Evaluation Of Hydromethanolic Fruit Extract Of Dennettia Tripetala On Haematological Parameters Of Male Wistar Rats

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Abstract: Dennettia tripetala is a medicinal plant found mainly along the coastlines of West Africa. It is applied in folklore remedies in the treatment of cough, fever etc. The plant has been reported to contain important substances necessary for blood cell formation. This study was done to investigate the effects of the fruit of Dennettia tripetala on haematological indices of male wistar rats. Male wistar rats were divided into three (3) groups of six (6) rats each. Group one (1) which served as control received distilled water. Group two (2) and group three (3) rats were treated with 100mg/kg bw and 200mg/kg bw of the hydromethanolic extract of the fruit of Dennettia tripetala respectively, for a period of 21days.

The results obtained showed that the extract did not significantly affect the red blood cell count, packed cell volume, haemoglobin concentration and white blood cell count. The mean corpuscular volume and mean corpuscular haemoglobin concentration were not significantly affected as well. This study showed that, the fruit of Dennettia tripetala may not influence haematological parameters in male wistar rats.

Keywords: Dennettia tripetala, haematological parameter, fruit, hydromethanolic, wistar rats.

I. INTRODUCTION

Plants are crucial to the survival of humans. They provide food for man, produce the oxygen which sustain life and also applied in the treatment of various ailments [Adesuvi et al., (2012)]. The use of medicinal plants for preventive and curative purposes has increased in the past few decades. According to available reports, about 80% of African population depend on medicinal plants for basic or primary health care [Iwu, (1999)]. Dinnettia Tripetala plant is found mainly in the tropics especially along the coastlines of West Africa [Umoh, (1998); Ejechi and Akpomedaye, (2005)]. The fruits which are the edible part of the plant are sometimes presented as a form of entertainment to quests in social and traditional ceremonies in southern Nigeria [Okigbo, (1980)]. It is also known for it's medicinal properties, and so highly regarded. Dinnettia tripetala is applied in folklore remedies in the treatment of fever, toothache and diabetes [Ejechi and Akpomedaye, (2005); Enwere, (1998)]. Also, the fruits of Dennettia tripetala are applied in the food of pregnant women [Umoh, (1998)]; possibly to reduce the symptoms of nausea [Enwere, (1998)].

Some scientific studies carried out have shown that the extract of Dennettia Tripetala caused analgesic effects and reduced inflammation [Ovemitan et al., (2008)]; increased gastric acid secretion [Bright et al, (2017)]; demonstrated antioxidant effects [Aderogba et al., 2011)], while the seeds effectively reduced intraocular pressure in humans [Timothy and Okere, (2008)]. Dennettia tripetala have been reported to possess a wide range of biologically active compounds such as flavonoids, tannins, steroids [Elekwa et al, (2011)] and alkaloids [Rosanna et al., (2003)]. These bioactive compounds are considered to be responsible for the various biological effects of Dennettia Tripetala. In addition, Dinnettia tripetala were reported to contain substances necessary for erythropoiesis [Sembulingam, (2016)^a] However, there is a dearth of scientific data on the effects of Dennettia tripetala on haematological parameters. This study was carried out with the objective to investigate the effects of the fruits of *Dennettia tripetala* on haematological parameters of male wistar rats.

II. MATERIALS AND METHODS

A. PROCESSING OF PLANT MATERIAL

Fresh mature friuts of *Dennettia tripetala* were procured from local vendors in Rivers State, Nigeria and were later authenticated in the herbarium unit, Department of Plant Science and Biotechnology, University of Port Harcourt, Nigeria. The fruits were washed with water to remove dirt, and dried at room temperature (26° C) over a period of 3 weeks. They were grinded using a manual engine grinder to obtain 500g of the fine powder. This quantity was soaked in 400ml of hydromethanol (20%:80%) for 48 hours. The solution was filtered to separate the filtrate from the residue. The extract was concentrated under reduced pressure in a vacuum at 45° using a rotary evaporator. The yield of the crude extract of *Dennettia tripetala* fruits obtained weighed 61.8g. The extract was stored in a refrigerator at 4° until used.

B. STUDY AREA

This experimental study was carried out in the department of Human Physiology, Faculty of Basic Medical Science, University of Port Harcourt, Nigeria.

C. EXPERIMENTAL ANIMALS AND PROTOCOLS

Eighteen adult male wistar rats, bred in the experimental animal centre of department of Human Physiology, University of Port Harcourt, Nigeria; and weighed between 130–150g at the beginning of experiment were used for the study. The rats were acclimatized for two weeks, and randomly assigned into 3 groups (n = 6). Group 1 served as control and received distilled water. Group 2 and group 3 received 100mg/kg body weight (bw) and 200mg/kg bw of hydromethanolic fruit extract of *Dennettia tripetala* respectively. The extracts were administered orally, once daily for 21 days. All animals had access to water and feeds *ad libitum*.

This study was conducted in accordance with the National Institutes of Health's Guide for the care and use of laboratory animals [National Institute of Health, USA. 1985].

D. BLOOD COLLECTION AND ESTIMATION OF HAEMATOLOGICAL PARAMETERS

The animals were sacrificed under chloroform anaesthesia on day 22, after 24 hours of last extract administration. Blood was collected by cardiac puncture and put into labeled sample tubes containing ethylene diamine tetra-acetic acid (EDTA) anticoagulant for use in determination of haematological parameters based on documented methods [Ochei and Kolhatkar (2007)].

