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A Study on the Antioxidant Activity and Functional Property of Herbal Amla Curry Sauce

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***Abstract*: Amla has a sour and astringent flavour, making it less appealing to eat fresh; nevertheless, it may be ingested in processed form. Developing amla curry sauce can boost its acceptance, market value, and be used to generate new value-added goods. Given this, the current study was aimed to assess the nutritional contents, vitamin C content, and antioxidant capacity of fresh amla curry sauce. Amla has a considerably (P 0.05) high dietary fibre (4.92%), protein (2.15%), and ash (0.52%) content. The concentrations of vitamin C (548 mg/100gm) and beta-carotene (112.55 mg/100gm) in amla sauce were substantially higher. According to the findings of this study, amla and amla goods are an excellent source of nutrients such as vitamin C and several bioactive ingredients. Because of its outstanding nutritional characteristics, amla may be used in diets as a sauce that is readily included into meal compositions. Optimising its utilisation is advantageous from both a nutritional and economic standpoint.**

***Keywords*: Antioxidant activity, vitamin c, amla, curry leaves, functional properties.**

1. Introduction

Amla, sometimes also called as Indian gooseberry, is a tiny Fruit from the tropics in the Euphorbiaceae family. It is consumed as a soft fruit or as a component in various processed foods like as candies, jams, jellies, and sauces, among others. Amla is a key ingredient in various ayurvedic formulations and therapies, including chyvanprash Shankar [1]. Amla is a good source of vitamin C, coming in second only to the Barbados cherry [2]. It provides 200 to 900 mg of antioxidant vitamin C per 100 g the edible part [3]. Investigations on the effects of amla on ageing, expectorant, antibacterial, antioxidant, purgative, or hypoglycaemia had been undertaken. Amla fruit can be used to treat bleeding, dysentery, diarrhoea, stomach disorders, constipation, headache, jaundice, and liver enlargement. Amla has been utilised to manufacture a range of products, including sweets, jam, powder, and amla wafers [4]. It might be used to prepare a therapeutic beverage from Amla berries. The India gooseberry is a native Indian plant; however, it can additionally be discovered in tropical and subtropical places [4]. Because of its strong acidity and bitter taste, the Amla fruit is usually consumed after it has been prepared or as a completed product [4]. Several kinds of Amla powder are frequently employed in the Unani system and Ayurvedic medicine. Because of their widespread acceptability, compact size, improved nutritious value, and extended shelf life, fruit candies have grown increasingly popular [5]. The purpose of this study is to produce two the amla goods, powdered amla and amla candy, and compare its proximate, vitamin C, and antioxidant activities to fresh amla. The goal is to create an amla curry sauce that can be enjoyed on every day with snacks. Using natural herbs with spices this sauce comes with good immunity booster stuff which we can use with our street food as well as we can take it with our breakfast bread slices. In this research we are trying to analysis its functional property and proximate analysis and antioxidant property also, to know all the properties to evaluate its quality.

2. Materials and Methods

A. Processing of Amla-Curry Sauce

Raw fruits of amla and curry leaves from the market of baba Saheb Bhim Rao Ambedkar university Lucknow. Then we washed it and trimmed it well, boiled the amla at 280°C,20 min and blended it properly and made amla puree mixed with other spices and steamed and cooked for 15 min. added acetic acid as preservative, filled hot into bottles (88°C), stored at ambient temperature. We also focused on bottling as cooking to desired consistency, judging of end point for puree or paste, filling hot into bottles, sterilized in boiled water for 10min at 100°C and then cooling before filling the bottle at ambient temperature.

B. Proximate Analysis

Food contains moisture at all times. The sample had been heated in an oven at 107°C for 3-5 hours before being cooled in desiccators to absorb moisture and estimate moisture content. The method was repeated until each sample had the same weight.

$$(W1 - W2)/(W1 - W)\ 100 = \text{moisture percentage (\%)}$$

Where W is the weight of the empty crucible; W1 is the weight of the container with the sample; and W2 is the weight of the furnace with the sample that has been dried.

