

**BIOCHEMICAL AND HISTOPATHOLOGICAL INVESTIGATION OF THE  
EFFECT OF *ACHACHATINA MARGINATA* HAEMOLYMPH IN NORMAL RATS**

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Sagamu.\*Correspondence: [adediwurajaiyesimi@gmail.com](mailto:adediwurajaiyesimi@gmail.com)**ABSTRACT**

**Background:** The use of wild animals and their products are an integral and essential ingredients in the preparation of drugs/medication for various ailments and diseases in West African traditional medicine.

**Methods:** This study investigated the effect of administering the haemolymph of *Achachatina marginata* on the biochemical parameters of the normal animals as well as the histopathological effect of the continuous administration of the haemolymph on the vital organs of the animals..

**Results:** The preliminary study revealed that the haemolymph of *A. marginata* exhibited a weight loss effect in the studied animals as well as significantly lowered the cholesterol and triglyceride levels in normal rats used in this study.

**Conclusion:** Though this result appear promising, it will be necessary to evaluate the long term effect of the haemolymph of *A. marginata* effect on the biochemical parameters.

**Keywords:** *Achachatina marginata*, Biochemical, Histopathology, Haemolymph

**INTRODUCTION**

*Achachatina marginata* (Achatinidae) commonly known as the African Giant Snail is a native of the tropical rainforest. It is found in the dense high forest and in the fringe of the derived Guinea Savannah (Segun, 1995).

The use of wild animals and their products constitute essential ingredients in the preparation of drugs in traditional medicine (Adeola, 1992; Gaski et al., 1994). Soewu (2008) reported fifty-five fauna species used for various traditional preparations of which *Achachatina marginata* is included.

In the traditional ethnomedicine of South West Nigeria, the African Giant Snail is included as part of recipes for the treatment of various ailments and diseases. It is believed that various preparations containing snails are useful in restoring fertility, virility and to cure smallpox (Akinnusi, 1998). Also, it is used as relieve in labour pains, blood loss in pregnancy and during delivery.

Previous biological studies reported that the isolated mucin motifs from *A. marginata* exhibited rectal absorption enhancing properties for the administration of insulin in rats. Suppositories containing 5% and 7% of the mucin showed marked and consistent blood glucose lowering effect (Adikwu, 2005). The meat of *A. marginata* is low in sodium, fat and cholesterol but high in proteins, iron and calcium hence it's claimed usefulness in the treatment of Atherosclerosis, Anaemia, Hypertension and obesity.

The presence of calcium, potassium, chloride and phosphorus has been reported in the snail haemolymph (Ademolu et al., 2006; Ademolu and Idowu, 2005). Also protein has been reported to be relatively higher than other metabolites in the haemolymph of *A. marginata* (Ademolu et al., 2006; South, 1992; Akinnusi, 2002, Imeuevbove and Ademolu, 1988) with heamocyanin a respiratory pigment as the major protein (South, 1992).

There are reports that the fluid exhibit pharmacological values for hypertensive patients, in the preparations of vaccines, for treatment of kidney diseases, tuberculosis, diabetes, certain circulatory and stomach disorders.

The orthocalcium phosphate extracted from the snail is claimed to have benefit in the cure of kidney diseases, tuberculosis, anaemia, diabetes and asthma (Mead, 1961, Ademolu et al., 2006)

The aim of this study is to investigate the biochemical effect as well as the effect of continuous administration of the haemolymph on vital organs of normal rats.

## Methodology

### Snail collection

African Giant Snails were bought from Sabo Market, Sagamu in January 2002. They were authenticated by Mr A.Y Muraina (at the Wildlife Department) Forestry Research Institute of Nigeria, Ibadan. Nigeria.

### Haemolymph Collection

The apex of the snails was opened by method adopted from Akinloye and Olorode (2000). The haemolymph was drained into a clean Petri dish. This was subjected to further investigations.

### Biochemical Screening

Male and female albino rats weighing between 70 and 250g were obtained from the colony bred of the Nigerian Institute of Medical Research Lagos. The rats were maintained at  $25 \pm 2^\circ\text{C}$  in a 12 hour light/dark cycle. They were fed with standard pellets and water (*ad libitum*).

The PCV, cholesterol and triglyceride levels of the animals were determined using standard Randox Kits. (Bucolo and David, 1973; Pearson et al., 1953; Natchin and Shakhmatova, 1973; Richmond, 1973)

Five rats were used per group.

