

Proximate Macromolecular (Crude Protein & Lipid) Comparative Analysis between *Cyperus Rotundus* and *Cyperus Tuberosus* of North-Western Nigeria

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Abstract: The goal of this research is to determine, quantify and compare the crude protein and lipid in *C. rotundus* and *C. tuberosus*. 10g each of *C. rotundus* and *C. tuberosus* was weighed and ground. 4g of each ground sample was taken to determine protein and 1g for lipid respectively. Both crude protein and lipid were determined. Statistically, the mean percentage protein was significantly higher ($p < 0.05$) in *C. rotundus* than that of *C. tuberosus*. Statistical mean percentage lipid significantly higher ($p < 0.05$) in *C. rotundus* was found in while lower in *C. tuberosus*. Hence, *C. rotundus* has higher macromolecules than *C. rotundus* and more preferred for use than *C. tuberosus*.

Keywords: *Cyperus rotundus*, *Cyperus tuberosus*, Protein and Lipid.

1. Introduction

Cyperus rotundus (*C. rotundus*) also called java grass, nut grass, ^[12] purple nut sedge, ^[9] is a species of cyperaceae found mostly in Africa, southern and central Europe, and southern Asia. *C. rotundus* is perennial plant that grows up to 55 inches, ^[2]. It prefers dry condition even though, can tolerate moist soil, ^[7]. It has so many medical values such as treating digestive system disorder, dysmenorrhoeal and other maladies, ^[7, 17]. It has been described by many herbalists it serves as stomachic, emmenagogue, deobetruent and in emollient plasters, ^[3].

Cyperus tuberosus (*C. tuberosus*) also called nut grass cheaply found in Africa and India, ^[5]. It grows in dried up pool, marshy and sandy area, river bank and rice cultivating field, ^[5, 6] and open place, ^[11]. It has been found that the tuber of this plant were eaten and use as a medicinal plant for spasm and coolant for indigenous medicine, ^[5].

Protein is a polymer of amino acids which abundantly occur in living cells, ^[15]. The efficiency and extend to which dietary protein can be used to build body depend solely on the quantity of amino acid present in a given protein, ^[19]. It has been reported that 2 table spoons of nut contain 5g of protein, ^[18]. Proteins are tasteless, odourless with variably high molecular weight, ^[4]

Lipids are group of heterogeneous group of hydrophobic biomolecules that have biological functions include energy store, signaling and cell structural component, ^[4, 10]. This research aimed at quantifying, analyzing and comparing the crude protein and lipid in *C. rotundus* and *C. tuberosus* as well as suggesting the best one to be using off.

2. Materials and methods

2.1 Material

Cyperaceae species, Analytical balance (Elit 210-4), Kjeldhal digestion apparatus (BHA India), Vacuum oven (OVL/570010J), Soxhalet apparatus, Petri dishes.

2.2 Methodology

2.2.1. Experimental design

About 10g of each *C. tuberosus* and *C. rotundus* was ground and specified measured portion was taken out for experimentation.

Crude fat determination using FAO principle, [11]

About 4g each of *C. rotundus* and *C. tuberosus* was ground and placed on ashless filter paper and tied on a thumble which was then transferred to 150ml beaker and dried at 100°C for 2 hours. The crude fat was extracted extensively with diethyl ether in soxhalet apparatus. The solvent was removed by evaporated and the residue (fat) was weighed and recorded into table 1.

Crude protein determination using Kjeldhal principle, [14]

About 1g each of the samples was weighed and transferred into Kjeldhal digestion flask followed by 0.5g of catalyst and 2 ml of concentrated H₂SO₄. The nitrogen from the protein is converted to (NH₄)₂SO₄. The digest was heated for an hour to make the solution clear which was then cooled and 12ml 14%NaOH was added to make it alkaline. The digest was then transferred to steam out apparatus. The ammonium steam was distilled into 10ml of 2% boric acid solution. The distilled NH₃ was the titrated with 0.02M HCl. The protein was calculated in gram and converted to percentage as shown in table 1.

3. Statistical Analysis

The data obtained from proximate macromolecules were subjected to analysis of variance (ANOVA). At 5% level of probability, the correlation analysis was carried out to ascertain the relationship between the determined compositions of *Cyperaceae* species. The data were also subjected to T-test for mean difference comparison between the macromolecules determined.

4. Result

Table 1: Result for Crude Lipid and Protein determined in *Cyperaceae* species

compositions	<i>C. rotundus</i> (%)	<i>C. tuberosus</i> (%)
Crude lipid	25.2±1.01	2.9±0.01
Crude protein	7.8±0.31	2.9±0.10

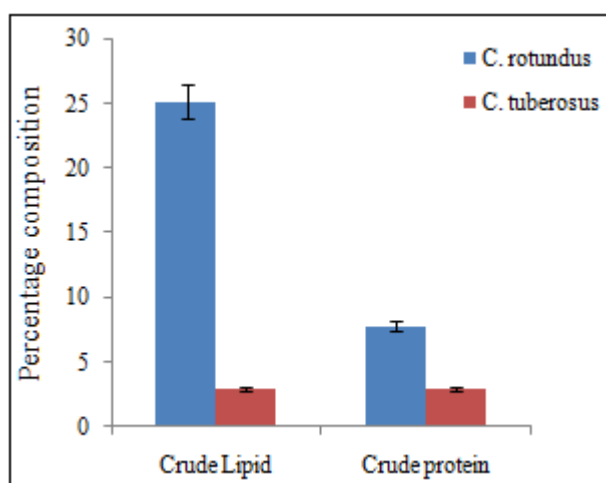


Figure 1: Comparative Percentage Crude Lipid and Crude Protein Composition between *C. Rotundus* and *C. Tuberosus*

5. Discussion

It can be depicted from both table 1 and figure 1 above that, the mean level of crude lipid in *C. rotundus* was significantly ($p < 0.05$) much higher than that of *C. tuberosus*. It has been reported by Mason and Farre [12, 16], that *Cyperaceae* species contain high content of nutrients lipid inclusive. In comparison, mean percentage level crude protein was found statistically higher ($p < 0.05$) in *C. rotundus* than *C. tuberosus*. This was in conformity with the research conducted by Ekeanyanwu and Ononogbu that high protein content was detected in *Cyperaceae* species. Even though varies among the species, [8].

6. Conclusion

C. rotundus has higher nutrients than *C. tuberosus* and therefore it should be more advantageous than the later. For medicinal purpose, *C. rotundus* is more preferable than *C. tuberosus*.

7. Recommendation

We recommend that more proximate researches on nutritional content should be done so as to have better

decision. To test the physiological effects of *Cyperaceae* species, it should be administered orally to experimental animals and check the sugar and protein levels as well as lipid profile.

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