THE BIOCHEMICAL ANALYSIS OF HURA CREPITANS (SANDBOX TREE) SEED OIL AND MEAL

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Abstract

Biochemical analysis of the seeds from *Hum crepitans* (Sandbox tree) was conducted. Oil was extracted using solvent extraction method.. Physical and chemical analyses were carried out on the oil while proximate analysis was carried out on the seed meal. Results showed that the oil content was 36.7% which is of good quality. The saponification value was 178.13mg /g, ash content of 0.4% dry matter and moisture content was 0.52 %. The proximate analysis of the seed meal showed that the ash was 4.5%, crude fibre 11.80% protein 22.15% and carbohydrate (nitrogen free extract) 24.85%. This shows that the seed meal is a good source of energy, plant protein and of high roughage but however low in mineral. The seed meal could be a supplement in livestock feed.

Introduction

Hura crepitans (the sand box tree) also known as the monkey's dinner bell is not indigenous to West Africa, but its point of origin can be traced to the tropical America (Burkill, 1967). This important tropical tree which is about 2.5m tall with spiny trunk and branches has long stem, oval leaves which are thin, heart shaped and has red flowers. The tree usually flowers at the beginning and end of the rainy season and is commonly planted along roads and in villages in West Africa. It .is also used as shade for cacao and prop for vanilla in Asia (Kerharo, 1950).

Also, the bark of the tree is used in South Africa for leprosy control, though with doubtful benefits, while the inflorescence has been of use in West Indies to make jam (Walker and Sullivan, 1961). The latex of the sand box tree is caustic and purgative due to the presence of two very toxic principles "Hurin and "crepitin". This latex is said to cause blindness, but has been of use as a fish poison and sometimes added to South America arrow poison (Kerharo, 1950). The leaves are used against eczema in Surinam's traditional medicine.

Moreover, the pale yellow or brown, softwood of the tree is used for furniture under the name Hura, (FAO, 1986). The seed of the Hura crepitans is very rich in oil and are emetic and when green are very purgative.

The analysis of Hura crepitans seed oil and seed meal became necessary in order to ascertain their suitability for human consumption and livestock feeds respectively. This is necessary with the increasing trend in oil consumption pattern in the country, additional source of oil should be found to complement the traditional sources of oil from palm kernel, groundnut, melon and other lesser-known seed oils. Also, the seed meal could be used as a supplement to livestock feed in view of the ever-skyrocketing cost of feeds in the country.

Materials and Methods

Matured seeds of Hura crepitans were collected from Moshood Abiola Polytechnic Campus, Abeokuta, Ogun State. The seeds were dehulled and sundried for several days and finally in an oven at 120°C for six hours. Seeds were later ground and oil extracted from the sample using soxhlet extraction with hexane as the solvent. The seed meal was obtained after the oil extraction.

The proximate analyses of the seed meal were obtained using the AOAC methods (1984), while saponification, iodine, free fatty acid and the acid values were determined by the British Standard Institute methods (1976). The colour of the oil was judged by visual observation.

Results and Discussion

Table 1 shows the physical and chemical characteristics of the oil from Hura crepitans seeds. The % oil yield is 36.7 which shows that the oil content of the seed is high and this can be compared to that *of Jatropha curea* which is 36% and that of cotton seed (39-45%) (Soyemi, 1998; Scheele, 1979). From this, one can say Hura crepitans seed is a good source of oil considering its abundance and highly economic for

domestic use.

The Saponification value obtained was 178. 13 mg/ KOH / g which is comparable to that of rubber seed oil (171.26) but lower than that of soya bean oil (185-195) (Nwokolo and Akpakunam, 1986). It can be concluded that Hura crepitans seed oil is not of very high molecular weight and containing many short-chained fatty acids.

The free fatty acid obtained for the seed oil is 1.25%. The free fatty acid content is an important variable when considering the quality of oil for human consumption and stability to oxidative rancidity. The lower the free fatty acid, the better the quality of the oil. This shows that the oil is of good quality.

The acid value of is 3.11 mg / KOH /g. The acid value of an oil or fat indicates the quality of fatty substances, and the higher the fatty acid presents in an oil, the greater the acid value. The value is, comparable to that of olive oil (0.2- 6mg KOH / g) which is considered to be the best of the edible oils ; for salad and culinary purposes (Daniel S., 1979). Therefore oil from Hura crepitans seeds can also be used for these purposes.

The Iodine value measures the degree of unsaturated fatty acid in an oil (Meyer, 1978). The iodine value of 35.56mg / g was obtained for the oil. This can be compared to that of melon seed oil (38.1mg /g) but very low when compared to that of maize oil of 105-130 mg/g. (Achinewhu, 1990. Van Der Vet, 1968). From this, it could be said that Hura crepitans oil will not solidify at room temperature due to the low amount of saturated fatty acid.

The moisture and ash contents of 0.52% and 0.42% respectively were obtained for the oil, This shows that the oil is relatively stable to oxidative rancidity. The lower the moisture and ash values the better the oil when considering the stability (Achinewhu, 1990).

The result of the proximate analysis of the seed meal is shown in Table 2. The ash content of 4.5% is very low compared to 11% for cassava meal (Adebambo, 1997). This implies low mineral content in the seed.

The crude protein value of 22.15% is relatively high for a plant source of protein. So the seed meal can be used as a complement ingredient in livestock feeds.

The crude fibre content of 11.80% may indicate poor digestibility, and this can be of nutritional significance as it helps to prevent constipation when used in feeds.

The nitrogen free extract which is a measure of the food that is carbohydrate is 24.85%, and this compares very well to that of soya whole seed of 24.50% (Onuwaje et al, 1986). This shows that the seed meal will meet the energy need of livestock when in feeds.

Table 1: Some Physical and Chemical Characteristics of Hura Crepitans Seed Oil

Measurement	Value
% Yield	36.7
Colour	Golden yellow
Moisture% dry weight	0.52
Total ash	0.4
Saponification (Mg/KOII/g)	178.13
Iodine (mg/g)	35.56
Free fatty acid (%)	1.25
Acid	3.11
Specific Gravity	0.88

Table 2: Proximate Analysis of Hura Crepitans Seed Meal (Oil Yield from Seed = 36.7%)

Nutrient	Content % dry weight
Ash	4.5
Crude fibre	11.80
Protein	22.15
NFE (Total carbohydrate)	24.85

Conclusion

From the result, it can be concluded that Hura Crepitans seeds seem very promising, as feed for livestock. Also being very rich in oil, it could be a source of oil for domestic as well as industrial use. However, before the seed meal could be used in livestock feed work must be done to ascertain whether it contains anti- nutritional factors that may have serious implications on its use in livestock feeding.

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