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Nutritional scrutiny of Pulp and Juice of *Phyllanthus emblica*

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ABSTRACT

Medicinal plants are the gift of natures to human beings to uphold a healthy life. Some medicinal plants consider as important source of nutrition and important source for active ingredients in food substances. *Phyllanthus emblica* is widely used in traditional medicine for treatment of various diseases. The fruit of *P. emblica* is known as a rich source of vitamin C and also contains a mixture of phenolic compounds. The present study was designed to study the nutritive and antioxidant activity of different contents of *P. emblica*. Analysis of carbohydrates, fibre, fat, protein, vitamins and phenols were studied by using standard protocols. Results showed the presence of higher amount of nutritionals (vitamins, phenols, antioxidants, protein, carbohydrates and mineral content) in pulp as well as in juice. Hence *P. emblica* fruits and its juice can be used to enhance the certain biological, chemical activities and phytochemical properties.

Keywords: Proximate nutrients, *Phyllanthus emblica,* antioxidants, phenols, calorific value.

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INTRODUCTION

India is endowed with a wide variety of plants, both wild growing and domesticated, which contribute to the diet of its people. Depending upon certain factors like availability, socio economic condition, tradition, taste, and culture, some of these fruits are regularly consumed; others are taken rarely [1]. *Phyllanthus emblica* commonly known as gooseberry or aamla is one of the most important traditional and underutilized fruits of Indian origin, having immense potential for cultivation on marginal or waste lands. It belongs to the family of phyllantaceae family. It has undergone preliminary research demonstrating in vitro antiviral, antimicrobial[2] and anticancer activity [3]. It is an oxidant with free radical scavenging properties due to the presence of high level of superoxide dismutase [4]. The fruit of Indian Gooseberry (*Emblic myrobalam*) (*Phylanthus emblica* S. Nelli) is acidic, bitter tasting and rich in vitamin C. The fruit possess pronounced expectorant antiviral, antibacterial, antioxidative activities. The known antioxidants, gallic acid, catechol, ellagic acid, phloroglucinol, pyrogallol, trigalloylglucose, indol acetic acid (IAA), vitamin C, ß-carotene, superoxide dismutase enzyme have been reported to be present in the fruit [5]. The fruit extracts of *P. emblica* also possess radioprotective effect against gamma irradiation and *in vivo* heptatoprotective activities against CCl4[6], paracetamol, ethanol[7] and antituberculosis drugs [8, 9]

Nutrition is the selection and preparation of foods. By practicing a healthy diet, many of the known health issues can be avoided. A poor diet may have an injurious impact on health, causing deficiency diseases like diabetes, obesity, osteoporosis etc. Hence this study has been made to evaluate the nutritional and antioxidant activity of *Phyllanthus emblica* fruits.

MATERIALS AND METHODS

Sample collection

The fruits of *Phyllanthus emblica* (fruit) were collected in Coimbatore, Tamilnadu (India) and used for this study.

Sample preparation

Fruit were manually washed in water and then cut into pieces with a knife. Seeds were removed with a squeezer and washed with water. Amla juice is obtained by squeezing or mixer. The suspended matter was removed from juice by using masline cloth. The fruit juice, seed and pulp weights were determined.

Biochemical Analysis

The estimation of vitamin C was done by the method of AOAC method [10] The amount of total

phenolic compounds was determined with Folin & Ciocalteu's reagent according to method described by Slinkard and Singleton, 1977[11]. Analysis of crude fat was carried out using petroleum ether (bp. 40–60°C) in a Soxhlet apparatus. Determination of crude protein (% N x 6.25) was performed by the micro-Kjeldahl method. Ash contents were estimated by heating the samples at 550°C and crude fiber by digestion with acid and alkali using fiber plus system. Carbohydrate analysis was done by phenol sulphuric acid method[12]. FRAP assay was performed according to the methods of Benzie and Strain [13].

Statistical Analysis

The values were expressed as Mean ± SD.

RESULTS AND DISCUSSION

The demand for the natural bio products without chemical is rising nowadays. These demand areas in the case of medicines and medicinal products. Amla (*Phyllanthus emblica*) is not popular as a desert fruit [14]. However, its high vitamin C, tannin and mineral contents and medicinal properties offer tremendous scope for processing into various juice based beverages such as syrups, squashes, nectar and ready-to-serve drink. It can also be used as an ingredient in many products such as ice creams, fruit syrups, jellies and fruit juice's beverages [15]. In this paper we have done the proximate analysis, some physico-biochemical properties and antioxidant activity of different contents of amla fruit. Table 1 showed the contents of amla fruits. 100g fruit contains 18-21 ml of juice, 70-72 g of pulp and 6-7g of seed respectively. The nutritional value of fruit pulp of *Phyllanthus emblica* has represented in Table 2. It reveals that the amla pulp is a good source of nutrients. The same results were reported in earlier studies of Sumalatha, 2013[4] and Singh *et al.*, 2011 [16].

Table 1 Contents of Amla fruit

Amla fruit	
Juice	18-21 ml/100g
Pulp	70-72 g/100g
Seed weight	6-7 g/100g

Table. 2 Nutritional investigations of *Phyllanthus emblica* fruit pulp

Nutrients	**Pulp**
Protein (%)	0.58 ± 0.08
Fat (%)	0.12 ± 0.05
Carbohydrate (%)	13.70 ± 1.1
Fibre(%)	3.30 ± 0.8
Ash (%)	0.5% ± 0.6
Calorific value (k Calories/100g)	58.20

Physico-biochemical properties of *Phyllanthus emblica* fruit juice is given in Table 3. The sample showed crude protein (0.25%), carbohydrate (15.63%), Acidity (5.60%), Calcium (117.01 mg/100g), Iron (2.4 mg/100g), pH (3.14) and TSS (9.20° brix) respectively.

