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Comparative analysis of potential genetic nutritive value in three Oil seed Crops

J. A Awopetu

Department of Agronomy, University of Ilorin, Ilorin, Nigeria

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ABSTRACT: Three oil seeds- soyabeans (*Glycine max* L.Moench) cashew (*Anacardium Occidentale* L.) and Groundnuts (*Arachis hypogea* L.) were evaluated for their genetic nutritive value in terms of crude protein and fat, using soyabean as a standard reference crop. Observations showed significant differences in terms of crude protein in the order of soyabean>groundnut>cashew. However, crude fat analysis indicated cashew>groundnut>soyabean in significant differences. There were no significant differences in the dry matter contents of the experimental materials. Coefficient of variation showed significant differences in calcium and phosphorus compared with sodium, potassium and magnesium in the three oilseed crops.

Key Words: Nutritive value; Oil seeds; Soyabeans; Groundnuts; Cashew; Crops.

Introduction

The basic human and animal plant food items are derived from cereals (carbohydrates) legumes (proteins) and fats and oils. Pattern of distribution of vitamins and minerals vary considerably in these traditional food items as well as in vegetables, fruits and others. The danger of food shortages, unfeeding and malnutrition has always constituted a global concern for decades without appreciable improvement (FAO, 2001).

World view on vegetable oil sources consider economic importance in terms of human and animal consumption as well as industrial and other domestic uses like illumination, preservatives, petrochemicals and pharmaceuticals (Fetuga, 1975, Goldsworthy and Healthcole, 1984). However, taste and other quality choice are of paramount importance especially when human or perhaps animal health is at stake (Akobindu and Poku, 1989, Abdel, 1982). The recent agitation for alternative fuel energy from plant sources gives greater concern globally considering an already limited source of food for both human and animal consumption (Fetuga, 1975). However, apart from concerted efforts in producing more food for ever increasing world population, both quality of food should be equally addressed along with quantity. This is only realistic when available food and feeds are critically screened before drastic efforts are made for crop improvement by way of plant breeding.

Materials and Methods

Crude fat , protein, fibre, dry matter, carbohydrate and ash were determined from milled seeds of cashew, groundnut and soyabean according to the standard methods of Association of Official Analytical Chemist (AOAC,1984) kjeldahl principles and Osborne and Voogt, (1978). The mineral constituents of phosphorus , potassium, calcium, magnesium and sodium were determined by automated atomic absorption spectrophotometer (Perkin and Elmer Model 2380). Physico-chemical properties were determined according to the method of Cock and Van Rede (1966).

Results and Discussion

- **Proximate analysis:**

Table 1 shows the analysis of proximate composition of cashew, groundnutsand soyabean. Significant differences are indicated where coefficient of variation are marked with asterisks.

Table 1: Proximate composition of cashew, groundnut and soybeans dry matter.

Crop	Moisture content	Crude protein	Crude fat	Crude fibre	Total ash	Dry matter	NFE	Energy content
Cashew	15.12	19.78	39.15	1.02	4.48	84.79	20.36	512.29
Groundnut	13.05	26.72	21.45	3.20	3.69	86.95	31.89	427.49
Soybeans	9.23	35.31	16.75	4.95	3.96	90.77	29.80	411.19
Mean (x)	12.50	27.27	25.78	3.06	4.04	87.50	2735	450.53
S	3.03	7.78	11.81	1.97	0.40	3.03	6.14	54.63
CV(%)	24.24	28.53	45.81	64.38	9.90	3.46	22.45	12.13

- **Physico-chemical properties**

Data analysis of the physico-chemical properties of cashew, soyabean and groundnuts are shown in Table 2. observations from the table indicate significant differences in both acid and saponofocation values. However, iodine and peroxidase values varyonly marginally.

- **Data on Mineral contents**

As observed in Table 3, the mineral constituents in soyabean, cashew and groundnuts indicate significant differences in both calcium and phosphorus but not in sodium, potassium and magnesium values.

Distribution pattern in cashew, soyabean and groundnuts in respect of crude protein fat, fibre as well as ash, dry matter and energy potential compare favourably with pioneer works by Gupta, (1981) Woodroof (1983). However high fibre content in soyabean is undesirable for man and livestock because of trypsin factor which may inhibit digestibility in their digestive systems.

Significantly high acid value may be due to accumulation of Fre Fatty acid(FAA) which is common to many oil seeds under prolonged stoage(Ashaye and Afolabi, 1975). Significant differences in saponification values are implicated in choice or preferences for industrial utility in the materials. Very

significantly high level of calcium in soyabean compared with groundnut and cashew would suggest its preferences in compounding human and livestock feeds especially for good bone formation (smart, 1994).

Table 2: Physico-chemical properties of cashew, groundnut and soybeans.

Crop	ACID VALUES	IODINE VALUES	PEROXIDE VLUES	SAONIFICATION VALUES
Cashew	3.98	25.13	4.50	22.44
Groundnut	0.50	26.65	3.60	39.27
Soybeans	1.29	25.13	3.96	33.66
Mean (X)	1.92	25.64	4.02	31.79
SD	1.82	0.88	0.45	8.57
CV(%)	94.79	3.43	11.19	26.96

Table 3: Mineral composition of cashew, groundnut and soybean.

Crop	Ca	Na	K	Mg	p
Cashew	0.80	4.97	4.12	4.13	0.94
Groundnut	2.14	4.91	4.12	4.11	0.75
Soybeans	0.59	4.97	3.98	4.06	1.25
Mean (x)	1.18	4.96	4.07	4.10	0.98
S	0.84	0.04	0.08	0.04	0.25
Cv(%)	71.19	0.81	1.97	0.98	25.51

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