

## **Effect of Chronic administration of *Landolphia owariensis* extract on the activities of rat enzymes**

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### **Abstract**

Medicinal plants are generally taken without any dose measurement especially by the uneducated people, some of this extracts may pose a great health risk. The objective of this work was to assess the effect of chronic administration of *Landolphia owariensis* extract on the activities of acid phosphatase and alkaline phosphatase in the kidney, liver and serum of rats. The methanol extract was administered orally to albino rats on daily doses of 250 mg/kg and the activities of enzymes were monitored for 12 days. A total of 24 albino rats were divided into two groups. *Landolphia owariensis* was administered to 12 rats and saline solution was administered to the remaining 12 as control. The results showed non significant increase in alkaline and acid phosphatase activities in both liver and kidney. Also an increase in serum enzyme activity was observed, however, this was not statistically significant. No adverse effects were observed on kidney and liver despite the chronic administration.

**Keywords:** *Landolphia owarrensis*, Kidney, Liver, Serum, Acid Phosphatase, Alkaline Phosphatase

### **Introduction**

*Landolphia owarrensis*, beauv or vine rubber, a family of apocynacea is a typical plant found in South Africa, Madagascar and various part of Nigeria. The local names are 'Ciwo' or 'kuranga' in Hausa, 'mbaoruto-isi' in Igbo and 'akitipa' in Yoruba language. The leaves have antiulcer and antisecretory effect (Olaleye et al., 2008). The decoction of the leaves is locally used as purgative, antihelminthes and antimalarial agent (Gill, 1992). The extract contains polyphenolic compounds and anti-oxidative constituent which may be flavonoids, the presence of which may be linked with anti inflammatory and analgesic activities of the extract. Flavonoids have been reported to possess antioxidant and antiradical properties (Birs et al., 1991). It was also validated to be a useful anti microbial agent (Ebi and Ofoefule, 1997; Nwogu et al., 2007). Tannins and saponins were also discovered to be the active principle (Owoyele, 1999).

Alkaline and acid phosphatases are marker enzymes found in specific regions of the cell, thus giving an indication of the sequence of cell damage. If any damage arises from the administration of chemical compound used, the level of those enzymes in the tissue following the chemical compound administration will

indicate the state of the tissue cell membrane (Nwogu et al., 2008).

Many people especially the uneducated use plant extract indiscriminately, thereby exposing themselves to liver or kidney damage. The objective of this work is to assess the effect of chronic administration of extract of *Landolphia owarrensis* on the activities of acid phosphatase and alkaline phosphatase in the kidney, liver and serum.

### **Materials and Methods**

Plant material was gotten from a biological garden of University of Ibadan, Nigeria. It was air dried and milled to powder using a blender. The methanol extract was obtained by adding 300ml of methanol to 30g of dried and powdered leaves of the plant for 4 days. Dried extract was obtained by evaporating the solvent in a water bath maintained at 45°C. Albino rats (*Rattus norvegicus*) weighing an average of 165g were obtained from animal holdings of Physiology Department of University of Ibadan, Nigeria.

A total of 24 albino rats housed under standard laboratory condition and fed with growers' mash and water *ad libitum*. The animals were divided into two groups. Group 1 consisted of 12 rats to which herbal

extract was administered. Group 2 was made up of 12 rats to which saline water was given to serve as the control. Each of the rats was given a dose of 250 mg/kg body weight for every 24 hours except for control. The rats were anaesthetized in a glass jar containing cotton wool soaked in chloroform. The rats were then removed and dissected on tray, exposing the visceral organs. The organs were removed and rinsed in 0.25M sucrose solution and weights were taken. The tissues were then homogenised in Ice cold 0.25M sucrose solution (1:5w/v) using pestle and mortal. The homogenate gotten from these tissues were kept in a labelled clean specimen bottles and frozen before enzyme analysis and protein concentration were determined.

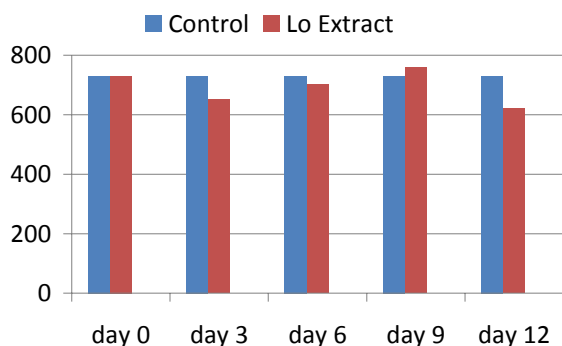
The blood was collected into test tube and kept in a slanting position at room temperature for about an hour and the yellowish liquid separating out from the serum was centrifuged. The supernatant was stored and kept in the freezer for analysis. The activities of alkaline phosphatase and acid phosphatase were determined as described by Balistreri and Shawl (1987). The total protein was determined using a chemistry analyzer (Ciba-Coming 550 Express Plus, USA).

### Statistical analysis

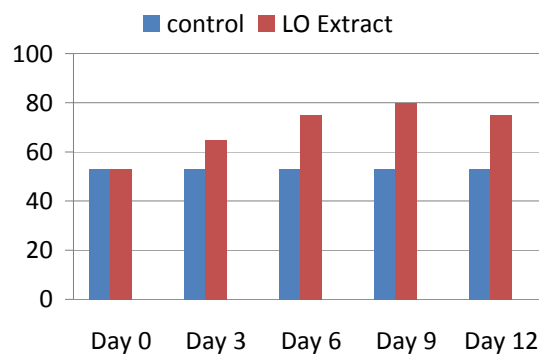
Data obtained were analysed using student's 't' test. P values  $\leq 0.05$  were taken to be statistically significant (Parker, 1979).