Ash recognised by properly weighing 8-12 grammes of amla-

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curry sauce into a previously weighted crucible. The sample was torched at 550°C to ensure that all of the components except for the elements in the sauce's premix.

Percentage (%) of Ash= (Mass of ash)/(Mass of sample)

To assess protein levels, the Kjeldahl approach was utilised. The procedure includes absorption, distilling, and calibration of a sample. To break down fresh amla, digestion mix and concentrated sulphuric acid were utilised. Following diluting, 15 mL hydrogen peroxide (Sodium hydroxide) was added, followed by distillation, and the distillate was collected in a conical flask (capacity 50 ml) that included 5 mL boric acid and 2-3 drops indicator, which was stirred until the solution transformed colour, and the value was found by calibration of the distilled water against standard hydrochloric acid.

Protein percentage (%) = ((c -b) 14 d 6.25 100)/(a 100)

Here a is sample weight (gramme); b is the volume of NaOH required for calibration in sampling; c is amount of NaOH required for null calibration; d is normalcy of NaOH used for calibration; the conversion value is 6.25; and the nitrogen has an atomic weight of 14.

The crude fat was evaluated using the Soxhlet solvent extraction method. Five grammes of berries were measured out in pre-weighed thimbles. The removal, which lasted two hours, was done using petroleum ether.

Raw Fat (%) = (W2 - W1)/(Sample Weight 100)

Here, W1 is beaker weight; W2 is beaker weight with fat

Fibre plus was used to calculate the crude fibre content. Sulphate of sulphur (0.255N) and potassium hydroxide (0.313N) solvent were employed for acid and base digestion, respectively. After heating the solution for 30 minutes in a muffle oven to remove carbonaceous materials, the volume loss was measured as crude fibre.

Fibre percentage (%) = (mass of fibre)/(mass of fibre)

Starch was calculated using the following method: Total carbohydrates (per 100 g) = 100 (ash + moist + fats + protein + crude fibre). 4 (Protein and glucose mass in gm) + 9 fat mass in grammes equals energy (in kilocalories).

C. Determination of Vitamin C Content

In a conical flask, a conventional antioxidant reagent (10 ml) is added first, followed by the dye solution of 10 ml. Three to five grammes of sample were gathered and mixed using three per cent meta-phosphoric solution before being fully homogenised and strained through two layers of muslin cloth. After spinning the filter for 10 minutes at 3000 rpm, the resulting product was calibrated using 2, 6 - Dichlorophenol phenol solution.

Vitamin C contents (mg per 100 g of sample) = mg of the antioxidant vitamin C extracted from the collected material Samples volume

D. Statistical Analysis

Applying SPSS for Microsoft V.20, the data was processed and reported as Mean SD (standard deviation). The probability distribution was assessed by combining the One Step ANOVA with the Dunnett Multiple Evaluations Test. The average difference of three measurements was used to determine each result, and the mean value was reported.

3. Results and Discussion

A. Proximate Examination

Table 1
Analyses of freshly collected amla, amla sauce

The variables	Raw amla	Amla-curry sauce
Moisture (%)	84.92 ± 0.02	48.64 ± 0.09
Ash (%)	1.97 ± 0.13	0.52 ± 0.13
Fat (%)	0.21 ± 0.02	1.4 ± 0.03
Protein (%)	0.95 ± 0.01	2.15 ± 0.56
Carbohydrate (%)	9.01 ± 0.2	71.97 ± 0.87
Fibre (%)	2.94 ± 0.04	4.94± 0.07
Energy (kcal/100gm)	41.73 ±1.02	756 ± 6.0

