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Proximate Composition of Apricot (*Prunus armeniaca*) Fruit and Kernel

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Abstract: *Prunus armeniaca* is commonly known as apricot and belongs to family *Rocaceae*. The apricots are sweet to taste and used in the preparation of jams, jellies, squashes. Apricot is a rich source of carotenoids and thought to provide health benefits by decreasing the risk of various diseases. Present study was carried out to know the proximate composition of apricot fruit and apricot kernel. Apricot fruit consisted of moisture, crude protein, crude fat, crude fiber, ash and nitrogen free extracts (NFE) as 84.39±2.53, 3.01±0.10, 1.53±0.05, 2.37±0.24, 4.94±0.15 and 3.76±0.45%, respectively. It was revealed that apricot kernel contained moisture, crude protein, crude fat, crude fiber, ash and NFE (Nitrogen Free Extract) as 4.87±.23, 17.31±2.51, 55.50±4.66, 3.19±.10, 2.23±.05, 16.90±1.55%, respectively. Result indicated that apricot kernel showed greater amount of fat and protein than apricot fruit.

Key words: Apricot · Proximate · Fat · Fruit · Kernel

INTRODUCTION

Apricot (*Prunus armeniaca* L.), relating Rosaceae family is one of the important stone fruits of South East Asia. In ranking of apricot production countries Pakistan is standing on 3rd position amongst major apricot producers with half million Mt annual production. The compositional profile of the fruits shows that it contains good proportions of dietary fibers and minerals like potassium, selenium, zinc, phosphorus, calcium, iron and magnesium. It is rich source of vitamin A, C, niacin, pantothenic acid, thiamin and riboflavin [1].

Apricot is an important medicinal edible plant that contains a number of secondary metabolites such as sterol derivatives, glucosides, cyanogenic compounds, carotenoids, mono- and polysaccharides, polyphenols, volatiles and fatty acids [2]. Apricot varieties have the potentials to carry out various biological activities such as antimutagenic, inhibitory activity for various enzymes, antimicrobial, cardioprotective, antinociceptive, anti-inflammatory and antioxidant activity desirable for human health. Antioxidant potential of apricot is quite high due to its richness with polyphenolic content displayed in both *in vivo* and *in vitro* test systems [3]. Apricot is very delightful and commercially merchandized fruit in the world. However, a caution about cyanogenic glucoside (amygdalin) present in apricot's seed should be taken into account before its consumption [4]. Apricot is a good source of dietary fiber which is beneficial to balance the body glucose level. Individuals using dietary fiber rich diet plan show considerably low risk perspective of certain gastrointestinal diseases, obesity, coronary heart diseases, diabetes, hypertension and stroke. The fructose in apricots is an alternative source for low glucose index (GI) sugars [5]. Pectin, the soluble fiber abundant in apricots, helps to lower the LDL levels. Their deep orange color indicates the presence of carotenoids especially β-carotene which converts to vitamin A in the body. Increasing dietary fiber intake lowers the serum cholesterol level and blood pressure. Augmented intake of soluble dietary fiber develops insulin sensitivity and glycaemia in diabetic and non-diabetic individuals. In obese individuals, fiber supplementation plays a significant role to accelerate weight loss [6].

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MATERIALS AND METHODS

Procurement of Raw Material: Fresh apricot fruit was procured from local market in Faisalabad. Selection of fruit was based on uniformity in size, shape, color, absence of physical damage or any evidence of abrasion. The reagents (analytical and HPLC grade) and standards were purchased from Sigma-Aldrich (Sigma-Aldrich Tokyo, Japan) and Merck (Merck KGaA, Darmstadt, Germany).

Sample Preparation: Procured fruit was subjected to sorting and grading on the basis of physical appearance to prepare a uniform lot in the Postgraduate Research Laboratory of the National Institute of Food Science and Technology, University of Agriculture, Faisalabad. Fresh apricot was washed to loosen the dirt and grits adhered to the surface. Fruit and kernel were subjected to proximate analysis. It is assured that all these proximate analysis were performed in National Institute of Food Science and Technology, University of Agriculture Faisalabad, Pakistan according to institutional guidelines and relevant laws.

