Journal of Medicinal Herbs and Ethnomedicine 2017, 3: 26-30
doi: 10.25081/jmhe.2017.v3.3373
http://updatepublishing.com/journal/index.php/jmhe/

ISSN: 2455-0485

REGULAR ARTICLE

HEPATOTOXIC ASSESSMENT OF *PECRALIMA NITIDA* SEEDS SUPPLEMENTED DIET IN WISTAR RATS

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ABSRACT

This study assessed phytochemical constituents of *Pecralima nitida* seed extract and its effect on liver enzymes activities of male albino rats fed *Pecralima nitida* seed supplemented diet. A total of twenty male albino rats were used for this study and were randomly divided into four groups of five rats each. Group I was fed with normal rat feed and water, group II was fed with 50% *pecralima nitida* seed and 50% normal rat feed, group III was fed with 70% *pecralima nitida* seed and 30% normal rat feed while group IV was fed with 90% sample and 10% normal rat feed for a period of twenty eight days. The preliminary phytochemical profile showed the presence of flavoniod, saponin, tainins, glycoside, alkaloid, phenol and steroid. These bioactive compounds may contribute to the reputed medicinal efficacy of *pecralima nitida* seed. Liver enzymes activities such as AST showed no significant difference between the control (24.39±3.6IU/l) and group II (25.88±3.7IU/l) but significantly increased in group III (37.38±7.2IU/l) and group IV (42.19±2.1IU/l). The other enzymes ALT and ALP showed significant statistical increase in groups II-IV ($P<0.05$). The histological evaluation shows that group III and IV had evidence of degenerative tissues induced by 70% sample and 30% normal rat feed and 90% and 10% normal rat feed. This however showed and suggested that irrespective of the reputed medicinal relevance of *pecralima nitida* seed, care should be taken in the quantity of these extract that is consumed as this may exhibit cumulative toxicity leading to functional impairment in the integrity of the liver.

Keywords: *Pecralima nitida*, Liver enzymes, Hepatotoxicity, Phytochemicals

INTRODUCTION

Medicinal plants have played an important role in treating a variety of diseases throughout the world due to its accessibility and cheap sources. Plants have formed the basis of traditional system of medicine that have been in existence for thousands of years and has continued to provide human kind with medical remedies. Several medicinal plants have been used in treatment of diseases without regulated regime [1]. *Picralima nitida* is commonly known as Osi-igwe in south eastern Nigeria and Akuamma in Ghana. *Picralima nitida* is a tropical small bushy tree of the family *Apocynaceae*. It has large glossy leathery leaves, conspicuous white flowers and large orange coloured fruits [2]. *Picralima nitida* is a monotypic plant exploited locally in Nigeria for its therapeutic value and equally employed as an arrow in fish poison [3]. *Picralima nitida* bears white flowers (about 3 cm long) with ovoid fruits [4]. Studies have shown that *Picralima nitida* has analgesics activities [5] hypoglycemic effects [6] and antimicrobial properties [7]. The fruit is smooth with a size about 15x10 cm and contains flattened seeds [8]. *Picralima nitida* has been reported to have wound healing properties and effective in the treatment of fever [9]. The seed oil has been shown to possess hypoglycaemic activity while glycosides isolated from the seed have been shown to have antihyperglycermic activity [5]. Owolarafe *et al.,* [10] noted that the general acceptability of herb products has been limited by lack of dose regimen, adequate toxicity data and large information about the bioactive content of these plants. Considering the complexity of herbal medicine and in view of all the reputed medicinal efficacy of this plant seed there is need to evaluate the bioactive constituents of this plant seed and its hepatotoxic effect in order to ensure holistic utilization of this plant seed and ascertain its safety for proper medicinal usage.

METHODS OF ANALYSIS

Preliminary phytochemical screening

Stnadard methods as described by Odebiyi and sofowora [11] were used to screen the presence of saponins, tannins, phenolics and alkaloids, Lieberman Burchad reaction [12]

Received 11 November 2017; Accepted 28 December 2017

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and steroids and glycosides were determined as previously described [13].