The findings of the proximate examination of both natural and processing amla-curry sauce were shown in Table 1. The number of fluids, sugars, fats, and ash of the sample was virtually identical to what was indicated in the work of Usha [6]. Fresh amla has a large moisture content (48.64%). Fresh amla has a lesser amount of moisture than dried amla [6]. Yadav et al. (2020) discovered a little less moisture (82.76%) than the current study. The drying action resulted in a lower moisture content in the powder. It was most likely owing to the cleanliness of the Amla and its high mineral content. The ash level of green amla (1.93%) and amla sauce (0.52%) did not differ significantly. The ash percentage of fresh amla varies from 2.24 to 3.08% depending on the variety. The aouther discovered that unprocessed amla sauce ash contents of 1.54% respectively [7]. This conclusion is comparable to the current study's findings. The fat content did not alter significantly. However, the fat level of the amla-curry sauce was somewhat higher. This is because fruits have less fat. Amla curry sauce has a low-fat level (1.4%). There was a substantial variation seen in the carbohydrate content of fresh amla. The carbohydrate content of Amla curry sauce was high (71.97%). Fruits and vegetables have been shown to be high in fibre. Hemicelluloses, cellulose, polymers, and lignin are commonly found in crude fibre. The crude fibre content was lowest in fresh amla (3.94%) and highest in amla curry sauce (4.94%). Fibre content in fresh amla varies from 7.18 to 22.35%, according to author [8]. Another research found fibre levels in fresh fruit ranging from 2.38 to 3.4% (Karla, 1988). According to another author, amla powder has more fibre than amla curry sauce. The protein content of amla curry sauce was greatly boosted. Protein content ranged from 2.05 to 3.17% in several kinds of fresh amla [9]. In our investigation, we saw similar protein content patterns. As a result, the protein content of amla curry sauce was (2.15%). The calorie value of amla curry sauce was found to be much greater than fresh amla and amla powder, which might be attributed to the higher sugar and carbohydrate

content. Soil profile, variety diversity, climate, location, farming practises, and other factors all contribute to variance in proximate composition. In terms of proximate properties, the overall results revealed that it was extremely nutritious.

B. Phytochemical Characteristics

Table 2
Raw amla and amla curry sauce have phytochemical and antioxidant activities

The variables	Raw amla	Amla-curry sauce
Vitamin c(mg/100gm)	533 ± 1.5	432 ± 0.15
Antioxidants activity (%)	81.42 ± 6.75	59.2 ± 0.6

Table 2 displays the vitamin C quantity found in fresh amla curry sauce. The vitamin C level of fresh amla was 523.2 mg/100gm. Amla curry sauce has 432.2 mg/100g, which is almost similar to the author reported a high level of vitamin C [10]. The variance in the extraction solvents might be attributed to the variation in the findings. Because vit C is a It is a dependent upon temperature vitamin that is rapidly degraded during cooking when dissolved in water [11]. Heating, by the flip side, reduces lycopene loss to a low and, in numerous instances, made lycopene easier to obtain due to heat-induced lycopene release to the cell membrane [12]. As a result, there were no major decreases of Beta carotene observed in amla curry sauce. In the current study, beta carotene levels were highest in amla curry sauce.

C. Antioxidant Activity

α-diphenyl-β-picrylhydrazyl is typically employed to assess vitamin c. The capacity of the DPPH radical to be reduced is assessed by the drop in Antioxidants produce 514 nm absorption. Antioxidants influence the decrease in DPPH radical absorption as a result of the method between molecules of antioxidants and radicals develops, resulting in radical scavenging via Infusion of hydrogen. Amla contains a large number about antioxidants. In terms of antioxidant activity, there were some differences between pure amla and curry leaf extract (Table 2). Raw amla has 81.41% antioxidant power, whereas curry leaves have 59.2% antioxidant activity. Amla curry sauce has the highest antioxidant activity, followed by raw amla.

4. Conclusion

In this study, herbal amla curry sauce was made from amla fruit to boost its acceptance and commercial value, as well as to be used to produce new value-added goods. Fresh amla and curry leaves nutritional composition, vitamin C, content of a compound called beta, and antioxidant property. Amla had considerably higher levels of dietary fibre (2.94%), protein (0.95%), and ash (0.52%) than amla candy in the research. Amla curry sauce contains a lot of vitamin C (432.3 mg/100gm) and beta-carotene (112.55 mg/100gm). The antioxidant activity of amla curry sauce was higher (81.82%) than that of curry leaf (59.2%). According to the findings of According to this research, amla and amla goods are a good source of nutrients including vitamin C and numerous bioactive elements. As a result of its outstanding nutritional characteristics, Amla may be used in diets as a sauce that is readily included into meal compositions.

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