Vol 6 | Issue 1 | 2016 | 35-37.

e-ISSN 2248 - 9169
Print ISSN 2248 - 9150

International Journal of
Experimental Pharmacology

www.ijepjournal.com

PHYTOCHEMICAL SCREENING AND ACUTE TOXICITY STUDY OF LEAF EXTRACTS OF *Haematostaphis barteri* (BLOOD GRAPES)

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ABSTRACT

Haematostaphis barteri has an extensive ethno botanical use in many areas and has been used for centuries as medicinal plant especially the leaves in the treatment of diverse medical ailments. The present study was designed to evaluate the phytochemical screening and acute toxicity study of the leaf extracts of *Haematostaphis barteri*. The fresh leaves of *Haematostaphis barteri* were collected from Hildi village of Hong local government of Adamawa state. The leaves were air dried, powdered and extracted using 95% methanol and water. Phytochemical screening and acute toxicity testing of the extract were conducted. The methanol extract was found to be relatively less toxic, while both the extracts were tested positive for alkaloids, alkaloid salts, saponins and tannis. The leaf extracts of *Haematostaphis barteri* was found to be less toxic and contain alot of phytochemical compounds which amply justifies the traditional use of this plant in north eastern Nigeria.

Keywords: *Haematostaphis barteri,* Methanol, Phytochemistry, Acute toxicity.

INTRODUCTION

Medicinal plants have been used as folklore remedies over the years to treat, manage or control Man's ailments [1]. There is a growing interest in herbal remedies worldwide because of their effectiveness, minimal side effects and affordability [2]. The therapeutic potentials of medicinal plants are mainly due to the presence of some compounds or chemical substances which occur as secondary metabolites. *Haematostaphis barteri* (blood grapes) is one of such plants, which have been extensively used for economic and medicinal purposes in the North East Arid Zone of Nigeria. A member of the *Anacardiaceae* family, the tree has edible fruits. Tadzabia and his colleagues and Kubmarawa reported the presence of some phytochemical constituents in the plant parts [3, 4]. *Haematostaphis barteri* have medicinal applications which include improvement of haemorrhoids, stomachaches and vomiting [5-7]. It can also be used as a food supplements in northern Nigeria [3]. This study therefore was embarked upon in order to evaluate the phytochemical constituents and acute toxicity of *Haematostaphis barteri.*

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MATERIALS AND METHODS

Collection and preparation of plant materials

Fresh leaves of *H. barteri* Hook F. was collected from Hildi in Hong Local Government area of Adamawa State in May, 2013. The freshly gathered leaves were identified by Prof. E. T. Rabo, a plant Taxonomist in the Department of Biological Science, Faculty of Science, University of Maiduguri. A voucher specimen number (00765) was assigned and sample deposited in the Research Laboratory of the Department of Chemistry. The leaves were air-dried and pulverized to a fine power and kept at room temperature until used.

Extraction of the plant material

About 400 g of the air-dried leaves of *H. barteri* was placed in Alundum timbles and its contents were introduced into soxhlet extractors which were connected to

a condenser. The solvents used for the extraction are 95% methanol and distilled water (200 cm^3). The extraction lasted for a period of 24 hours. The crude extracts were transferred into conical flask and were concentrated on water bath for 2 hours. The yield of the extracts was determined, collected and stored at 4^oC until used.

Preliminary Phytochemical screening

The leaf extract of *Haematostaphis barteri* was prepared in a suitable forms for the screening of alkaloid, alkaloid salts, anthracenosides, flavonoids, polyuronide, reducing compound, saponins and tannins using the standard laboratory procedures described by Harbon, Trease and Evans and Sofowora [8, 9].

