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EFFECTS OF METHANOLIC LEAVES EXTRACT OF DATURA ALBA NESS ON HAEMATOLOGICAL PARAMETERS IN MALE WISTAR RATS

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Abstract:
Haematological parameters are essential parameters that need to be assessed periodically to ascertain the levels and ensure that it is within the normal values in other to maintain good health. Blood cells are important because they are responsible for out their specific role as: RBC is for oxygen, and nutrient transportation, WBC is for body defense and platelet is for coagulation. Decrease in any of these formed elements may affects the body system and it must be within limits. The aim of the study is to evaluate the Effects of Datura alba ness Leaves extract on haematological parameters in male Wistar rats. 20 rats were randomly selected and placed into four groups with five rats per group. The

control group was fed with rodent chow and water, the low dose group was given 500mg/kg/bwt of the extract, medium dose group was given 1000mg/kg/bwt of the extract, the high dose group was given 2000mg/kg/bwt of the extract. All the extracts were given orally. Administration lasted for 21 days and on the 22nd day, animals were weighed and sacrifice, blood samples were collected for haematological analysis. Data were analysed using ANOVA and SPSS version 25 were used and $p < 0.05$ was said to be significant. The results shows significant decrease in the white blood cells of the animals administered with both low and medium dose of the extract. Result also shows significant decrease in the red blood cells of the rats administered with medium dose of the extract. No significant difference in platelet counts. There is no significant difference is the haematological indices and differentials (neutrophils, monocytes, leucocytes and eosinophil of the rats administered with the extract. The result showed that, this extract induced dyslipidemia in male Wistar rats.

Keywords: Effects, Datura alba ness, Leaves, Extract, Haematological, Parameters.

Introduction

World Health Organization (WHO) in 2008, revealed that more than 80% of the world's population relied on traditional medicine for their primary healthcare needs (Pierangeli, et al., 2009; Ammara et al., 2009).

The Herbal prescriptions and natural remedies is a common practice in developing countries for the treatment of various diseases and this practice is an alternative way to compensate for some perceived deficiencies pharmacotherapy (Sofowora, 1993; Zhu, et al., 2002). Hematology is a branch of medicine that deals with the study of blood, blood-forming organs, and blood-related disorders and diseases. Hence, hematological tests are used to detect and diagnose diseases such as hemophilia, anemia, leukemia, sickle-cell anemia, lymphomas, and several infections (Oladejo, et al., 2022). Hematological parameters including the white blood cell and its differentials such as lymphocytes and neutrophils are important in fighting against foreign substances in a biological system while the red blood cells have been saddled with the responsibilities of delivering oxygen to the body tissues via blood flow through the circulatory system (Oladejo and Osukoya, 2021). Impairment in the functionality of these parameters could therefore exert a detrimental effect on the general wellbeing of a biological system. Hench, there is a need for a study to focus on the effect of substances on hematological parameters in a biological system. To this end, this study was designed (Anyanwu, et al., 2023).

Hematological parameters, including red and white blood cell counts and hemoglobin concentration, are widely used clinical indicators of health and disease. These traits are tightly regulated in healthy individuals and are under genetic control (Kelada *et al.*, 2012). The following are hematological parameters: White Blood Cell (WBC), Red Blood Cell (RBC), hemoglobin (Hb), hematocrit (Hct), Mean Cell Volume (MCV),

Mean Cell Hemoglobin (MCH), mean Cell Hemoglobin Concentration (MCHC), platelet count (Plt) (Kone, et al., 2017).

Materials and Method

Collection and Identification of Plant materials

Fresh leaves of *Datura alba nees* (Thorn apple) were collected from Abua-Odua local government area of Rivers State, Nigeria. The plant was identified and authenticated at Plant Science and Bio-technology department University of Port Harcourt.

Preparation of Extract

Fresh leaves of *Datura alba nees* was washed with water to remove sand and other particles. The plant was then air dried and coarsely grinded and soaked with the methanol solvent. The mixture was allowed to stand for 72hrs with continuous agitation morning and evening. The mixture was filtered to obtain a clear solution which was mounted on a water bath for drying at a temperature of 50˚c in other to denature the sample the extract gotten was preserved for use. The dose to be administered was determined using a stock solution and the average weight of the rats in each group.

Experimental Animal

Twenty adult male rats weighing between 102-169g were obtained from the Department of Anatomy, University of Port Harcourt. They were accommodated and permitted to acclimatize in their new environment for 14 days. The facility was adequately ventilated and kept at room temperature of 27ºC with 12hour natural light-dark cycle. The animals were kept in cages and maintained at their natural condition The animals were weighed before commencement of administration and after administration. They were kept clean in a disinfected cage with saw dust as their beddings in animal house and with free access to food and water.

Experimental Design

Twenty male Wistar rats were used for this study. They were randomly selected and group into 4 groups with 5 rats per group. Administration of extracts was done for 21 days and on 22nd day, the animals were sacrificed and blood samples were collected.