Haematological parameters estimated include, red blood cell (RBC) count, packed cell volume (PCV), haemoglobin (Hb) concentration, mean corpuscular volume (MCV), mean corpuscular haemoglobin concentration (MCHC) and white blood cell (WBC) count.

E. STATISTICAL ANALYSIS

The statistical analysis of data was done using statistical package for social sciences (SPSS) version 20.0 and the results were expressed as mean \pm SEM. The one way analysis of variance (ANOVA) was used to determine the difference between the mean(s) and the results were regarded as significant at p<0.05.

III. RESULT

A. RESULT PRESENTATION

The results of this study are presented in tables 1 and 2.

Groups	Haematological parameters		
	RBC count	PCV	Hb
	$(x10^{6}/MM^{3})$	(%)	(g/dl)
Group 1	6.95±0.91	48.33±2.76	16.33±0.42
(Control)			
Group 2	5.33 ± 0.80	46.83±2.81	15.33 ± 0.80
(100mg/kg)			
Group 3	6.17±0.79	43.83±2.23	14.50 ± 1.84
(200mg/kg)			

Values expressed as Mean \pm SEM. n=6.

 Table 1: Effect of hydromethanolic extract of Dennettia

 tripetala on RBC count, PCV and Hb

	1	,		
Groups	Haematological parameters			
	MCV	MCHC	WBC count	
,	(Cu µ)	(%)	$(x10^{3}/MM^{3})$	
Group 1	84.17±3.17	35.83±2.52	7.15±0.55	
(Control)				
Group 2	86.00±1.93	37.67±1.65	6.43±0.47	
(100mg/kg)				
Group 3	84.00±3.10	36.50±1.26	6.03±0.34	
(200mg/kg)				

Values expressed as Mean \pm *SEM.* n=6*.*

Table 2: Effect of hydromethanolic extract of Dennettia tripetala on MCV, MCHC and WBC count

B. RESULT ANALYSIS

In the result presented, the extract was administered at low dose of 100mg/kg bw to group 2 and higher dose of 200mg/kg bw to group 3. Group 1 served as control and received no extract.

In table 1, the red blood cell count, packed cell volume and Hb concentration were not significantly (p<0.05) increased in groups 2 and 3 when test groups were compared to control group.

The effect of the extract on mean corpuscular volume, mean corpuscular haemoglobin concentration and white blood cell count were highlighted in table 2. The parameters were not significantly (p<0.05) altered when the test groups were compared to control.

IV. DISCUSSION

The search to scientifically unravel more of the medicinal attributes of various plants or even toxicities associated with their use has increased in the past few decades. Medicinal plants are also known to contain biologically active constituents which are responsible for the observed effects. Similarly, this study was carried out to investigate the effects of the hydromethanolic extract of Dennettia tripetala on the haematological indices of male wistar rats. The knowledge of haematological indices are important because they effectively and sensitively reflect the physiological and pathological changes in an animal [Zhou et al., (2009)]. In the present study, there was no significant changes in the level of red blood cells in the treated groups. The red blood cells are the non nucleated formed elements of blood which are also referred to as erythrocytes and produced from the red bone marrow in adult life [Sembulingam and Sembulingam, (2016)^a]. The extract of *Dennettia tripetala* did not influence any stage of the growth and differentiation of the red blood cell series in the bone marrow, despite been reported to contain some amounts of ascorbic acid [Okwu and Morah, (2004)], which is a stimulating factor for erythropoiesis. The findings in this study, regarding the effect of the extract of Dinnettia tripetala on the red blood cell contradicts the reported findings in a study, which stated that, Dinnettia tripetala caused a significant reduction in red blood cell concentration with a lower dose (87mg/kg)bw, but , agrees with the report of non significant effect with the higher dose (170mg/kg)bw, when they were compared to control [Ikpi and Nku, (2008)]. The difference with the finding in this study may be due to the different methods employed in extraction of plant extract. Dennettia tripetala was reported to contain some amounts of iron, riboflavin and nicotinic acid [Okwu and Morah, (2004)], which are factors necessary for haemoglobin formation [Sembulingam and Sembulingam (2016)^b]. Notwithstanding, the extract of Dennettia tripetala did not cause any signicant alteration in the concentration of haemoglobin in this study. The packed cell volume was not altered as well. A direct relationship between red blood cell, packed cell volume and haemoglobin concentration has been reported [Schalm et al., (1975)], hence, alteration in one parameter, affects the other. The packed cell volume is the proportion of blood occupied by red blood cells, expressed in percentage while the haemoglobin is the iron-containing coloring matter of red blood cells which is responsible for carrying respiratory gases [Sembulingam and Sembulingam (2016)^c]. This relationship is built around the red blood cells in blood. The finding concerning the packed cell volume and haemoglobin concentration in this study may be because of the non significant effect on red blood cell count, since they are directly related to one another. This finding agrees with the report in a similar study stating a non significant change in the packed cell volume and haemoglobin concentration when test groups were compared to control. The concentration of white blood cells were not significantly affected by the extract of Dennettia tripetala in this study. The concentration of white blood cells can be significantly increased by some substances that possess the ability to boost the immune system [Frandson, 1981]. The mean corpuscular volume was not affected

showing that the extract may not have influenced the ratio of the larger erythroblast to the mature erythrocytes in blood. Similarly, the mean corpuscular haemoglobin concentration was also not affected in this study which showed that the red blood cells remained normochromic even after administration of the extract of *Dennettia tripetala*.

V. CONCLUSION

Dennettia tripetala fruit is reportedly rich in iron and other constituents necessary for formation of the red blood cells series, however, the extract of Dennettia tripetala did not significantly influence haematological parameters of wistar rats in this study.

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