



PROXIMATE COMPOSITION FOR PROTEIN AND OIL CONTENTS OF SOME  
SELECTED GROUNDNUT (*Arachis hypogaea* L.) CULTIVARS  
GROWN AT KEFFI, NASARAWA STATE NIGERIA



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**Abstract:** The proximate composition for protein and oil contents of some selected groundnut cultivars showed that among all the genotypes evaluated, only ICGV-15-07947 has the highest oil content of 46.26% while others ranges from 35.03 - 39.02%. ICGV-15-07947 has the highest protein content of 29.42% than other cultivars. ICGV-15-09932 has 26.74%, ICGV-15-5891(26.47%), ICGV-15-09992(25.77%), ICGV-15-07999 and ICGV-12991 (25.23%), ICGV-15-09994(24.89%), ICGV-15-86024(24.36%) and the lowest with the protein content is ICGV-15-07803(24.02%) showing significant difference ( $p < 0.05$ ) between them. Cultivar ICGV-15-07947 has the highest protein contents and oil contents therefore its highly recommended because that makes it good for human consumption, useful animal feeds as well it could be used in soap making and when product which requires high protein content are to be developed it will be useful.

**Keywords:** *Arachis hypogaea*, proximate composition, protein, oil, genotypes

### Introduction

Groundnut (*Arachis hypogaea* L.) is an important oil crop of Brazilian origin, is cultivated in tropical and warm temperate climates. Groundnut is an important oil seed and cash crop accounting for more than one-third of the total oil seed production in Nigeria. Groundnuts are not only rich in proteins which are easily digestible and consequently, a higher biological value, but are rich in B-complex vitamins. It is a rich source of minerals (phosphorus, calcium, magnesium and potassium) and vitamins (E, K and B group) niacin, folic acid, zinc, iron, riboflavin and thiamine (Ingale and Shrivastava, 2011; Stigter and Brunini, 2007). The groundnut kernels are consumed directly as raw, roasted or boiled kernels or oil extracted from the kernel is used as culinary oil. It is also used as animal feed (oil pressings, seeds, green material and straw) and industrial raw material (oil cakes and fertilizer). The crop plays an important role in the dietary requirements of resource which in turn its haulms are used as livestock feed (Pretorius, 2006).

It is a self-pollinated leguminous crop which is believed to have originated from Latin America where it was grown by the Indian communities, but now its cultivation has spread throughout the tropical and temperate climates of the world (Van der Merwe and Joubert, 1995). Two-seeded types originating from Brazil were taken to Africa, whereas three-seeded types originated from Peru and were transported from the west coast of South America to China and islands in the western Pacific Spanish types were introduced to Europe in the late 1700s from Brazil and grown for oil and for human consumption as chocolate-covered peanuts (Stalker, 1997). Groundnut has contributed immensely to the development of the Nigerian economy. From 1956 to 1967, groundnut products including cake (kulikuli) and oil accounted for about 70% of total Nigeria export earnings, making it the country's most valuable single export crop ahead of other cash crops like cotton, oil palm, cocoa and rubber. Presently, it provides significant sources of cash through the sales of seed, cakes, oil and haulms (Olorunju *et al.*, 1999). This research work is aimed at evaluating the proximate composition of the groundnut cultivars grown in Keffi, Nigeria

### Materials and Methods

#### Collection and preparation of groundnut cultivars

Nine groundnut cultivars which includes: ICGV 15-5891, ICGV 15-09994, ICGV-12991, ICGV 15-86024, ICGV 15-07947, ICGV 15-09932, ICGV 15-07803, ICGV 15-09992 and ICGV 15-07999 obtained from the IAR (Institutes of

Agricultural Research and Extension Services) Ahmadu Bello University Samaru, were planted in plots measuring 4 x 3.6 m. Each plot were planted with five rows with an inter-row spacing of 90 cm and the intra-row spacing of 7 cm and a planting depth of 6 cm. The harvested seeds were air-dried for 4 weeks and then wrapped in separates black polythene bags sealed in a clean dry air-tight container and placed in a deep freezer (- 4°C) for 14 days to disinfect the decorticated seeds

**Table 1: Description of genotypes**

Genotypes	Sources
ICGV 15-5891	IAR
ICGV 15-09994	IAR
ICGV 12991	IAR
ICGV 15-86024	IAR
ICGV 15-07947	IAR
ICGV 15-09932	IAR
ICGV 15-07803	IAR
ICGV 15-0992	IAR
ICGV 15-07999	IAR

#### Analysis of groundnut samples

##### Seed oil determination

Oil contents of the samples were determined according to Meyer and Terry (2008). The recovered oil were weighed and the percentage oil content [% (w/w)] was calculated.

##### Seed protein determination

The Bradford micro assay was used to determine the protein contents of the samples. After the addition of reagent, the samples were read using a spectrophotometer at 595 nm (wave length) to determine the protein concentrations based on bovine serum albumin (Tsfay *et al.*, 2010).