Group A: Five normal rats were administered with haemolymph of *A. marginata* (1ml/kg bw/day) continuously for fourteen days.

Group B: Five normal rats used as control were administered with distilled water (1ml/kg bw/day) continuously for fourteen days.

### Histopathology

All the animals in groups A and B were sacrificed on the fourteenth day. The Kidneys, livers, spleens and small intestines were fixed in Formalin. These were then taken to the Faculty of Veterinary Medicine, University of Ibadan for histopathology examination.

## RESULTS

**Table 1:** Effect of continuous administration of *A. marginata* haemolymph on weight of normal albino rats.

	Initial Mean Weight(g)	Final Mean Weight (g)	%
Group A	219.5 $\pm$ 0.12	200.8 $\pm$ 0.33	8.5% (Decrease)
Group B	74.5 $\pm$ 0.41	82.3 $\pm$ 0.06	10.5% (Increase)

**Table 2:** Effect of *A. marginata* haemolymph on Biochemical Parameters of normal albino rats.

	DAY				
	0	3	8	10	14
PCV					
Group A	39.8 ± 1.43	39.8 ± 1.45	39.8 ± 1.15	38.3 ± 2.47	38.0 ± 0.82
Group B	25.3 ± 1.40	26.5 ± 1.44	26.5 ± 1.44	25.5 ± 1.42	28.0 ± 1.46
Cholesterol (mg/dl)					
Group A	241.4 ± 2.85	150.0 ± 2.59 (37.9%)	162.0 ± 2.06 (32.9%)	120.8 ± 2.20 (49.9%)	133.3 ± 2.28 (44.8%)
Group B	165.2 ± 3.95	187.5 ± 3.96	150.0 ± 2.93	123.1 ± 3.39	127.8 ± 3.42
Triglyceride (mg/dl)					
Group A	140.9 ± 2.26	84.6 ± 1.91 39.9%	105.6 ± 1.61 25.1%	100.0 ± 0.04 29.0%	115.0 ± 2.47 18.4%
Group B	113.6 ± 2.91	98.1 ± 2.91	88.9 ± 2.39	108.3 ± 2.97	106.2 ± 3.28

Figures in parenthesis represents % decrease;

## DISCUSSION

The use of plants and inclusion of animals in ethnomedicine might be due to synergistic effects with plants or recognised bioactive ingredients in the animal part(s) (Soewu, 2008).

This study has also revealed the ability of the haemolymph of the African Giant Snail to reduce weight. The animals administered haemolymph had an average weight loss of 8.5% over a period of fourteen days of continuous administration while animals which served as control and administered with water only, gained an average weight of 10.5% over the same period (Table 1.) This could therefore justify the use of the haemolymph of *A. marginata* in shedding of weight as previously reported by Adams (1999).

Furthermore, this study showed that the haemolymph of *A. marginata* had no effect on the PCV level of the test animals. This indicates that the haemolymph has no antianaemic potentials contrary to the traditional belief and previous report that it has ability to cure anaemia (Mead, 1961) Table 2.

The haemolymph significantly lowered the cholesterol level of the test animals by 37.9%, 32.9%, 49.9% 44.8%, on day 3, 8, 10 and 14 respectively while the mean triglyceride values of the test animals were reduced by 39.9%, 25.1%, 29% and 18.4% on days 3, 8, 10 and 14 respectively. This reduction in the triglyceride levels of the animals could therefore justify the use of the haemolymph in the management of hypertension, atherosclerosis, obesity and Diabetes Mellitus as previously reported. Table 2.

The histopathological examination revealed that the spleens, kidneys, small intestines and liver of the control rats had no lesions however, the livers of the test rats showed periportal congestion, periportal mononuclear neutrophil infiltration while the kidneys had multifocal glomerular and tubular degeneration in the cortex and focal areas of interstitial mononuclear cellular aggregates in the cortical interstitium. This therefore suggests that the continuous administration of the haemolymph of *A. marginata* could cause renal damage. This however is a preliminary study and further studies would be required.

Finally, though the haemolymph of *A. marginata* can be effective in shedding weight, lowering cholesterol and triglycerides, caution should however be exercised in its continuous administration because of its likely effects on the livers and kidneys.

Further studies would be carried out to thoroughly investigate the effect of haemolymph of *A. marginata* on vital organs.

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