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Full Length Research Paper

The Effect of De-Fatted *Moringa Oleifera* Seed Powder on Growth Rate and some Biochemical Parameters of Albino Rats

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ABSTRACT

The nutritional and therapeutic properties of *Moringa oleifera* cannot be overemphasized, since all the parts of the plant (leaves, seeds, root, bark, pods etc.) have been reported to possess anti-biotic, anti-hypertensive, anti-tumor and anti-oxidative activities. This study, seeks to determine the effect of defatted *Moringa oleifera* seed powder on growth rate and some biochemical parameters of albino rats. Fifteen albino rats, divided into three groups (A, B and C), were fed with commercial rat pellets, casilan and defatted *Moringa oleifera* seed powder respectively for 21 days with their weights measured at 2 days interval. The rats were sacrificed and sera collected after the feeding trial. Aspartate and Alanine transaminases, alkaline phosphatase and total bilirubin levels were estimated using Reflotron Plus Chemistry Analyzer. The result of the growth rate showed a growth increase from 80.10 ± 3.56 to 100.98± 5.47 for the rats fed with commercial rat pellets and a decrease in growth from 66.70± 7.55 to 56.31± 8.50 and 52.28± 7.10 to 40.95± 5.89 for the rats fed with casilan feed and defatted *Moringa oleifera* seed powder respectively. Using statistical analysis (one-way ANOVA), it was discovered that there was no significant change in the tested biochemical parameters of the populations at 95% level of significance ($p<0.005$). Therefore, the defatted *Moringa oleifera* seed powder did not support growth and did not pose any toxicity effect to the liver.

Key words: *Moringa oleifera*; transaminases, bilirubin, alkaline phosphatases, casilan.

INTRODUCTION

Over the past two decades, many reports have appeared in mainstream scientific journals describing the nutritional and medicinal properties of *Moringa oleifera* (Lam). (Fuglie, 1999 and Fahey, 2005)

Moringa oleifera trees also known as Okwe oyibo, Oku ghara ite, Okochi egbu or Okwe olu etc. **Igbo**; Adagba maloye, Ewe ile etc. **Yoruba** and zogall, zogalla-gandi etc. **Hausa** (Ozumba *et al.*, 2009), have been used to combat malnutrition, especially among infants and nursing mothers. In fact, the nutritional properties of *Moringa oleifera* are now so well known that there seems to be little doubt about the substantial health benefits to be realized by the consumption of its leaves in situations where starvation is imminent (Fahey, 2005).

The therapeutic properties of *Moringa oleifera* cannot be overemphasized, since all parts of the plant (i.e leaves, seeds, roots, oil, bark etc) have been reported to possess antibiotic activity, anti-hypertensive, anti-pyretic and anti-oxidative activities (Fuglie, 1999; Ozumba *et al.*, 2009; Igwilo *et al.*, 2011 and Nsofor *et al.*, 2012).

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Owing to the nutritional properties of the plant, it is expected that consumption of the seed support growth without exerting any toxic effect on certain sensitive organs of the body-especially the liver. Hence, this work was carried out to monitor the effect of defatted *Moringa oleifera* seed powder on growth rate and some biochemical parameters of albino rats.

EXPERIMENTAL

Sample Collection and Preparation

The seeds were bought from the department of Agricultural Engineering, Nnamdi Azikiwe University, Awka and were dried in a cool and well ventilated room. They were ground into powder and defatted using Soxhlet oil extraction method. After defatting, the sample feed was compounded and made into pellets.

Animal Grouping and Sample Administration

Fifteen albino rats were divided into 3 groups (A, B, and C) with 5 rats in each group. Groups A and B were fed with commercial rat pellets and casilan feed respectively; while group C was fed with feed containing the defatted *Moringa oleifera* seed powder.

The rats were fed with the respective feeds for 21 days and their weights measured at 2 days interval.

Serum Collection

After the 21 days of feeding and weighing, sera were collected from the rats for analysis. The rats were anaesthetized with chloroform and the blood collected straight from the heart into a clean and dry centrifuge tube. After centrifugation, the separated sera were collected into sample containers using Pasteur pipette.

Determination of Aspartate (AST) and Alanine Transaminases (ALT), alkaline Phosphatase (ALP) and Total Bilirubin

Analysis of AST, ALT, ALP and total Bilirubin were made using Reflotron Plus chemistry analyzer. The principle of the analyzer is based on the use of reflectance photometry to measure the colour produced on the test pad as the test reaction occurs on it depending on the parameter measured. The test strips are loaded with the appropriate reagents. The reagents then react with the chemical parameter being measured and a colour is produced which is proportional to the concentration of the parameter that is measured.

RESULTS

Figure 1, shows the growth profile of the rats fed with the different preparations. The rats that were fed with commercial rat pellets showed a growth rate of 80.10 ± 3.56 to 100.98 ± 5.47. Those that received the defatted *Moringa oleifera* seed preparation showed a negative growth rate of 52.28 ± 7.10 to 40.95 ± 5.89; while those that were fed with Casilan preparation showed a growth rate of 66.70 ± 7.55 to 56.31 ± 8.50.