Acute toxicity study

Animal and treatment

Thirty (30) albino rats of both sexes weighing between 110 and 250 g were obtained from Department of Veterinary Anatomy, University of Maiduguri. They were fed with grower's mesh (Sander's Nigeria Ltd) and water ad libitum. The rats were divided into six groups (A, B, C, D, E and F) of five rats each. The acute toxicity studies of the methanol extract was carried out in vivo using intraperitoneal route. Initial pilot studies were carried out to determine the maximum dose of extract that did not produced death and minimum dose that produce 100% death. In between this dose ranges 6 doses (200, 400, 600, 800, 1000 and 1200 mg/kg) were selected for the study. Each group was placed in clean cage and was injected with the extract at different specified doses. A control group was also injected with equivalent volume of saline solution. The signs of toxicity and death were observed for 24 hours at which the LD_{50} of the extract was calculated using the arithmetic method of Karba as modified by Aliu and Nwude [10].

RESULTS

Preliminary phytochemical screening

Table 1 showed the phytochemical constituent of both aqueous and methanol extracts in which alkaloid, alkaloid salts, saponins and tannins were found to be present in the extracts. Anthracenosides, reducing compound and polyuronides were not detected in both extracts, while flavonoids was found to be absent in the aqueous extract.

Acute toxicity study of methanol leaf extracts of *Haematostaphis barteri*

Table 2 showed rats in the control group (A) were not affected throughout the 24 hours of acute toxicity study. Thirty five minute after the administration of the extract there were signs of dropping eyes and decrease locomotors activity in groups B, C, D, that were treated with 200, 400 and 600$mgkg^{-1}$ body weight respectively. Deaths were recorded after 3 hours of extract administration. In groups E, F and G, that received extract doses of 800, 1000 and 1200$mgkg^{-1}$ respectively, waltzing movement and abdominal stretching were observed. There was a drastic reduction in food intake among the rats. Six hours after administration of extract, piloerection, salivation and restricted movement were observed among groups F and G. Mortality were observed in these groups 24 hours after extract was administered.

Table 1. Qualitative phytochemistry of leaf extracts of *Haematostaphis barteri*

Phytoconstituents	Results	
	Aqueous Extract	Methanol Extract
Alkaloid	+	+
Alkaloid salt	+	+
Anthracenosides	-	-
Flavonoids	-	+
Polyuronide	-	-
Reducing compound	-	-
Saponins	+	+
Tannins	+	+

- = not detected; + = present

Table 2. Acute toxicity study of leaf extracts of *Haematostaphis barteri*

Group	Dose (mg/kg)	Number of rats (n)	Number of death	Dose difference (Dd)	Mean death (md)	Dose difference x md
A	Control	5	0	0	0	0
B	200	5	0	0	0	0
C	400	5	1	200	0.5	100
D	600	5	2	200	1.5	300
E	800	5	3	200	2.5	500
F	1000	5	4	200	3.5	700
G	1200	5	5	200	4.5	900
Total						**2500**

$LD_{50} = LD_{1200}$-Dd x md/n (1200-2500/5); LD_{50} = 1200-500 = 700 mg/kg.

DISCUSSION

The significant numbers of phytochemicals compounds detected in this study agrees with the reports of several literatures in which similar active principles were detected [3]. The presence of this phytochemicals in this plant supports its traditional use in the improvement of haemorrhoids, stomachaches and vomiting [5-7]. However the report of this finding did not quite agree with the report of Tadzabia in which reducing compound, polyuronide and anthracenosides were not detected. The differences in plant species, solvent system used in extraction and part of the plant used may be attributable to the lack of these phytochemicals that were not detected in the present study. Tadzabia and his colleagues used the ethanol stem bark extract of *Haematostaphis bartteri* instead of the methanol leaf extract of *Haematostaphis barteri* used in the present study. The relative less toxicity of the methanol leaf extract observed in this study agrees with the report of Abubakar [11] in which aqueous extract of the leaves was found to be less toxic. Although the mechanism underlying the antihaemorrhoids effect as reported by Abubakar largely remains unknown. The flavonoid derivatives present in *Haematostaphis barteri* extract may be responsible for the observed activity [12].

CONCLUSION

The leaf extracts of *Haematostaphis barteri* contain phytochemical compounds and was found to be relatively less toxic which may be responsible for the use of this plant by traditional herbalist in the management of diverse medical ailments.

ACKNOWLEDGEMENT

The authors are sincerely thankful to staff of Chemistry Laboratory, Department of Chemistry, Faculty of Science and University of Maiduguri for their technical assistance and support.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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