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EVALUATION OF NUTRITIONAL COMPOSITION OF WATERLILY (*Nymphaea lotus* Linn) FROM TATABU-FLOOD PLAIN, NORTH - CENTRAL, NIGERIA

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ABSTRACT

The proximate composition of leaves, petiole, root, rhizome and seeds of waterlily harvested from Tatabu flood plain/wetlands were determined and analyzed in percentages. Moisture content was highest in the rhizome (20.40 ± 1.241) while the seeds gave the lowest value of (4.18 ± 0.176). The highest value for Ash content was observed in the root (27.36 ± 1.261) and the seeds gave the lowest (2.81 ± 0.498). Highest value for the Crude fat was obtained from the seeds (9.95 ± 0.637) whiles the petiole gave the lowest value of (2.27 ± 0.377). The Crude protein and Crude fibre values were highest in the leaves (19.5 4± 0.782) and; (15.53 ± 0.448) while the lowest was obtained in the seeds (3.27 ± 0.104), (1.60 ± 0.200) respectively. There was a significant differences among the parts analyzed for the Ash content ($p<0.05$). The NFE varied from (31.21 ± 2.176) to (78.15 ± 1.418)

Keywords: Flood plain, Waterlily, proximate composition,

INTRODUCTION

Aquatic plants grow profusely in lakes and waterways all over the world and have both negative and positive implication on water bodies. Eradication of these plants has proved almost impossible and even reasonable control is difficult. Turning these plants to productive use would be desirable if it would partly offset the costs involved in mechanical removal. Among other uses, there has been considerable interest in using aquatic plants as a source of animal feed (Anon, 1984). Tropical and subtropical floodplains possess an abundance of aquatic macrophytes of different species and ecological groups (Bini *et al*., 2001). The presence of these macrophytes generally represents high primary production, biomass, nutrient cycling and stock capacity for the ecosystem (Henry-Silva *et al*., 2001). For animals, they contribute to the feeding of herbivores and detritivores (Maine *et al*., 1999; Pompêo *et al*., 1999) in addition of serving as food substrate for algivores and invertivores (Casatti *et al*., 2003).

Waterlilies, commonly known as *Nymphaea*, a genus of herbaceous aquatics hailing from almost every part of the world has been among the prominent aquatic macrophytes that have been identified in Nigerian freshwater bodies (Obot and Ayeni, 1987). Impact of some macrophytes on water bodies have been highlighted by many authors (Obot, 1984; Mbagwu and Adeniji, (1988), Ita, (1993), Ogunlade, (1996), Awodoyin, 2004). However, there is dearth of information on waterlily despite its presence on many of our fresh water bodies in the country and its usefulness among the fisher folk (Mohammed and Awodoyin, 2008).

This macrophyte usually forms one of the most common macrophytes that grow throughout the year on our shallow water bodies including fish ponds. Unfortunately information on the agronomical characteristics and nutritive value which is important to aquaculture is highly limited.

Further more, it has been observed that people of the North Eastern part of this country eat and market the seeds of waterlily (Un-published). Study conducted on ethno-botanical uses and socio-economic importance of waterlily to the fishing communities in the Kainji Lake Basin revealed that the people do utilize the leaves, petiole, roots and seeds in preparation of concoction for different ailment and consumption (Mohammed *et al*, 2008)

However, before advocating the utilization of this weed for supplementation of fish/livestock feeds, there is need to explore the nutritional quality and anti-nutritional composition. The present study was undertaken to investigate the nutritional potential (proximate analysis) of waterlily to ascertaining its suitability for use as fish feed.

MATERIALS AND METHODS

Sampling Site

The experimental macrophyte, waterlily, was harvested from Tatabu flood plains/wetlands. Three samples of the macrophyte were collected from the study site and send to the laboratory for analytical processes. The macrophyte categorized into four parts, viz. leaves, petioles, roots and rhizomes, all in triplicate were subjected to proximate analysis.

Laboratory Analysis

The samples were thoroughly washed, dried and weighed. The proximate analyses for moisture, ash, lipid (fat) content, crude protein and crude fibre were carried out in triplicates according to the methods described by AOAC (1990). Nitrogen was determined by the micro-kjedahl method as modified by Cocon and Diane (1973) and the nitrogen content was converted to protein by multiplying by 6.25 (Jeanette 1987). All proximate results were expressed as percentage of sample analysed.

RESULTS AND DISCUSSIONS

The proximate composition of the waterlily samples collected from Tatabu flood plain /wetlands on dry weight basis are presented in **Table 1.** The table show the mean of percentage moisture content, ash content, crude fat, crude protein, and crude fibre for the five sampled parts of water lily which consists of leaves, petioles, roots, rhizomes and seeds.

The seeds had the least range of moisture content of (4.18 ± 0.176%) and there was a significant difference among the replicates ($p<0.05$) while the rhizome has the highest range of moisture content of (20.40 ± 1.241 %) with no significant difference ($P>0.05$) among the replicates. This equally exhibits one of the characteristics of emergent aquatic plant (Little, 1979)

The percentage ash content of the samples analyzed shows a high value obtained for the petioles (27.36 ±1.261%). The percentage crude fat recorded the minimal value of nutrients in all the samples collected and analyzed. The seeds recorded the highest value crude fat of (9.95 ± 0.637%), which might be due to the oily nature of the seeds.

The highest percentage crude protein was obtained from the leaves (19.54 ± 0.782%) while the minimal value was recorded in the seeds (3.27 ± 0.104%). The crude protein content of water lily leaves obtained in this study is higher than that obtained for water hyacinth leaves (15.29%) (Okoye, *et al*, 2000), palm kernel cake (19.06%) (Eyo, 1994) and close to duck weed (26.30%) (Mbagwu and Adeniji, 1988). Crude protein is an important feed ingredient normally used as a major ingredient in fish feed formulation

The value of crude fibre varies from (1.6 ± 0.20 %) in the seeds to (15.53 ± 0.0448 %) in the leaves. It is an important part of any diet. The study revealed that all the morphological parts of this macrophyte are made up of fibrous structure.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the proximate analysis of five different parts of water lily (leaves, petioles, roots, rhizomes and seeds) has demonstrated that among, the tested aquatic macrophytes, water lily could be a good source of protein for incorporation in fish diet. Though some anti-nutritional factors may be present in this macrophyte but it has not been evaluated. Therefore, there is need to carry out detail study on its mineral composition and other important anti-nutritional factors.

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Table 1: Proximate Composition (% Dry weight) of harvested parts of water lily from Tatabu flood plain (values shown are mean ± S.E; n = 3)

Parameter	Leaves	Petiole	Root	Rhizome	Seeds
Moisture content (%)	6.40 ± 0.321	6.17 ± 0.344	4.85 ± 0.377	20.40 ± 1.241	4.18 ± 0.176
Ash Content (%)	14.48 ± 0.347	27.36 ± 1.261	22.55 ± 1.032	9.68 ± 0.193	2.81 ± 0.498
Crude fat (%)	4.83 ± 0.209	2.27 ± 0.377	2.93 ± 0.176	2.82 ± 0.260	9.95 ± 0.637
Crude Protein (%)	19.54 ± 0.782	9.04 ± 0.194	5.03 ± 0.318	11.47 ± 0.315	3.27 ± 0.104
Crude fibre (%)	15.53 ± 0.448	15.10 ± 0.776	12.53 ± 0.405	13.24 ± 0.350	1.60 ± 0.20
Nitrogen Free Extract (%)	44.78 ± 2.121	34.74 ± 1156	42.71 ± 1469	31.21 ± 2.176	78.15 ± 1.418