Group 1. control received 5mls of distil water + feed Group
Group 2. Received 500mg/kg/bwt of (low dose) of extract + feed Group
Group 3. Received 1000mg/kg/bwt of (medium dose) of extract + feed Group
Group 4. Received 2000mg/kg/bwt of (high dose) of extract + feed

Blood Collection

The rats were made to fast overnight, they were anaesthetized using chloroform soaked in cotton wool and placed in a desiccator and the blood samples were collected using cardiac puncture and put in an EDTA bottle to prevent coagulation.

Analysis of Sample

Blood was used for chemistry analysis as described by Drasar et.al., (2011)

Results

The results shows significant decrease in the white blood cells of the animals administered with both low and medium dose of the extract. Result also shows significant decrease in the red blood cells of the rats administered with medium dose of the extract. No significant difference in platelet counts (Table 1). There is no significant difference is the haematological indices of the rats administered with extract across all the groups (Table 2). Also, no significant difference in the differentials (neutrophils, monocytes, leucocytes and eosinophil of the rats administered with the extract (Table 3).

Table 1: Effect of leave extract of *Datura alba nees* on formed elements of male Wistar rats

Group	Pack cell volume (%)	Haemoglobin (mg/dL)	Red blood cell count	White blood cell count	Platelet Count
Control	36.60 ±1.17	12.44 ±0,45	6.48±0.27	8.36 ± 0.70	631.60 ± 36.83
Low Dose	35.20 ±1.07	12.02 ±0.26	5.78±0.19.	11.72 ±0.59*	591.80 ± 15.05
Medium Dose	34.20 ± 1.74	11.40 ± 0.57	4.20±1.12*	14.96 ±1.67*	572.00 ± 13.04
High Dose	39.40 ±0.75	13.02 ±0. 20	7.36±0.09	7.18 ± 0.84	688.60 ± 51.83

Values are presented in mean±SEM, n=5, * $p \leq 0.05$ statistically significant compare to control

Table 2: Effect of leave extract of *Datura alba nees* on haematological indices of male Wistar rats.

Group	Mean Corpuscular Haemoglobin Concentration	Mean Corpuscular Haemoglobin	Mean Corpuscular Volume
Control	31.50 ± 2.35	18.68 ± 0.17	56.08 ± 0.70
Low Dose	34.22 ± 0.23	19.00 ± 0.21	56.74 ± 1.32
Medium Dose	33.25 ± 0.54	19.02 ± 0.26	58.86 ± 1.14
High Dose	33.86 ± 0.82	18.64 ± 0.24	56.66 ± 0.98

Values are presented in mean±SEM, n=5, * $p \leq 0.05$ statistically significant compare to control

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Table 3: Effect of leave extract of *Datura alba nees* on haematological indices of male Wistar rats.

Group	Neutrophil	Leukocytes	Eosinophil	Monocytes
Control	15.80 ± 2.06	78.80 ± 2.15	-1.80 ± 0.20	4.00 ± 0.45
Low Dose	16.60 ± 1.54	74.20 ± 2.29	2.60 ± 0.40	5.60 ± 0.60
Medium Dose	18.80 ± 1.24	75.20 ± 1.46	2.40 ± 0.50	2.40 ± 0.50
High Dose	15.20 ± 1.36	79.00 ± 2.42	1.80 ± 0.37	4.00 ± 0.84

Values are presented in mean±SEM, n=5, * $p \leq 0.05$ statistically significant compare to control

Discussion

Majority of people in Africa now rely on traditional medicine to get their treatment at a more convenient and affordable rate. effective. However, the over dependent on the plant datura alba nees without taking into cognizance the effects on reproductive hormones and organs, haematological, electrolytes, and other health parameters.

The results shows the effect of leave extract of *Datura alba nees* on haematological parameters of male Wistar rats. The results shows significant decrease in RBC and WBC levels in animals treated with low dose (500mg/kg/bwt). Also, there is significant decrease in WBC when medium dose (1000mg/kg/bwt) of *Datura alba nees* extract was administered and compared with the control. The significant decrease in both WBC and RBC levels in the treated animals with low and medium dose of *Datura alba nees* extract could be due to the bioactive compounds found in the plant extract. Also, there was neither increase or decrease in both PCV and platelet cells levels across all treated groups and this may be due to time or dose dependent. This shows that the plant Datura alba nees may not be beneficial to male who depend on it and care should be taken when take it for another purpose. The results also shows that, the effect of leave extract of *Datura alba nees* on red blood cell indices of male Wistar rats shows no significant increase or decrease in the levels of the haematological indices (MCHC, MCH and MCV) across all treatment group and this may be due to time or dose dependent. Again, there is no significant difference in the differentials of the WBC across all treatment groups administered with the extract. This extract shows that the bioactive compounds found in it are not go for haematopoisis and could not be use by any person suffering from anaemia.

Conclusion

Majority of people in Africa now rely on traditional medicine to get their treatment at a more convenient and affordable rate. effective. However, the over dependent on the plant datura alba nees without taking into cognizance the effects on reproductive hormones and organs, haematological, electrolytes, and other health parameters. The

research revealed that the leaves extract of Datura alba nees significantly decrease the levels of WBC and RBC and this may not be beneficial for person with anaemia.

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Ethical approval: It was approved by the ethical committee of Faculty of Basic Medical Sciences, Rivers State, Port Harcourt, Nigeria.

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