

PROXIMATE CHEMICAL ANALYSIS OF *ZONOCERUS VARIEGATUS*
(GIANT GRASS HOPPER)

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ABSTRACT

Proximate composition of *Zonocerus Variegatus* has been determined as a means of assessing its nutritional potential as a protein supplement. Chemical analysis gave crude protein value of 66.30 ± 2.4 and ash value of $2.9 \pm 1.8\text{g}/100\text{g}$. Crude fat was $15.50 \pm 20\text{g}/100\text{g}$ while crude fibre was $12.40 \pm 1.8/100\text{g}$. Analysis of mineral elements showed that *Zonocerus Variegatus* is very rich in potassium, calcium and phosphorus and moderately rich in sodium, and manganese.

All the essential amino acids were found to be present at the level quoted for these amino acids by FAO. Studies are in progress to assess the nutritional suitability of the protein present in *Zonocerus Variegatus*.

Key word : *Zonocerus Variegatus*.

INTRODUCTION

Food and Agriculture Organization of the United Nation has determined that the food consumed by people in third world countries is deficient in protein, both in quantity and quality. In Nigeria the poor economic condition has contributed to inadequate consumption of protein of good quality and this has resulted in gross malnutrition. Attempts have been made by nutritionist to increase protein quality by supplementation with leaf protein (Ladeji and Okoye, 1995; crayfish and Soya bean Temple et al. 1996) have been used to complement the nutrition of babies and school age children. These supplements are few and this has increased the search for never supplements among edible insects. Crayfish has a crude protein of about $62.5\text{g}/100\text{g}$ while Soya bean has about $42.0\text{g}/100\text{g}$ and are widely used in complementary food formulation.

In Borno State of Nigeria, giant grass hopper, *Zonocerus Variegatus* is widely eaten as delicacy. These grass hoppers are caught at night during the cold whether (November- January), boiled briefly and then roasted. The roasted grass hoppers are then sold in markets. The aim of this investigation was to analyse the grass hopper chemically

and to determine its proximate composition as a means of assessing its nutritional potentials.

MATERIALS AND METHODS

Collection of *Zonocerus Variegatus* Sample for Analysis.

The grass hoppers were bought from traders in Mari and Monday markets both in Maiduguri, Borno state Nigeria and then brought to the laboratory. They were briefly exposed to hot water at 100⁰ c for about 3 mins to kill them. The intestinal portion was removed.

PROXIMATE ANALYSIS

The remaining portion of the grass hopper was dried at 60⁰ c for 8 hrs and milled. Crude lipid, crude protein (N X 6.25) and total ash were determined using the AOAC (1980) procedure. Crude fibre was estimated on the defatted sample by the method of Joslyn (1970), the amino acid profile was determined by the method of Spackman and Moore (1958) using norleucine as an internal standard; tryptophan and Cysteine were determined by the method of Gaitonde (1967). Elemental composition was determined using Zeeman polarized Hitachi model atomic absorption spectrophotometer.

RESULTS AND DISCUSSION

Table 1 gives the proximate analysis of *Zonocerus Variegatus*, Table 2 gives the mineral content, while the amino acid composition is given in Table 3.

Table 1: Proximate Composition of *Zonocerus Variegatus*
(mean of three determinations \pm SD)

COMPONENT	CONCENTRATION (g/100g dry wt).
Total ash	2.9 \pm 0.20
Crude lipid	15.5 \pm 1.10
Crude protein	66.3 \pm 1.80
Crude fibre	12.4 \pm 1.5
Nitrogen free extract	4.5 \pm 0.2

Table 2: Mineral Element Composition of Zonocerus Variegatus.

Element Concentration	(Mg/100g dry matter)
Sodium	17.70
Potassium	109.90
Calcium	117.40
Magnesium	2.50
Manganese	5.70
Iron	0.70
Zinc	0.90
Copper	0.14
Phosphorus	1860.0

Table 3: Amino Acid Composition of Zonocerus Variegatus (g/ 16g N)^a

Amino Acid	Zonocerus Variegatus	FAO reference protein ^b	% amino acid score
Isoleucine	4.2	4.2	100.00
Leucine	5.1	4.2	121.43
Lysine	5.7	4.2	135.71
Methionine	2.0	2.2	90.91
Threonine	4.0	2.8	142.86
Phenylalanine	4.5	4.2	160.71
Valine	3.4	2.8	80.95
Tyrosine	2.9	2.8	103.57
Tryptophan	1.8	1.4	128.57
Cysteine	1.6	2.0	80.00
Arginine	7.3		
Histidine	4.2		
Alanine	5.2		
Serine	5.2		
Proline	3.9		
Glycine	4.7		
Glutamic acid	15.3		
Aspartic acid	9.2		

a. values are means of three determinations (\pm SD)

b. FAO (1970).

The ash content of 2.90g/100g is lower compared to reported values for cricket, other varieties of grasshoppers and termite (Uddoh, 1982). The crude lipid (15.50/100g) is higher than the reported values for edible insects but considerable lower than in termites (Uddoh 1982). Though high lipid content may affect storing quality of edible insects, the amount present may not be enough to affect the storing quality, moreover, it may be necessary to ascertain how long this can be kept without affecting the food quality. The crude protein (66.30g/100g) is higher than for most edible insects (Uddoh, 1982; Platt 1962). The sodium, potassium, calcium and iron contents of *Zonocerus Variegatus* (Table 1) were lower, while the phosphorus was higher than the values reported for edible insects (Oguntona and Akinyele 1995)

All the essential amino acids are present in the edible insects and they compare very well with the FAO standard for these essential amino acids. Of particular interest is the high concentration of Threonine. Leucine and Phenylalanine, the levels of these amino acids are well above the FAO values. With these arrays of essential amino acids in the required proportion, consumption of *Zonocerus Variegatus* will considerably improve protein nutrition.

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