Animals

Twenty male albino rats weighing 120-148g were purchased from the Animal house, Department of Pharmacology, University of Nigeria Nsukka. They were housed in standard cages and allowed to acclimatize to laboratory conditions for seven days prior to commencement of feeding.

Animal feeds formulation

Seeds of *pecralima nitida* were collected from Amangwu Acha in Isuikwuato L. G. A of Abia State. The seeds were dried at room temperature. The dried seeds were milled into powder and the ground powder were formulated with normal rat feed using the various percentages of the samples. Group I = Control Fed normal rat fed, Group II = Fed 50% sample and 50% normal rat feed while Group III = Fed 70% sample and 30% normal rat feed, Group IV received 90% feed and 10% sample. The formulated feeds were made into pellets. The animals were allowed free access to food and water *ad libitum* and were sacrificed according to ethical norms and regulations after twenty eight days.

Biochemical analyses

Serum Alanine Aminotransferase (ALT) activity and serum Aspartate Aminotransferase (AST) activity were determined by the colourimetric method described by Reitman and Frankel [14] while Alkaline phosphatase activity of the serum was determined by the method described by Bassey *et al.,* [15] using commercial diagnostic kit (Randox, United Kingdom).

Histological studies

The method of Baker and Silverton [16] was adopted in the preparation of slices of previously fixed tissues (liver) for histological examination. Following the decalcification, dehydration, impregnation, embedding and section cutting, the tissues were stained using the Mayer's acid-alum-haematoxylin and Eosin staining techniques then mounted in neutral balsam. The slides were then examined microscopically for histological changes.

Statistical analysis

The statistical analysis of result was done using students package for social sciences(SPSS) and data collected were analyzed using Analysis of Variance (ANOVA). Means were separated using One way analysis of variance.

RESULTS

Table 1: Preliminary phytochemical analysis of Picranima nitida seeds

Flavoniod	+
Saponin	+
Taninins	+
Glycoside	+
Alkaloid	+
Phenol	+
Steroid	+
+= present	

The preliminary phytochemical analysis of *Picralima nitida* seed shows the presence of flavoniod, saponin, taninins, glycoside, alkaloid, phenol and steroid

Table 2: Liver enzymes activities of male albino rats fed with *Pecranlima nitida* seed supplemented diets

Enzymes	Group I	Group II	Group III	Group IV
AST (IU/l)	24.39 ± 3.6^{a}	25.88 ± 3.7^{a}	37.38 ± 7.2^{b}	42.19 ± 2.1
ALT (IU/U)	9.30 ± 2.0^{a}	10.25 ± 2.0^{a}	13.63 ± 1.1^{b}	15.54 ± 0.8
ALP (IU/l)	232.63 ± 3.2^{a}	234.47 ± 1.1^{a}	424.58 ± 6.8^{b}	498.76 ± 6.2

Results represent mean±standard deviation (n=5). Values in the same roll having the same alphabet are not significantly different (P>0.05)

Legend:
Group I = received normal rat feed and water
Group II = received 50% sample and 50% normal rat feed
Group III = Fed 70% sample and 30% normal rat feed.
Group IV received 90% sample and 10% normal rat feed
Histological evaluation of the liver.

