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Evaluation of Some Nutritional Characteristics of Indian Almond (*Prunus amygdalus*) Nut

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Abstract: The study of nutritional characteristics of Indian almond (*Prunus amygdalus*) showed the proximate composition to be: 97.70% dry matter, 11.52±1.10% crude protein, 6.76±0.72% ash, 5.09±0.84% crude fibre, and 21.76±1.20% fat and 54.87±2.80% carbohydrate. The antinutrient composition was found to be 0.25% phytin, 0.07% phytin phosphorus, 0.04% cyanide, 1.82%Tannin. Its fatty acid and mineral contents were 0.65% oleic acid, 0.19% phosphorus, 0.17% potassium, 0.25%magnesium, 245.65ppm sodium, 845.45ppm calcium, 92.12ppm zinc, 70.62ppm iron and 9.21ppm copper.

Key words: Almonds, antinutrients, minerals, proximate composition.

Introduction

The almond tree is a native of the warmer part of Western Asia and of North Africa, but it has been extremely distributed over the warm temperate region of the old world. The almond belongs to the same group of plants as the rose, plum, cherry and peach, being a member of the tribe prunae of the natural order Rosaceae. The genus amygdalus to which it belongs is very closely allied to prunus (plum) in which it has sometimes been merged; the distinction lies in the fruit, the succulent part attached to the stone in the plum (known botanically as the coat in the almond which is hard and juiceless of a dingy green tinged with dull red, that when growing it looks not unlike an unripe apricot (Grieve, 1981).

Almond trees are small and like many other rosaceaus fruit trees, they are often self-sterile, requiring pollen from another cultivar before fruits can be produced (Phychorraphis, 1977). There are two principal varieties of almonds, the bitter almond (*Prunus dulcis var amara*) and the sweet almond (*Prunus dulcis var dulcis*). The former contains a poisonous glycoside, amygdal which readily breaks down into prussic acid and that prevents its use as human food. The latter is grown for its edible nuts which are used as either raw or in confections and puddings (Phychorraphis, 1977).

Almonds are grown as orchard crops, highly nutritious but owing to their high cost they are a luxury food. Sweet almonds have a bland taste and the white emulsion formed when they are bruised with water is characterized by no marked odour, the seeds being thus distinguished from bitter almonds (Grieve, 1981).

Almonds (*Amygdalus communis* L.) are drought tolerant; exhibiting xeromorphic characteristics such as the ability to endure severe water stress in dry seasons (Abd. El-Rahman *et al*., 1966; Fereres *et al*., 1979; Torrecillas *et al*., 1988). Almond is chiefly valued because of its supposed virtue in preventing intoxication (Grieve, 1981) and high fat value (Sathe, 1993), high protein content, fibre, vitamin and minerals (Gustafson, 1999, Duxbury, 1989; Anonymous, 1989).

On expression, almonds yield nearly half their weight in a bland fixed oil, which is employed medicinally for allaying acrid juice, softening and relaxing solids and in bronchial diseases, in tickling coughs, hoarseness, costiveness, nephritic pains and because they contain practically no starch and being rich in protein, they are often made into flour for cakes and biscuits for diabetic patients (Grieve, 1981).

Almonds can help lower cholesterol. Specifically, they reduce low-density lipoprotein (LDL) cholesterol, while preserving the beneficial high-density lipoprotein (HDL) cholesterol. One factor behind the almond's successful assault on cholesterol is its fatty acid composition. The main factors behind the almond's successful assault on cholesterol are its fatty acid composition (Gustafson, 1999) and its dietary fibre content known to limit cholesterol absorption and reduce its plant sterols. The almond fibre content is also a dietary factor known to reduce cholesterol and its plant sterols, which may help to limit cholesterol absorption.

Materials and Methods

Collection and weigh of sample: Almond fruits (*Prunus amygdalus*) were collected fresh from Quarter 12A, Ijokodo Estate of The Polytechnic, Ibadan, Nigeria .One hundred randomly picked whole almond fruits were weighed. The edible portion was manually removed leaving the stony shell containing the seed. The stony shell was carefully cracked to remove the groundnut-like seed. The respective weights of the whole fruit, the edible portion, the shell and the seed were recorded.