Proximate Analysis: The percent composition for moisture, crude protein, crude fat, crude fiber, ash content and nitrogen free extract (NFE) of mashed apricot and ground kernel were performed as described by [7]. All the tests were carried out in triplicates.

Moisture Content: Moisture content of apricot fruit and ground kernel was determined by drying the sample in hot air oven (Model: DO-1-30/02, PCSIR, Pakistan) at 105±5°C till constant weight according to AOAC [8] Method No. 934-01. The loss in weight is expressed as moisture contents as under

$$\text{Moisture (\%)} = \frac{\text{Initial Weight} - \text{Final Weight}}{\text{Initial Weight}} \times 100$$

Crude Protein: Protein content of apricot fruit and kernel powder samples were determined using kjeltech apparatus (Model: D-40599, Behr Labor Technik, Gmbh-Germany) as per procedure described in AOAC [9] Method No. 984-13. Purposely, apricot fruit and grounded seed were digested with conc. H_2SO_4 and digestion mixture (K_2SO_4:$FeSO_4$:$CuSO_4$ as 100:5:10) while heating until the color was transparent greenish. The digested material was then diluted up to 250 mL in volumetric flask. 10 mL of 40% NaOH with 10 mL of diluted sample were taken in distillation apparatus whereas liberated ammonia was collected in a separate beaker containing 4% boric acid solution, using methyl red as an indicator. Consequently, ammonium borate was formed that was used for nitrogen determination in sample. Thus, percentage of nitrogen in the sample was estimated by titrating the distillate against 0.1N H_2SO_4 solution till light golden coloration. Crude protein content was calculated by multiplying nitrogen percent (N %) with factor (6.25).

$$\text{N (\%)} = \frac{\text{Vol. of 0.1N H2SO4 used x 0.0014x Volume used}}{\text{Vol. of distillate sample taken x Weight of sample}} \times 100$$

Crude protein (%) = Nitrogen (%) x 6.25

Crude Fat: Crude fat content was determined using hexane as solvent in soxhlet apparatus (Model: H-2 1045 Extraction Unit, Hoganas, Sweden) following the protocol of AOAC [10] Method No. 920-39.

Crude Fiber: Crude fiber in fat free samples were estimated by digesting firstly with 1.25% H_2SO_4 for 30 min and then with 1.25% NaOH solution through Labconco Fibertech (Labconco Corporation Kansas, USA) as described in AOAC [11] Method No. 978-10. Afterwards, sample were filtered and washed with distilled water. The dry residues of fruit and kernel samples were weighed and placed in muffle furnace at temperature of 550-650°C till grey or white ash was obtained. The crude fiber percentage was estimated according to the following expression.

$$\text{Crude fiber (\%)} = \frac{\text{Weight of digestive sample} - \text{Weight of ash}}{\text{Initial weight of sample}} \times 100$$

Total Ash: Ash in each dry sample was assessed by direct incineration in a Muffle Furnace (MF-1/02, PCSIR, Pakistan) at 550-600 °C after charring, till grayish residues (AOAC; Method No. 924-05)[12].

$$\text{Ash (\%)} = \frac{\text{Weight of ash}}{\text{weight of sample}} \times 100$$

Nitrogen Free Extract (NFE): NFE in apricot fruit and grounded kernel samples were calculated according to the given equation:

NFE % = 100 – (moisture% + crude protein % + crude fat % + crude fiber % + ash %).