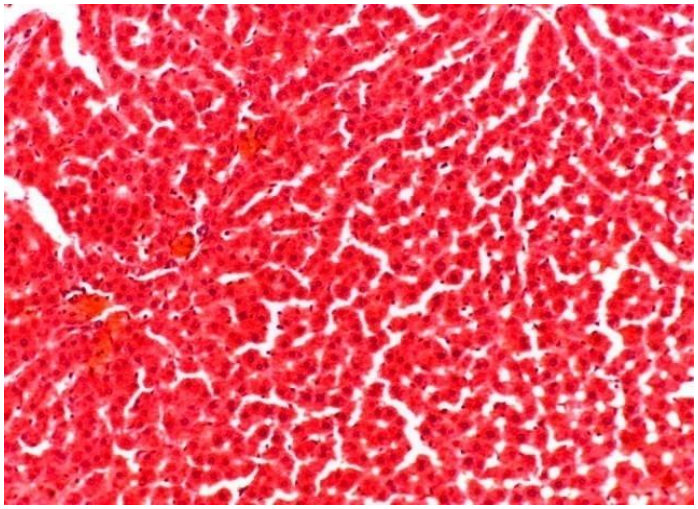

Fig. I: Histological picture of liver of rats in group I (Control) showing normal liver morphology

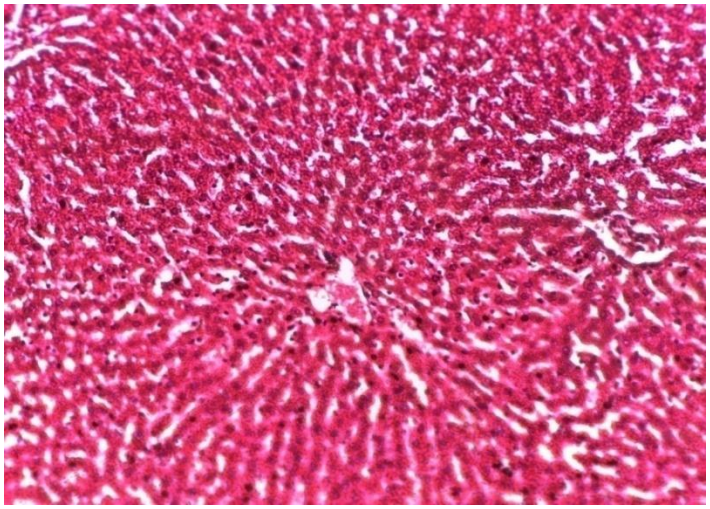

Fig. 2: Histology sections of group II showing liver tissue with normal tissue disposition. The central vein, the sinusoids and the plate of hepatic cells appear normal

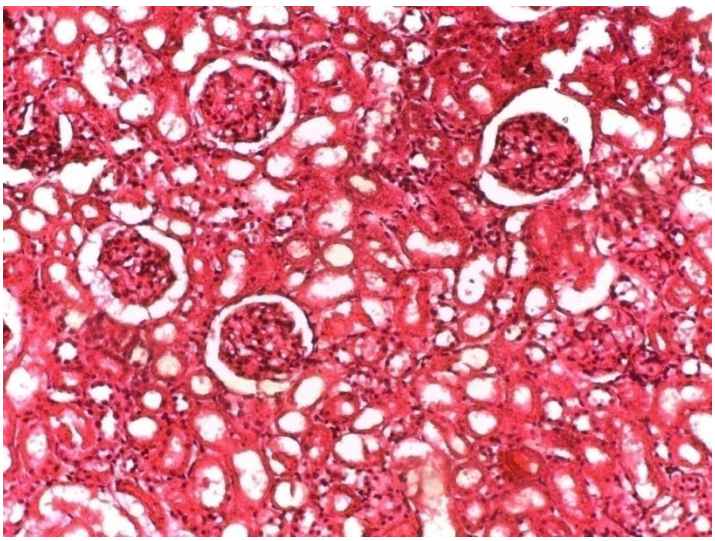

Fig. 3: Histology sections show liver tissue of group III with hyalinization and slightly increased/dilated central vein. The stroma secnis congested with the sinusoids appearing congested. The eosinophilic background of the stroma masked the hepatocytes

