2

Table 1

Parameters	Standard juice	variation-1100 (ml)	variation-2 100 (ml)
Moisture (g)	87	91.09	90.71
Acidity (g)	0.35	0.45	0.48
pH	4.42	4.63	4.75

The standard ash gourd juice results that 100ml contain 87g of moisture,0.35g of acidity and 4.42g of pH.

In Variation-1, 100ml of ash gourd and amla based juice contains 91.09g of moisture, 0.45g of acidity and 4.63g of pH. In Variation-2, 100ml of ash gourd and amla based juice contains 90.71g of moisture, 0.48g of acidity and 4.75g of pH. Compared with standard juice, Variation-2 showed good results.

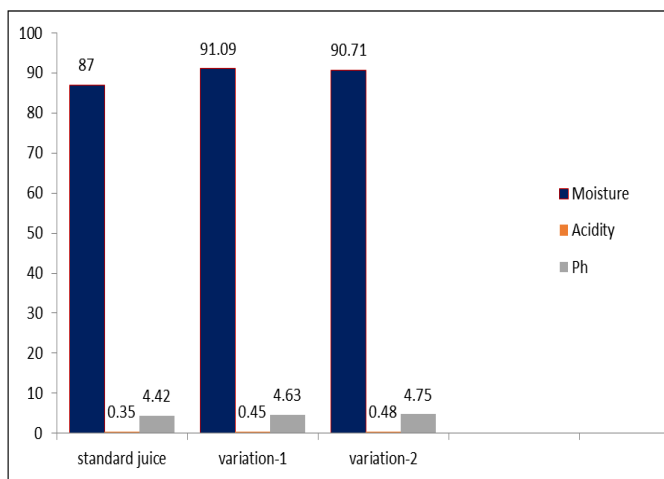


Fig 1: Comparison of Physico-Chemical Properties of Value Added Juices with Standard Juice

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

3. Statistical Analysis for Physico- Chemical Properties of Ash Gourd and Amla Based Juices

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 juices.

Table 3: Statistical Analysis of Formulated Juices

Parameters	Variation -1	Variation-2	Total	χ^2
Moisture	91.09	90.21	181.1	1.01*
Acidity	0.25	0.28	0.53	
Ph	4.20	4.35	4.55	
Total	95.54	95.34	190.2	

Significant at 0.5% * level.

The above table explained that the statistical analysis of physical properties of ash gourd and amla based juices was 0.5% level of significance. Hence the null hypothesis was rejected, and the research hypothesis was accepted

Conclusion

This work has shown that the locally available vegetable juices contain safe level of physico-chemical elements for human consumption. Each juice provides a different range of physico-chemical components that are desirable in a diet. The physico chemical information of ash gourd and amla based juices especially in Variation-2 (moisture, acidity and antioxidant) highlighting that it could be a good source of nutrients.

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