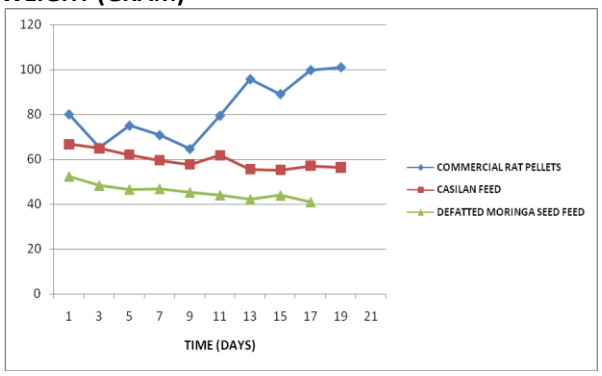

Figure 1: Shows the growth rate of rats fed with commercial rat pellets, casilan feed and de-fatted *Moringa oleifera* seed feed respectively.

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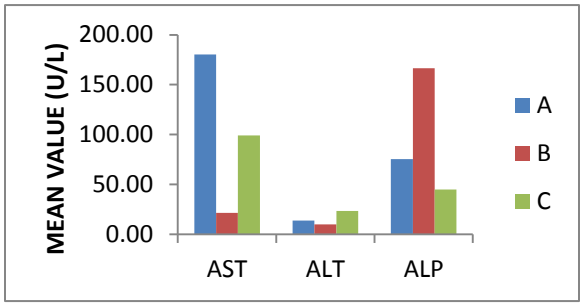
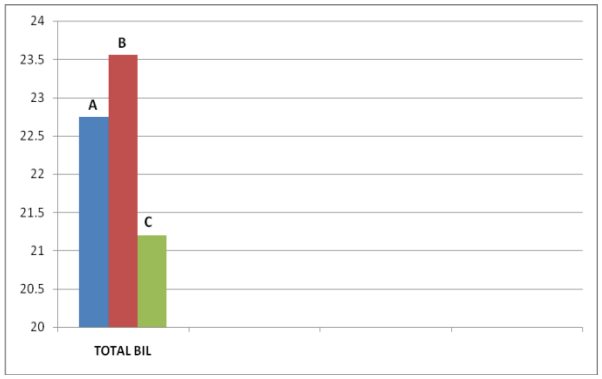
The enzyme levels of the 3 groups (as tested) are shown in Figure 2. The AST levels of the group that received the defatted *Moringa* seed preparation, Casilan feed and commercial rat pellets were 180.25 (U/L), 21.40 (U/L) and 99.20 (U/L) respectively. Their ALT levels were 13.72 (U/L), 10.00 (U/L) and 23.60 (U/L) respectively. The ALP levels showed that the experimental group had 75.50(U/L) while those that received the commercial rat pellets had 45.00 (U/L). The group that was fed with the Casilan preparation had 166.47(U/L).



A = *Moringa* seed feed,
B = Casilan feed,
C = Commercial rat pellets
Figure 2: Shows the mean values of AST, ALT and ALP of rats in the different feed groups.

Figure 3, shows bilirubin levels of the 3 experimental groups. The group that was fed with the defatted *Moringa* seed diet had 22.75 (Umol/L); those that received commercial rat pellets had 21.20 (Umol/L) while those fed with the Casilan diet had 23.56 (Umol/L) of bilirubin levels.

MEAN VALUES
Umol/L



A = Rats fed with defatted Moringa seed feed, B = Rats fed with Casilan feed, C = Rats fed with Commercial rat pellets.
Figure 3: Shows the mean values of total bilirubin in the different feed groups

DISCUSSION

From the results of the study, it was discovered that the rats fed with defatted *Moringa oleifera* seed powder diminished in weight as against those fed with commercial rat pellets. This is an indication of impaired growth. The growth impairment may have resulted because of possible presence of certain antinutrients -which may be removed if the seed is further processed. It has been reported that frying, cooking and soaking removed the antinutrients in seed (Igwilo *et al*, 2007[a]; Igwilo *et al*, 2007[b]; Akubugwo *et al*, 2007). The absence of the oil which comprises 412.0g of seed content (Oliveira and Silveira, 1999), could have also been a factor.

The high levels of Aspartate transaminase observed in rats fed with the defatted *Moringa oleifera* seed powder may have resulted because of factors like inflammation of the heart and increased haemolysis, since it is found at high

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concentrations in the heart, erythrocytes and muscle tissues.

Alanine transaminase, Alkaline phosphatase and Bilirubin levels of rats fed with defatted *Moringa oleifera* seed powder and those fed with the commercial rat pellets, fell within the normal range. Hence, it is an indication that the defatted *Moringa oleifera* seed powder posed no threat to the liver. The liver is by far the richest in ALT; therefore elevation of blood ALT levels (or concentration) is more specific for liver damage.

However, the one-way ANOVA statistical analysis done at 95% significance level, showed that there was no significant change ($p<0.05$) in the parameters of the population tested.

CONCLUSION

The defatted *Moringa oleifera* seed powder did not pose any threat to the liver although it did not support growth. However, it is safe to be taken for its therapeutic benefits. The *Moringa oleifera* seed, whether defatted or not can be made to support growth by processing it further.

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