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- **Short communication**

Biochemical compositions of black carpenter ant, *Camponotus pennsylvanicus* (Hymenoptedra : Formicidae)

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Full growth adult black carpenter ants are about 3.4 to 13 mm long and they may be of black, reddish or yellowish in colour. The ant lives outdoors and indoors in decaying or hollow wood. Carpenter ants are similar to termites, but unlike termites they do not eat wood for food but they love sweets and meats, especially from other insects **(**Orkin, 2016**).**

The nutritional values of insects have long been determined by Abulude, 2004; Abulude *et al*., 2006 and Abulude *et al*., 2007). In the past, insects' consumption has mainly been confined to rural Nigeria, but nowadays it has spread to all parts of the country. There has been phenomenal rise in the costs of the conventional sources of protein like egg, fish, meat and others. To this end, there is an option to source for alternatives that are relatively cheap, hence there is the need to study this insect based on animal and human needs. The results will determine if it will be necessary to kill, conserve or breed the back ants for future use as feed to animals and food to human. Processing has assisted in eliminating or reducing some antinutrients, per chance if the antinutrients are high there may be the need for processing.

Like other insects, carpenter ants are food to fowls, lizards and other animals. There is a scanty of information on the nutritional and antinutritional compositions of the ants in Nigeria and many parts of the world. It was therefore decided to evaluate the biochemical compositions of the black carpenter ants, *Camponotus pennsylvanicus.*

Adults of the black carpenter ants were collected from Federal College of Agriculture, Akure, Ondo State, Nigeria. The ant were sundried for ten days in order to eliminate moisture, ground into fine powdery form, packed in a plastic container, labelled accordingly and stored in refrigerator prior to laboratory analysis**.**

The proximate and mineral compositions were determined as described by AOAC (2005), while phytate content was determined using the methods described by Abulude &

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Ojediran (2006). The calorific values in kilojoules were calculated by multiplying the crude fat, protein and carbohydrate by Atwater factor of 37, 17 and 17 respectively and calculated fatty acid (0.8 x crude fat) (Adeyeye *et al*., 2008).

Data obtained were generated in triplicates and analyzed using Mean, Standard deviation and one-way (one factor) analysis of variance with Duncan Multiple Range test at 95% confidence or $p < 0.05$.

Plate 1. Adult black carpenter ant, *Camponotus pennsylvanicus*

Table 1. Biochemical Compositions of black carpenter ant, *Camponotus pennsylvanicus*

Parameters	Values
PROXIMATE COMPOSITION (%)	
Protein	22.50± 0.12^{b}
Fat	1.00 ±0.02^{c}
Carbohydrate	30.86 2.51^{bc}
Moisture	42.52 ±0.32^{b}
Fiber	1.46 ±0.02^{a}
Ash	1.66 ±0.2^{cd}
Energy	35.4Kcal ±2.51^{bc}
MINERAL COMPOSITION (mgkg^{-1})	
Sodium	610 ±2.32^{c}
Zinc	4.86 ±0.20^{c}
Calcium	524 ±2.30^{e}
Potassium	34.85 ±2.02^{c}
Magnesium	40.32 ±2.34^{c}
Copper	3.11 ±0.02^{d}
Iron	3.22 ±0.02^{a}
Nickel	1.21 ±0.05^{b}
Manganese	21.33 ±0.07^{b}
ANTI NUTRIENT COMPOSITION (mgkg^{-1})	
Oxalate	1.35 ±0.20^{a}
Phytate	62.79 ± 0.20^{b}
Tannins	0.72 ±0.20^{c}

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same row are significantly not different ($p > 0.05$).

Table 1, Showed the proximate composition of carpenter ants, the moisture content value was 42.52%, while others ranged thus; carbohydrate 30.86%, protein 22.50% Ash 1.66% fibre 1.46% and fat 1.00%. The mineral composition of carpenter ants, revealed that carpenter ants contained Na (610mgkg^{-1}), Ca (524mgkg^{-1}), Mg (40.32mgkg^{-1}), K (34.85mgkg^{-1}), Mn (21.33mgkg^{-1}), Zn (4.86mgkg^{-1}), Fe (3.22mgkg^{-1}), Na (1.21mgkg^{-1}) and Cu (3.11mgkg^{-1}). The anti-nutrient present in the black carpenter ants were 62.79mgkg^{-1}, oxalate (1.35mgkg^{-1}) and tannin (0.72mgkg^{-1})

The results obtained in this study showed that the sample analyzed contain appreciable amount of nutrients which compared favorably with the conventional feeds. The crude protein content 22.50% was lower than 39.9% recorded for cricket (Abulude, 2004). Also, the ant sample's carbohydrate content was lower than 35.75 – 71.22% found in varieties of mushrooms (Ndamitso & Abulude, 2013).

There was little or no difference in the proximate analysis between the carpenter ant and that of cowpea and soyabean, although the fat extracted in carpenter ant had a low percentage of fat 1.00% compared to that of *D. alata* (Udensi *et al*., 2010))

The ash content which is an indication of the percent mineral component of the ant was relatively high, it could be deduced that the ants will contain high levels of minerals.
The anti-nutrients are relatively high. This is an indication that some mineral and protein might not be available for the consumers of this sample. Anti-nutrients are known to inhibit the absorption of mineral and other food nutrients in the body.

The study confirmed that carpenter ants contained high protein, fat, and carbohydrate, it may be good as alternatives to other convectional feeds for animals.The limitation of this sample could be the high content of phytate, oxalate and tannin, but it would be recommended that the sample should be subjected to different processing methods like boiling, autoclaving and so on before consumption.

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