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Short

Physicochemical, Functional Properties and Proximate Composition of Tamarind Seed

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ABSTRACT

Tamarind seed is an underutilised by-product of the tamarind pulp industry. Only a small portion of the seed, in the form of tamarind kernel powderis used as a sizing material in the textile, paper, and jute industries. A study was carried out toanalyse the useful and biological properties of tamarind seed (*Tamarindus indica*). All the processed seeds were dried and pulverised before qualitative analysis. Functional analysis of tamarind seed shows water absorption capacity 20 percent and oil absorption capacity 16 percent shows and gelatinisation concentration was 10 percent. Proximate composition of tamarind seed shows that moisture, protein (g), fat (g), fiber (g), ash (g), carbohydrate (g) and energy (kcal) was 8.4±0.25 (g), 20.5±1.25 (g), 9.5±0.35 (g), 8.6±215 (g), 3.2±0.76 (g), 57.8±1.92 (g) and 364.0±4.89kcal, respectively.

KEYWORDS

Tamarind Seed, Proximate Composition, Functional Properties

INTRODUCTION

Tamarind (*Tamarindus indica* L.) belongs to the legume family of rosid dicot genus. The tree is autochthonous to tropical Africa. Tamarind, (*Tamarindus indica* L.) could be useful tropical an giospermous tree used primarily for its fruits. Tamarind is a multipurpose tree species; almost every part of it finds some use. The fruit contains about 55% pulp, 34% seed, and 11% shell, and the fiber in a pod (Rao and Srivastava, 1974). Tamarind seed has therapeutic properties, can treat polygenic disease, jaundice, snake bites, chronic symptom, dysentery etc. Tamarind is suited for dry tropical conditions and grows well in several wet tropical areas with seasonally high rain. Tamarind can be grown commercially as plantations and homestead gardens for its product. Also, It maybe used as a decorative plant in cities. Tamarind seeds are agriculture wastes but have potential to be used. Also, a large amount of seed waste is discarded from the tamarind industry, so the utilisation of tamarind seed is interesting from the perspective of the possible utilisation of this waste (Sundaram *et al.*, 2015). In the present study, the organoleptic properties of tamarind seed powder and its nutrient potential were analysed.

MATERIALS AND METHODS

The present investigation was undertaken to analyse the organoleptic properties, nutritional value of tamarind seed. The study was conducted at Department of Foods and Nutrition, College of Home Science, MPUAT, Udaipur Rajasthan, India.

Tamarind seed powder

Seeds were procured from the market and were sorted to get rid of foreign materials. Hundred and fifty gram of seeds were roasted at the temperature of 100°C, dehulled by hand, ground with a laboratory liquidiser, packed in associate airtight instrumentation and keep prepared for additional analysis.

Physical properties

Whole tamarind seeds were hand-picked for the analysis of physical properties. Different seed characteristics like seed size, numbers of seeds in 10 g, weight of 100seeds, seed volume and bulk density were measured. The colour and appearance was visually examined.

Functional properties

The water and oil absorption capacity were calculated using a centrifuge. The least gelatinisation concentration was determined using the method of Coffman and Garica (1977).

Chemical analysis

Chemical analysis included determination of the amount of moisture, protein, fat, ash and fibre with nitrogen-free extract.

Determination of proximate composition

The moisture, ash, crude fiber and fat contents were determined using a standard method. The moisture content of the sample was analysed by the moisture analyser, ash content by ignition at 6000°C in a Muffle furnace for six five hours, oil content extraction was done by Soxhlet extraction techniques with methyl – ether. Nitrogen content was determined using micro- Kjeldahl and converted to crude

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protein (N x 6.25). Meanwhile, the carbohydrate content was calculated by difference. A gravimetric method was used for estimation of the dietary fibre content after the enzymatic digestion of starch and protein in fat and moisture-free sample.

RESULTS AND DISCUSSION

Quality Evaluation of Tamarind Seed Powder

Physical properties

Physical characteristics of tamarind seed (whole) seed assessed by the parameters like seed length, seed width, numbers of seeds in 10 g, the weight of 100seeds, seed volume, seed density. The results obtained are presented in Table 1.

Table 1: Physical properties of tamarind seed whole

Physical properties	Mean±SD
Seed length (mm)	10.59 ±1.25
Seed width (mm)	8.84±0.05
No. of seed in 10g	6.0±4.26
Weight of 100 seeds (g)	202 ±0.02
Seed volume (cc)	20.5±0.09
Seed density	1.77 ±0.04

Physical examination of tamarind seed revealed that it is light cream and square in shape. Seed length was 10.59 ±1.25mm and width was 8.84±0.05 mm (Table 1). The number of seeds in 10g was 6.0and weight of 100 seeds was 202 g. Seeds volume and density was 20.5 and 1.77.

Functional properties

The water absorption capacity, oil absorption capacity, and least gelatinisation concentration of tamarind seed are described in table 2.

Table 2: Functional properties of Tamarind seed flour

Functional Properties	Mean ± SD
Water Absorption Capacity (%)	20.0±1.34.
Oil Absorption Capacity (%)	16.±1.35
Least Gelatinization Concentration (%)	10.0±0.02

Nutrient composition

Moisture, crude fat, crude protein, crude fibre, ash, carbohydrate, and energy content of the procured sample have been shown in Table 3.

Table 3: Proximate composition of tamarind seed powder per 100g

Nutrients	Mean ± SD
Moisture (g)	8.4 ±0.25
Protein (g)	20.5±1.25
Fat (g)	9.5 ±0.35
Fiber (g)	8.6 ±215
Ash (g)	3.2 ±0.76
Carbohydrate(g)	57.8 ±1.92
Energy (kcal)	364.0 ±4.89

Moisture content of tamarind seed powder was 8.4 percent. Similarly, Akajiaku *et al.* (2014) found 8.0 percent moisture content in tamarind seed powder in his study. Dried tamarind seed powder contained 20.5±1.25 percent of protein. The values were higher than the protein content of wheat flour (13.4%) as reported by Nwosu (2013) and thus can be used as a component in baking flours also. Shalini and Murthy (2015) reported that the protein content of unprocessed tamarind seed was 18.8%. The protein content of the tamarind seed nut has nutritional significance. So, its intake will undoubtedly increase the total dietary intake of protein. Tamarind seed powder was found to be a potential source of dietary fiber. This property is beneficial in managing diabetes and cardiovascular disease. The results of the present investigation revealed that tamarind seed content 8.6 percent of crude fibre. Panigrahi *et al.* (1989) reported that whole tamarind seed contains 131.3 g/kg crude protein, 67.1g/kg crude fibre, 48.2 g/kg crude fat, and 56.2 g/kg.The crude lipid in *T. Indica* seed nuts was 9.5±0.35 g. Similar studies found that fat content ranged 6.94 ± 0.062 g in tamarind seed (Yusuf and Ahemad, 2007). The total fat of raw seeds in another review is lower reported by Pugalenthi *et al.* (2004) and Vadivel and Pugalenthi (2010).In the present investigation, the ash content was found to be 3.2 percent. Akajiaku *et al.*, 2014analysis of the roasted tamarind seed revealed the values of ash content to 4.55 percent. Carbohydrates and energy content of dried Tamarind seed powder was 57.2 g and 364.0 kcal per 100g, respectively. Johanis *et al.*(2017)reported 75.58 percent carbohydrates in tamarind seed powder.

CONCLUSION

Results of proximate analysis indicated that seeds had a higher value of protein, fat, ash, and fiber contents. Hence, tamarind seed may be used as a cheaper source of protein to alleviate protein malnutrition, which is widespread in many developing countries.

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