## Results and Discussion

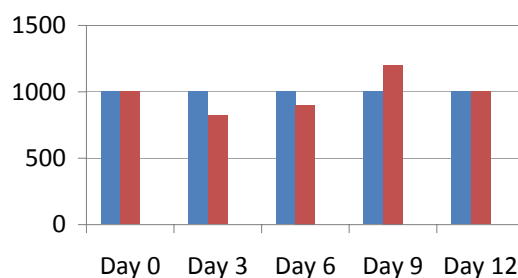
The activities of acid phosphatase and alkaline phosphatase of liver and kidney increased insignificantly ( $P > 0.05$ ) when compared with the control as shown in the figures (1 to 6). The results revealed an insignificant ( $P > 0.05$ ) decrease in the activity of acid and alkaline phosphatase in the kidney and liver of the rat which was followed by increase in the activity. This may depicts little or no damage to the tissues as confirmed by Nwogu et al. (2008). The increase in activity may be due to de novo synthesis of



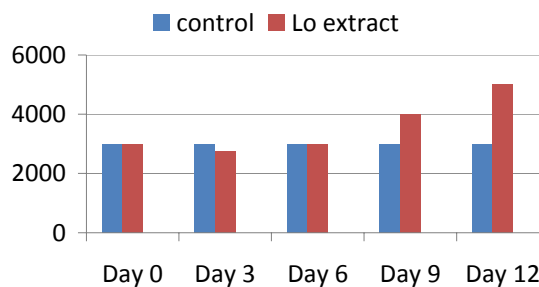
**Fig. 1: Effect of LO extract on the ACP activity in the liver**



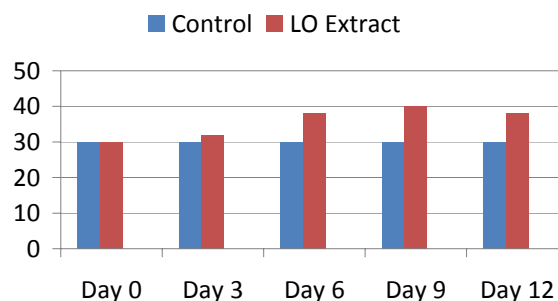
**Fig. 2: Effect of LO on ALP activity in liver**



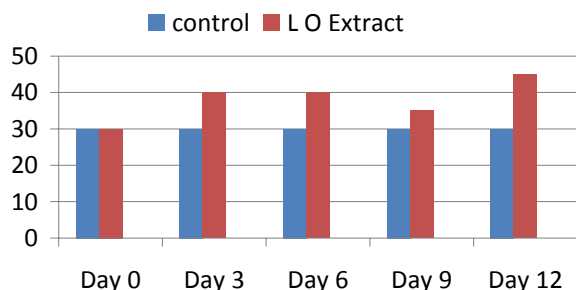
**Fig. 3: Effect of LO on ACP activity in Kidney**



**Fig. 4: Effect on ALP activity in Kidney**



**Fig. 5: Effect of ALP activity in serum**



**Fig. 6: Effect of LO on ACP activity in serum**

enzymes in the tissues which may result from the actions of various contents of the extract such as flavonoids, saponins, tannins etc. This plant extract serves as antimalarial, antimicrobials, antihelminthes and purgatives and no adverse effects is observed on kidney and liver despite the chronic administration. The plant should be prevented from extinction by cultivating and preserving the existing ones.

## References

- Balistreri, W.R. and Shawl, L.M. 1987. Liver function In: Fundamentals of Clinical Chemistry. Tietz, N.W. 3<sup>rd</sup> (ed.), W.B. Sanders Company, Philadelphia. Pp: 729-761.
- Birs, W., Heller, W., Micheal, C. and Satan, M. 1991. Flavonoids as antioxidant. Determination of antiradical efficiencies. *Methods litcymal*, 186:343-353
- Ebi, G.C. and Ofoefule, S.I. 1997. Investigations into the folkloric anti-microbial activities of *Landolphia owariensis*. *Phytotherapy Research*, 11(2):149-151
- Gill, L.S. 1992. Ethnomedical uses of plant in Nigeria. Pp: 1-2
- Nwogu, L.A., Alisi, C.S, Ibegbulem, C.O. and Igwe, C.U. 2007. Phytochemical and antimicrobial activity of ethanolic extract of *Landolphia owariensis* leaf. *African Journal of Biotechnology*, 6 (7): 890-893.
- Nwogu, L.A., Igwe, C.U. and Emejulu, A.A. 2008. Effects of *Landolphia owariensis* leaf extract on the liver function profile and haemoglobin concentration of albino rats. *African Journal of Biochemistry Research*, 2 (12): 240-242
- Olaleye, S.B., Owoyele, V.B. and Odukanmi, O.A. 2008. Antiulcer and gastric antiseecretory effects of *Landolphia owariensis* extracts in rats. *Nigerian Journal of Physiological Sciences*, 23 (1-2):23-6.
- Owoyele, B.V., Olaleye, S.B, Oke, J.M. and Elegbe, R.A. 2001. Anti-inflammatory and analgesic activities of leaf extract *Landolphia owariensis*. *African Journal of Biomedical Research*, 4:131-133.
- Parker, R.E. 1979. Introductory Statistics for Biology. 2<sup>nd</sup> (ed.), Arnold publisher Ltd., London. Pp:18-30.