An earlier study (17) revealed that the fresh fruit of the plant had 81.2% moisture, 0.5% protein, 0.1% fat, 0.7% ash, 3.4% fiber and 14.1% carbohydrate. The ascorbic acid, TSS and total phenols in juice for different verities were studies by Mishra *et al.*, 2009 [18] and which was found to be 463.0 ± 6.83 (g/100 g), 9.3 ± 0.23 (^{0}Brix) and 174.0 ± 4.7 (mg/100 gm) respectively.

Table 4 showed the biochemical exploration of amla fruit pulp which represents that the amla is good source of vitamin like C and A. Figure 1 and 2 showed the phenolic content and antioxidant activity of amla fruit pulp and juice. In both the analysis, the amla fruit pulp showed very good phenolic as well as antioxidant activity when compared with juice. Jain *et al.*, 2000 [19]reported that the amla is rich in polyphenols, minerals and is regarded as one of the richest source of vitamin C (200-900 mg per 100 g of edible portion).

Table. 3 Physico-biochemical and antioxidant properties of *Phyllanthus emblica* fruit juice

Parameters	Amla juice
pH	3.14 ± 0.15
Acidity (%)	5.60 ± 0.26
TSS (°brix)	9.20 ± 0. 60
Carbohydrate (%)	15.63 ± 1.2
Protein (%)	0.25 ± 0.08
Calorific value (k Calories/100g)	63.52 ± 0.4
Calcium (mg/100g)	117.01 ± 1.1
Iron (mg/100g)	2.4± 0.13

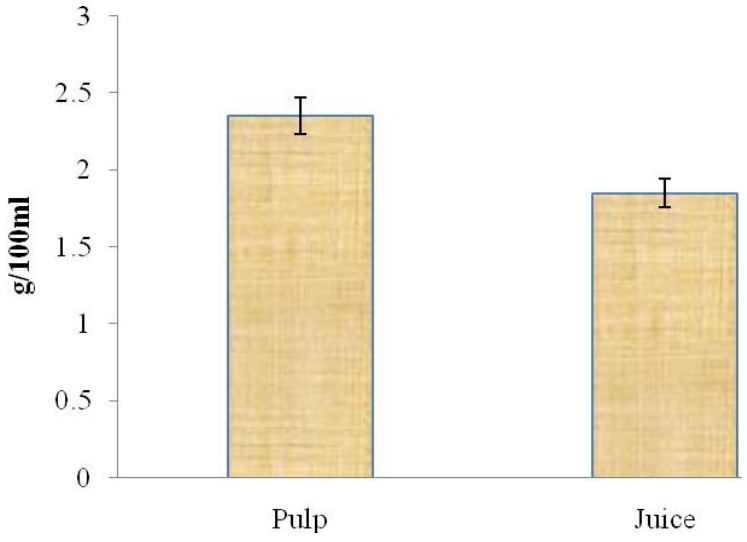

Figure 1 Analysis of phenolic content in Pulp and Juice

Table 4 Analysis of Vitamin A and C in Juice and Pulp

	Pulp	Juice
Vitamin A (I.U)	15.0 ± 0.6	1.46 ± 0.08
Vitamin C (mg/100 g)	650 ± 0.8	350 ± 0.97

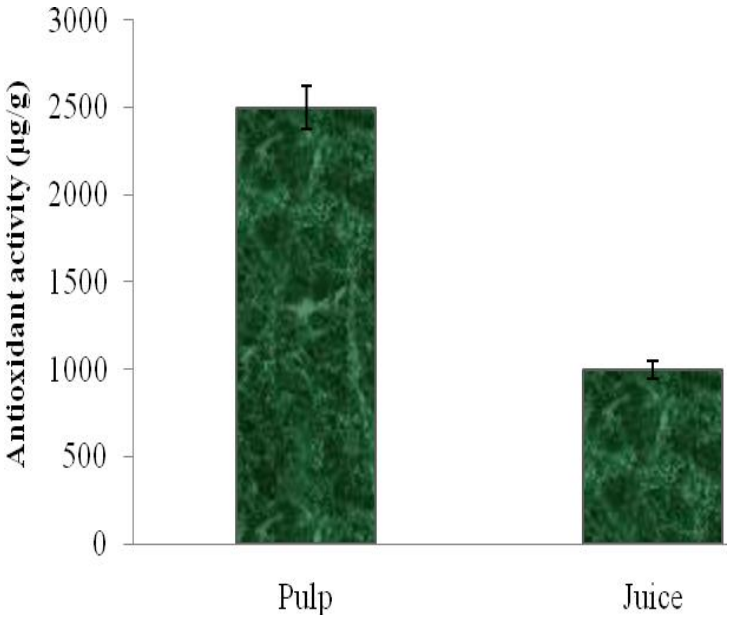

Figure 2 Antioxidant activity of Pulp and Juice

CONCLUSION

From overall study it is understood that the amla pulp has a good amount of vitamin C, vitamin A, phenols, antioxidant activity and also shows high nutritive value than juice. So it could be concluded that instead of consuming amla fruit as juice, it would better to take it in its natural form in order to relish the rich source of vitamins and other nutrients.

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