Sample preparation: Almond seeds (nuts) were gathered and sun dried for about two weeks after which

Table 1: Weight analysis of Indian almond fruit component parts

Component Part	Total Weight	Percentage of Total Weight
Whole Fruit	32.95±2.02	-
Edible Portion	25.38±1.69	77.02
Endocarp nut	7.11±0.42	21.58
Nut	0.45±0.05	1.40

Values are means± standard error (SE) of 100 randomly picked Indian almond fruits.

Table 2: Proximate composition of Indian almond nut in percent (dmb)

Dry matter	97.70±3.81
Crude Protein	11.52±1.10
Ash	6.76±0.72
Crude Fibre	5.09±0.84
Fat	21.76±1.20
Carbohydrate	54.87±2.80

Values are means±SE of triplicate determinations

Table 3: Values of antinutrient and free fatty acids of Indian almond nut

Parameters	Composition %
Phytin	0.25
Phytin Phosphorus	0.07
Phytin phosphorus/Total phosphorus*100	41.18
Cyanide	0.04
Tannin	1.82
Oleic Acid	0.65

Values are means of duplicate determinations.

Table 4: Mineral contents of Indian almond nut (dmb)

hosphorus %	0.19
Potassium %	0.17
Magnesium %	0.25
Sodium (ppm)	245.65
Calcium (ppm)	845.45
Manganese (ppm)	10.24
Zinc (ppm)	92.12
Iron (ppm)	70.62
Copper (ppm)	9.21

Values are means of duplicate determinations.

they were milled, using a blender. The resulting powder was preserved in a bottle covered with a screw cap pending analysis.

Proximate analysis: Samples' proximate values were analyzed chemically according to the Official Methods of Analysis of the Association of Official Analytical Chemist (AOAC, 1980). Crude protein was measured by multiplying crude nitrogen by 6.25. The acid value was determined, cyanide content was titrimetrically determined by the method of McCance and Widdonson, 1975. Tannins was spectrophotometrically determined by the method of Czernianwski, 1958; Phytin was determined according to the method of Young and Greeve, 1953; Atomic absorption Spectrophotometer was used to determine calcium, iron, magnesium, zinc, copper and, manganese while flame emission spectrometer was used to determine sodium and potassium in the sample. Phosphorus was quantitatively determined by Vanado-Molybdate colorimetric method.

Results

The edible portion (fused epicarp and mesocarp) and nut of the Indian almond were estimated to be 78% of the whole fruit. The stony endocarp without nut constituting the remaining portion is about 22%. The proximate composition of the Indian almond nut (Table 2) was estimated on dry matter basis.

The nuts of Indian almond have high fibre, high ash, high fat and it is a high-energy food. Judging from its relative portion of the entire fruit, the nut is highly proteinaceous.

Discussion

The weight of Indian almond fruit reported in this work was similar to the reports on peerless variety (Anonymous, 1991). Those of the varieties:mission, neplus, garmel and nonpareil are higher. The mineral composition derived in this work was lower than that reported by Gardner *et al.,* 1952. Tannin is an antinutrient that binds to and precipitates proteins. Phytin is a complex salt of calcium and magnesium, and phytin phosphorus accounts for the total phosphorus in the almond seed. This may reduce the bioavailability of minerals such as calcium, magnesium, zinc and iron. Tannin, phytin and cyanide significantly influence the function and nutritional properties of foods (Maga, 1982). Because of its high protein content and low starch, almond nuts can be incorporated into cakes and biscuits for diabetic patients. This nut contains high fat content and is known as a high energy food (Sathe, 1993), and also because of its oily character, it sometimes gives immediate relief in heart burn; the fatty acid composition is a successful factor that lowers LDL cholesterol and preserves HDL cholesterol. The fibre content is also a dietary factor that reduces cholesterol. Thus, almond oil is a more potent cholesterol reducing agent than olive oil because it contains mom or polyunsaturated fatty acids rather than saturated fatty acids, the almond nuts contain almost all nutritionally or physiologically needed ingredients. Magnesium and copper help to maintain a healthy cardiovascular system. Presence of calcium and magnesium are necessary for strong bones. Its low cyanide content allays the fear that the children consuming the nut might suffer cyanide toxicity.

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