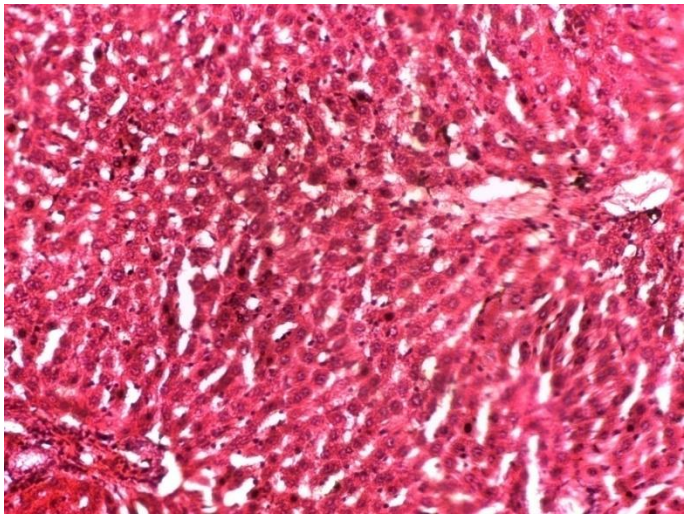

Fig. 4: Histological sections show liver tissue with enlarged hepatocytes and areas of nerosis, the stromal tissue appears edematous and distorted. The sinusoids appear dilated in some area and the central vein looks normal

DISCUSSION

Various secondary metabolites have been implicated to exhibit a wide range of biological effect and protection against different diseases. These acclaimed medicinal plants with medicinal efficacies are consumed without a regulated regime. The preliminary phytochemical analysis of *pecralima nitida* seed revealed the presence of flavonoid, saponin, tannins, alkaloid, steroid and phenols. The findings show that *picralima nitida* seed contains some useful bioactive substances that could contribute to its acclaimed medicinal efficacy. This confirms the findings of Ubolum *et al.* [17] and Nwabor *et al.* [5] that *P. Nitida* contains bioactive components. The level of enzyme markers such as AST, ALT and ALP is often used as markers of hepatic damage [14]. Reported that alanine aminotransferase and aspartate aminotransferase play crucial roles in transamination reaction and can be used as potential biomarkers to indicate hepatotoxicity. [17] also reported injury to organs like liver lead to the release of tissue-specific enzymes into the blood stream. Therefore, increased liver enzymes in serum as observed from this study could be an indicator of hepatocellular damage. [10] also posited that elevated levels of serum enzymes are indicative of cellular leakage and loss of functional integrity of liver. Findings from this study shows that liver enzymes did not show any significant increase in groups I and II but significant increase was observed in group III fed with 70% sample and 30% normal rat feed and group IV 90% sample and 10% feed. The abnormal high level of ALT, AST and ALP observed from this study are the consequences of *Pecralima nitida* seeds induced liver dysfunction and denotes damage to the hepatic cells. This increase in the activity of the liver enzymes is in dose dependent manner as observed from this study. Similar results have been reported by Aguwa *et al.* [8] who posited a dose-and time-dependent elevation of serum AST, ALT, and serum alkaline phosphatase and concomitant degeneration and rupture of the hepatocytes of rats administered hydroethanolic extract of *Pecralima nitida* seeds. Osayemwenre *et al.* [4] also reported signs of toxic effect on the liver, kidneys and the lungs after prolonged exposure at high doses of methanolic fruit rind of *P. Nitida* in rats. Similarly, Fulgence *et al.* [18] also reported that *Pecralima nitida* seed extracts caused death in mice at high doses of 6810 mg/kg body weight. This demonstrates the absolute care that should be taken in administration of this plant seed extracts in management of diseases. The histological analysis of the liver clearly indicated the derangement of the hepatocytes as the dose increases. This indicates that *Pecralima nitida* seeds may exhibit cumulative toxicity at increased dosage.

CONCLUSION

Findings from this study has shown that *Picralima nitida* seeds contain useful bioactive constituents that possess health promoting potentials. However, absolute care should be taken in the quantity of this seed used for medicinal purposes as increased dosage may be hepatotoxic.

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