##### Data analysis

Data were subjected to analysis of variance and the different means were separated using Fisher's unprotected testing least significant differences at 5% level when ANOVA showed significant ( $P < 0.05$ ) difference between treatments

### Results and Discussion

The proximate composition analysis for protein and oil contents of the nine groundnut cultivars as presented in Table 2 showed significant differences in protein content among each other. ICGV-15-07947 has the highest protein content of 29.42% than other cultivars. ICGV-15-09932 has 26.74%, ICGV-15-5891(26.47%), ICGV-15-09992(25.77%), ICGV-15-07999 and ICGV-12991 (25.23%), ICGV-15-09994(24.89%), ICGV-15-86024(24.36%) and the lowest with the protein content is ICGV-15-07803(24.02). This result agrees with the report of Asibuo *et al.* (2008) who reported

that groundnut crude protein values fell within the range of 8.92 to 30.53%.

The oil content also showed significant differences among the cultivars. The results of the oil percentage composition ranges from 34.23 - 46.23% this is in agreement with the report of Asibuo *et al.* (2008) who reported that, crude fat values lie within the range of 33.6 – 54.96%. The fat contents is important in diets as it promotes fat soluble vitamin absorption. It is a high energy nutrient and does not add to the bulk of the diet (Atasie *et al.*, 2009) the high crude fat values also signifies that these groundnut cultivars are viable sources of oil and will be suitable for commercial production of oil. The highest cultivar with high oil content is ICGV-15-07947(46.23) while the lowest oil content cultivar is ICGV-15-5891(34.23%) (Table 2).

**Table 2: Proximate composition of groundnut cultivars**

Genotypes	%CP	%E.E
ICGV-15-5891	26.47 <sup>b</sup>	35.03 <sup>b</sup>
ICGV-15-09994	24.89 <sup>b</sup>	39.02 <sup>b</sup>
ICGV-12991	25.23 <sup>b</sup>	37.35 <sup>b</sup>
ICGV-15-86024	24.36 <sup>b</sup>	34.23 <sup>b</sup>
ICGV-15-07947	29.42 <sup>a</sup>	46.23 <sup>a</sup>
ICGV-15-09932	26.74 <sup>b</sup>	38.68 <sup>b</sup>
ICGV-15-07803	24.02 <sup>b</sup>	36.60 <sup>b</sup>
ICGV-15-09992	25.77 <sup>b</sup>	37.89 <sup>b</sup>
ICGV-15-07999	25.23 <sup>b</sup>	37.59 <sup>b</sup>
Mean	25.79	38.07
CV	0.00	0.00

Means with same letters in same columns are not significantly different (P<0.05) using Duncan multiples range test; CP: Crude protein; E.E: Ether extracts (crude fat)

The result showed that among all the genotypes evaluated, only ICGV-15-07947 has the highest oil content while others ranges from 35.03 - 39.02% and the same genotype ICGV-15-07947 contains the highest amount of protein of 29.42% this is similar to observation made by Okello *et al.* (2010) who concluded that groundnut seeds contains 40-50% fat and 20-50% protein.

The results of the current study showed that the cultivar ICGV-15-07947 with 46.26% agree with the report of Ee and Dunford (2009) who have reported that the oil content of groundnut range from 45.7 to 48.7% and 44 to 53%, respectively. Nutritional quality (oil and protein content and amino acids) of the seed is strongly influenced by production location, genotype and season, with respect to soil moisture and temperature during crop growth and seed maturation and seed size (Dwivedi *et al.*, 1996). The oil content of kernels shows significant genotypic variations. The crop season, habit group, geographical location, soil fertility, moisture availability, maturity of crop at harvest, seed mass have a bearing on the oil content (Misra, 2004). Gashti *et al.* (2012) further stated that groundnut is an oil and protein crop and there is a mutual relationship between oil and protein production. Protein components such as amino acids are synthesized first and then the plant uses these substances in order to synthesize the oil and therefore its content enhances.

### Conclusion

This study indicated that, high level of oil is found in the genotype ICGV-15-07947 as well as high level of protein. This makes it a potential source of edible oil as such groundnut characteristically contains high level of oil and protein, with low level of moisture content, ash content, and carbohydrate. Therefore the study has established the nutritive value of the groundnut cultivars which could be considered as a good sources of protein and oil. it can be concluded that, among all the genotype evaluated, ICGV-15-07947 with the high level of oil and protein contents makes it good as cake

for human consumption, useful as animal feed, beneficial in soap making because of it oil content and when products which require high protein content are to be developed will be useful because of its high protein contents. This will aid to fight against malnutrition, especially protein-calorie malnutrition, leading to good health.

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### Conflict of Interest

The Authors declare that there is no conflict of interest related to this study.

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