RESULTS AND DISCUSSIONS

Proximate Analysis of Apricot Fruit and Kernel: Proximate analysis has vital role in chemical screening of any commodity. Proximate composition (Table 1) showed that apricot contains moisture, crude protein, crude fat, crude fiber, ash and NFE (Nitrogen Free Extract)

Table 1: Proximate composition of apricot fruit

Constituents	Quantity (%)
Moisture	84.39±2.53
Crude protein	3.01±0.10
Crude fat	1.53±0.05
Crude fiber	2.37±0.24
Ash	4.94±0.15
NFE	3.76±0.45

Table 2: Proximate composition of apricot kernel

Constituents	Quantity (%)
Moisture	4.87±0.23
Crude protein	17.31±2.51
Crude fat	55.50±4.66
Crude fiber	3.19±0.10
Ash	2.23±0.05
NFE	16.90±1.55

as 84.39±2.53, 3.01±0.10, 1.53±0.05, 2.37±0.24, 4.94±0.15 and 3.76±0.45%, respectively. Likewise, proximate analysis of apricot kernel (Table 2) showed the moisture, crude protein, crude fat, crude fiber, ash and NFE (Nitrogen Free Extract) as 4.87±.23, 17.31±2.51, 55.50±4.66, 3.19±.10, 2.23±.05, 16.90±1.55%, respectively.

The present results regarding proximate composition of fruit are in harmony with the investigation of Haciseferogullar *et al*. [13] they showed the percentage of moisture, crude protein, crude fat, crude fiber and ash in apricot fruit as, 82.23, 2.84, 1.04, 2.41 and 5.34% respectively. Later, Ali *et al*. [14] investigated the chemical composition of apricot and observed that apricot contain 85±0.1% moisture, 8.25±0.143% crude protein, 3.00±0.10% crude fat, 11.85±0.66% crude fiber and 9.25±0.024% ash.

Similarly, Akinci *et al*. [15] determined that the apricot contains moisture (82.1%), crude protein (3.59%), crude fat (0.55%), crude fiber (1.55%) and ash (3.15%). Additionally, Gezer *et al.* [16] concluded that moisture, protein, fiber, fat and ash contents of apricot are 82.31, 4.29, 1.48, 3.12 and 3.50%, respectively. The data regarding proximate composition in current study is also in accordance with previous finding of Baryeh [17] observed the composition of apricot fruit as 79.79, 4.8, 0.78, 0.77 and 3.07% for moisture content, crude protein, crude fat, crude fiber and ash contents, respectively. However, the chemical composition of apricot varies with the growing conditions like climate, season, agricultural practices, variety and age [17, 18].

Beyer and Melton [19] reported the chemical composition of apricot kernel involving moisture, crude protein, crude fat, crude fiber and ash as 4.70, 20.60, 52.00, 2.50 and 2.90%, respectively. Mori *et al*. [20] trailed that apricot kernel composition as moisture content 2.8%, crude protein 24.1%, crude fat 50.9%, crude fiber 2.4% and ash 2.2%. Gezer *et al*. [9] reported that apricot kernel contains 5.5% moisture, 21.5% crude protein, 44.2% crude fat, 16.4% crude fiber and 2.8% ash content. Ozcan [21] described the compositional profile of the apricot kernel oil in which he reported the values of crude protein, ash, crude fiber, moisture and crude fat as 20.2, 2.3, 18.0, 3.4 and 44.6%, respectively.

Gupta *et al.* [22] expressed the proximate analysis report of apricot kernel as it contains moisture content (1%), crude protein (23.10%), crude fiber (2.74%), ash (2.47%) and crude fat (53.17%). Furthermore, Abd EI-Aal *et al*. (1986) illustrated the compositional profile of apricot kernel as 1, 22.20, 2.29, 55.96 and 2.15% of moisture, crude protein, fiber contents, fat and ash contents.

CONCLUSION

Proximate analysis showed that there is low fat content in apricot fruit i-e 1.53±0.05% and large fat content present in apricot kernel i-e 55.50±4.66%. Crude protein content of apricot kernel are i-e 17.31±2.51 more as compared to apricot fruit i-e 3.01±0.10.

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