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Nutritional and Physico-chemical Properties of *Bombax glabrum* Seeds

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Abstract: This study evaluates the proximate composition of *Bombax glabrum* seeds and the physico-chemical properties of the seeds oil. Protein and fat content of *Bombax glabrum* seeds were 10.23% and 58.23% respectively. Carbohydrate content of the seed was low (16.60%) when compared to other oil seeds like soybeans and groundnut. The relative density of the oil was 1.125. The value was above the recommended codex standard for edible vegetable oils. The refractive index for the *Bombax glabrum* seed oil was 0.628 which was lower than the standard value obtained for cotton seed oil (1.458-1.466) and groundnut oil (1.460-1.465). Saponification and iodine value obtained were 42.93 mgKOH/g and 3.38 Wij's. The unsaponifiable matter was 4.20 g/kg and was lower than the values reported for soybeans, cotton seeds etc. Acid value was 0.71 mgKOH/g. The peroxide value (3.64 meq/kg) was lower than the codex standard for edible vegetable oils (10 meq/kg). Moisture content and free fatty acid of the oil were low. The seed is a good source of protein and fat.

Key words: *Bombax glabrum*, seeds, proximate, physico-chemical

INTRODUCTION

Seeds have nutritive and calorific values which make them necessary in diets. They are good sources of edible oils and fats. The amount of energy provided by 1 g of fat and oil when fully digested is more than twice as many joules as that by carbohydrates and proteins (Odoemeclam, 2005). Other sources of oil seeds are soybeans, cotton seed groundnut, sunflower, melon, rape seed, benni seeds (Frank, 1998). French nut (*Bombax glabrum*) seeds are also high in fat content and could be classified as oil seeds. They belong to family *Bombacaceae*. *Bombax glabrum* and *Bombcopsis glabra* are synonyms to each other. It is a medium sized tree and the fruit is a smooth, green capsule, 4-8 inches in length and splits opens naturally on longitudinal sutures when ripe. The fruit is sporadically grown throughout the tropics and subtropics and used as household plant in temperate regions. The family *Bombacaceae* has 28 general and 200 species. *Bombax glabrum* is used to make hot drink similar to hot chocolate by grinding the roasted seeds. It can also be used as flavourant. The young leaves are used as soup vegetable while the fruit pulp is made into drink. This fruit is classified as underutilized crop and there are limited research work done on this seeds. This study evaluates the proximate composition of the seeds and physico-chemical composition of the seed oil.

MATERIALS AND METHODS

Matured fruits of *Bombax glabrum* were obtained on the farm at Iree, Osun State. Nigeria. The fruits were opened and the seeds were removed and analyzed. *Bombax glabrum* seeds samples were analyzed for proximate and physico-chemical properties using the methods described by AOAC (1990).

RESULTS AND DISCUSSION

Proximate composition is shown in Table 1. Protein content of *Bombax glabrum* was 10.23%. This value was within the range reported for chest nut (Umran Erturk *et al*., 2006). Ragone (2006) reported protein content of 13.3-19.6% for breadnut seeds flour while protein content of 15.76% (dry basis) was recorded by Nwabueze (2006) for raw flour of African breadfruit (*Treculia Africana*). These values were higher than the values determined for *Bombax glarum* seed. Fat content of *Bombax glabrum* was 58.23%. The seeds are good sources of oil and this was higher than the fat contents of 6.2-29.0% and 11.45% recorded for breadnut seeds and African breadfruit by Ragone (2006) and Nwabueze (2006). Carbohydrate content of the seed was low (16.60%) when compared to other oil seeds like soybeans and groundnut.

Table 2 showed the physico-chemical properties of the *Bombax glabrum* seeds oil. The relative density of the oil was 1.125. The value was above the recommended codex standard for edible vegetable oils. The value obtained for cotton seed oil ranged from 0.918-0.917 while they are 0.925 and 0.918-0.923 for soya oil and sunflower oil respectively. The refractive index for the *Bombax glabrum* seed oil was 0.628 which was lower than the result standard value obtained for cotton seed oil (1.458-1.466) and groundnut oil (1.460-1.465). Saponification value obtained was 42.93 mgKOH/g and this was lower than the refined oils reported by

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Table 1: Proximate composition of *Bombax glabrum* seeds

Parameter (%)	Mean value
Protein	10.23±0.2
Ash	2.84±0.5
Fat	58.23±1.2
Crude fibre	1.25±2.3
Moisture	10.85±0.8
Carbohydrate	16.60±0.2

Table 2: Physico-chemical properties of *Bombax glabrum* oil

Parameter	Mean value
Relative density	1.125±0.7
Refractive Index	0.628±0.4
Saponification (mgKOH/g)	42.93±0.2
Iodine value (Wij's)	3.38±0.6
Unsaponifiable matter (g/kg)	4.20±0.3
Acid value (mgKOH/g)	0.71±0.6
Peroxide value (meq/kg)	3.64±0.8
Moisture content (%)	4.25±0.5
Free fatty acid (%)	0.05±0.2

Kirk and Sawyer (1999). The iodine value obtained was 3.38 Wij's. This was lower than the values reported for soybeans, sunflower oil, cotton seeds oil and groundnut. The lower iodine value signifies low degree of unsaturation and the lesser the liability of the oil to become rancid by oxidation.

Oil: The unsaponifiable matter was 4.20 g/kg and was lower than the values reported for soybeans, cotton seeds etc. Acid value was 0.71 mgKOH/g. Acid value for non virgin oil, soybeans oil and cotton seed oil was 0.6. The value obtained was slightly higher than this value. Acid value is the measure of the extent to which the glycerides in oil have been decomposed by lipase or other action (Ihekoronye and Ngoddy, 1985). Peroxide value of *Bombax glabrum* oil was 3.64 meq/kg. This value was within the maximum recommended codex standard for edible vegetable oils (10 meq/kg). Peroxide value of 9.7-11.6 Meq/kg were determined for the melon seeds oils while 19.54 m mol/g was reported for melon seeds oil by Ebuehi and Avwobobe (2006). Unlike acid value, peroxide value is an indicator of deterioration of fats. Moisture content of the oil was low (4.25%) The free fatty acid of the oil was low (0.05%). This indicates the stability of the products.

Conclusion: *Bombax glabrum* seeds are rich in protein and fat contents. The seed could be used to enrich food products. Also the physicochemical properties showed that the oil are stable and could be used in industries for production of soap and other products.

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