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Effect of Soaked *Moringa oleifera* Seeds on Growth Rates and the Levels of Some Biochemical Parameters in Albino Rats

[1]I.O. Igwilo, [1]T.J. Ogoke, [1]D.O. Ogbu, [2]S.N. Igwilo, [3]E. Obi and [4]M.S. Abdulsalami,
[1]Department of Applied Biochemistry, Nnamdi Azikiwe University, Awka, Nigeria
[2]Department of Human Kinetics and Health Education, Nnamdi Azikiwe University, Awka, Nigeria
[3]Department of Haematology and Toxicology, Nnamdi Azikiwe University,
Nnewi Campus, Anambra State, Nigeria
[4]Department of Biological Sciences, Nigerian Defence Academy, Zaria, Kaduna State, Nigeria

Abstract: *Moringa oleifera* is a multipurpose tree, cultivated in the tropics and sub-tropics for its nutritional and therapeutic properties. The raw matured seeds which have been reported to be used as food and clarifying agent of turbid water caused growth retardation in albino rats and this might have been due to its anti-nutritional contents. Owing to these adverse factors, the effect of soaking the seeds for 30 min and then compounding it as feeds was done. Its effect on growth rate and the level of some biochemical parameters on rats were investigated. The Wistar albino rats were fed for 21 days and their weights measured at 2 days interval. Aspartate and Alanine transaminases, Alkaline phosphatase and total bilirubin levels were assayed using Automated Vitros 350 Chemistry Analyzer. The growth rates of rats fed with the commercial rat pellets, Casilan diet and the processed *Moringa* seed diet had a range of 80.06±3.54 to 100.98±5.37, 66.70±7.54 to 55.23±7.47 and 52.99±4.15 to 35.47±2.26, respectively. The parameters assayed for the group that received the processed *Moringa* seed diet are 144.00±16.80 (AST), 41.00±7.05 (ALT), 66.50±8.80 (ALP) and 12.45±1.18 (Total Bilirubin). The one-way ANOVA statistical analysis indicated that there was no significant change in the parameters of all the groups at 95% significance level ($p<0.05$). Hence, the soaked *Moringa oleifera* seed did not support growth in the animal subjects and also did not pose a threat to the liver. However, it is better to develop more suitable processing methods to improve the seed's nutritional capabilities.

Key words: *Moringa oleifera*, anti-nutritional factors, ALT, AST, ALP

INTRODUCTION

The use of medicinal plants in the treatment of diseases is becoming more common especially in less developed countries in Africa and Asia. One of the medicinal plants that are highly pharmacological is *Moringa oleifera* (Lam)-a perennial softwood tree with timber of low quality. The plant known in vernacular languages as Okochi-egbu, Okwe-olu etc. (IGBO); Adagba maloye, Ewe ile etc. (YORUBA) and Zogalla-gandi, Zogall etc. (HAUSA) (Ozumba *et al.,* 2009; Igwilo *et al.*, 2010), is erect, slender, has medium-like fruits, small white flowers and tear-drop shaped round leaves (Nambiar, 2006). The tree is commonly referred to as "*Moringa*", which is the only genius in the family Moringaceae (Quattrocchi, 2000) and is grown mainly in the semi-arid, the tropical and sub-tropical regions (Nsofor *et al.*, 2012).

Moringa has both therapeutic and nutritional importance. It is also used in animal forage, biogas, domestic cleaning, biopesticide and water purification (Fuglie, 1999, 2001). In fact, according to Fahey (2005), almost all parts of the tree are useful and have long been consumed by humans. It is reported that the protein content of the seed is almost 28% and no toxic agent has been found in it. However, it has been reported that feeding rats with a diet containing the seed showed impaired growth and caused enlargement of the liver and kidneys (Oliveira *et al.*, 1999).

Since the seed has been reported to possess nutritional and therapeutic properties, it was therefore vital to find out if soaking the seeds will improve its effect on growth rate without posing threat to some organs of the body. Hence, the purpose of the research was to determine the effect of the soaked *Moringa oleifera* seeds on growth rate and some biochemical parameters of albino rats.

Corresponding Author: I.O. Igwilo, Department of Applied Biochemistry, Nnamdi Azikiwe University, Awka, Nigeria

MATERIALS AND METHODS

Collection and processing of seeds: The *Moringa oleifera* seeds were bought from the Agric Engineering department of Nnamdi Azikiwe University, Awka. The seeds were sorted and cleaned before soaking in water for 30 min. After soaking, they were air-dried and ground into powder using a grinding machine. The ground seeds were then compounded into feed for the feeding experiment.

Animal treatment: The Wistar albino rats (15) were grouped into 3 sets-an experimental group and two control groups. Each group contained 5 rats and were fed for 21 days. The experimental group was fed with the diet compounded with the processed *Moringa* seeds while the first control group was given commercial rat pellets. On the other hand, the second control group received a Casilan diet. The weights of the rats were measured at 2 days interval within the 21 days of feeding.

After the feeding period, the animals were sacrificed and their sera collected for enzyme analysis.

Analysis of aspartate (AST) and alanine transaminases (ALT), alkaline phosphatase (ALP) and bilirubin: The AST, ALT, ALP and Bilirubin levels were determined using VITROS 350 AUTOMATED CHEMISTRY ANALYZER.

RESULTS AND DISCUSSION

The growth profile of the rats fed with the different diets is shown in Fig. 1. The growth rate of the rats that received commercial rat pellets was 80.06±3.54 to 100.98±5.37 while that of those that received the soaked *Moringa* seed diet was 52.99±4.15 to 35.47±2.26.

Figure 2 shows the blood enzyme levels of the 3 groups. The AST levels of the experimental group and the group that received commercial rat pellets were 144.0 U L^{-1} and 79.2 U L^{-1}, respectively while, their ALT levels were 41.0 U L^{-1} and 23.6 U L^{-1}, respectively. The ALP levels showed that the group that received the soaked *Moringa* seed diet had 66.5 U L^{-1} activity and those that were given the commercial rat pellets had 45.0 U L^{-1} activity.

The bilirubin levels of the 3 groups as shown in Fig. 3. The group that were fed with the soaked *Moringa* seed diet had 12.45 Umol L^{-1}; those that received

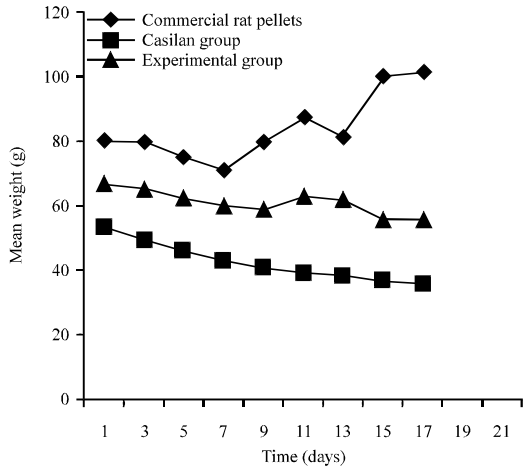

Fig. 1: Growth profile of the groups that received commercial rat pellets, casilan diet and the soaked *Moringa* seed diet

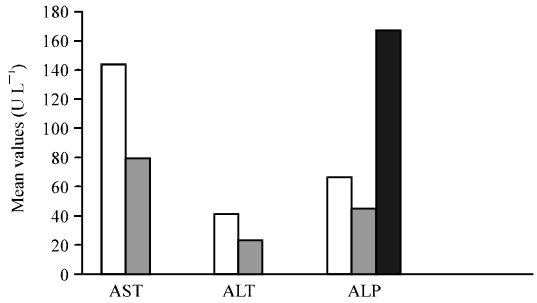

Fig. 2: Mean enzyme activity of AST, ALT and ALP for the groups that received the soaked *Moringa* seed diet, Commercial rat pellets, and Casilan diet, respectively

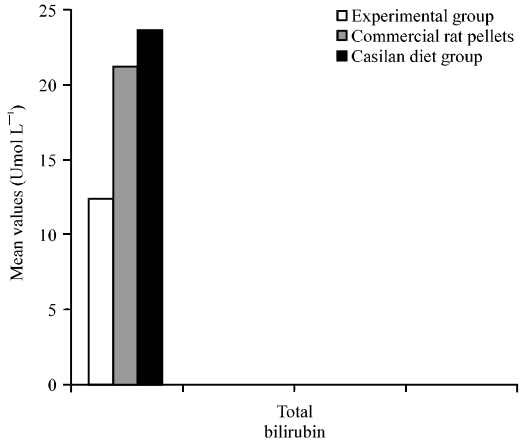

Fig. 3: Mean concentration of total bilirubin of the group that received soaked *Moringa* seed diet, commercial rat pellet and casilan diet, respectively

commercial rat pellets had 21.2 Umol L^{-1} while those fed with the Casilan diet had 23.56 Umol L^{-1}.

From the results obtained, it was seen that the soaked *Moringa oleifera* seeds did not support growth, as the rats diminished in weights for the period of the feeding. This may have been due to the presence of some anti-nutritional factors that could not be removed by soaking for 30 min alone.

However, frying and cooking can suffice, as they have been reported to remove the anti-nutrients present in plants (Igwilo *et al.*, 2007a, b; Akubugwo *et al.*, 2007).

The elevated levels of Aspartate transaminase recorded in the groups fed with the soaked *Moringa* seed diet and commercial rat pellets, can be said to have been an indication of myocardial infarction and increased haemolysis, since it is found at higher concentrations in the heart , muscles and the eryhthrocytes (Nelson and Cox, 2008).

The normal levels of alanine transaminase, alkaline phosphatase and bilirubin observed, showed that the seeds posed no threat to the liver. This is inconsistent with Oliveira *et al.* (1999), who reported that feeding rats with *Moringa* seed meal caused enlargement of the liver and some other vital organs of rats.

However, it was observed, using statistical analysis, that there was no significant change ($p<0.05$) in the tested biochemical parameters of the groups.

CONCLUSION

The soaked *Moringa* seeds did not support growth and also did not pose any threat to the liver.

However, it is recommended that more research be carried out on how best the seed can be processed so that its growth potentials can be maximally harnessed.

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