

THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

Effect of Aqueous Extract of *Ficusexasperata* Leaf on the Body Weight and Haematological Parameters of Wistar Rats

P. A. Odiba

Chief Lecturer, Department of Science Laboratory Technology, Federal Polytechnic, Idah, Kogi State, Nigeria

E. Jalija

Principal Lecturer, Department of Maths/Statistics, Federal Polytechnic Idah, Kogi State, Nigeria

Abstract:

The effect of aqueous extract of the leaf of *Ficusexasperata* administered at 100, 200, 300 and 400 mg/kg body weight for 14 days was investigated on body weight and haematological parameters of Wistar rats. The extracts at all doses had no significant effect on the red blood cells (RBC), haemoglobin (HB), packed cell volume (PCV) when compared with the animals in the control group. In contrast, the extract at all doses caused a significant reduction in white blood cells (WBC), and platelets (PLC) as well as the body weight. These observable alterations in some parameters were indications that the aqueous extract of the leaf of *Ficusexasperata* possess slight toxicity. This indicates that the aqueous extract of the leaf may not be completely safe as oral remedies.

Keywords: *Ficusexasperata*, haematology, weight parameters, oral remedy

1. Introduction

Plant-extract-based medicine is quite appreciated and culturally well accepted by rural and even urban population. Herbal plant contains number of medicinal properties and one of such plants is *Ficusexasperata* valh (Ganong, 2005).

Ficusexasperata Valh is commonly known as sand paper tree and is widely spread in West Africa in all kind of vegetation types and particularly in secondary forest re-growth. *F. exasperata* is widespread in tropical Africa, and is also recorded in the Arabian Gurf (Berg, 1991). Phytochemical and toxicological analyses of the leaf and stem extract of *F. exasperata* have revealed the presence of flavonoids, tannins, saponins, alkaloids and cyanogenic glycosides (Ijeh and Ukwani, 2007). *Ficus exasperate* is a medicinal plant used for treating different diseases. The viscid, non milky sap is used for treating sores, eye trouble and stomach pain in ivory Coast (Burkill, 1997).

Sap is equally used to arrest bleeding in Ghana (Abbiw, 1990). The liquid infusion in which bark is boiled is given to cows to hasten the expulsion of birth (Hallen, 1979). It is also used by traditional birth attendants (TBAS) in Congo to ease child birth (Bouquet, 1969).

In Southern Africa scraping of the bark is used in embrocating the body and also as a stimulant (Burkill, 1997). In upper Ivory Coast it is applied to leprosy sores (Bouquet, 1969). The Yoruba-speaking people of Western Nigeria often employed decoctions and infusions of *F. exasperate* leaves traditional for the management, control and/or treatment of an array of human diseases, including diabetes mellitus, hypertension and certain cardiovascular dysfunctions. The present study was therefore undertaken to investigate the effect of aqueous extracts of *ficusexasperata* on body weight and haematological parameters of Wistar rats.

2. Materials and Methods

2.1. Collection of Ficusexasperata Leaves

Ficusexasperata leaves were collected from the wild in Okenya, Igalamela/Odolu Local Government Area of Kogi State and was authenticated in the Pharmacognosy unit of the Department of Pharmacy, University of Nigeria, Nsukka.

2.2. Plant Extracts Preparation

The plant sample collected was air dried till total moisture was removed from the plant and then grinded to powder using milling machine. It was further extracted with distilled water by using soxhlet apparatus for 72h. The extract was concentrated to dryness and the residue was obtained as a dark green solid was weighed and reconstituted separately in distilled water to give the required doses of 100, 200, 300, 400 mg/kg body weight for the feeding of the Wistar rats.

2.3. Experimental Design

Wistar rats weighing 160-258 g were purchased at the animal breeding unit of the college of veterinary/medicine university of Nigeria, Nsukka. They were kept in well ventilated wooden cages under standard conditions (temperature, 25-29° C, 12 h light and 12 h dark cycle) and allowed free access to growers feed and water, the animals were allowed a 7 days' period of acclimatization. The cages were cleaned regularly to maintain proper hygiene.

2.4. Animal Grouping and Extract Administration

Twenty Wistar rats were randomized into 5 groups of 4 animals each after weighing. Groups II, III, IV, and V were orally administered with 100, 200, 300 and 400 mg/kg body weight of aqueous extracts of *Ficusexasperata* for fourteen days while they fed on grower's mash. Group I (the control group) was not administered with the plant extract.

2.5. Collection of Blood Sample

After fourteen days of extract administration, the animals were re-weighed. The blood samples were collected from the animals through cardiac puncture into EDTA bottles after anaesthetizing the animals with chloroform. Red blood cell (RBC) and white blood cell (WBC) counts were determined using a haemocytometer. The packed cell volume (PCV) was estimated by the microhaematocrit method and the haemoglobin (Hb) concentration by the cyanomethaernoglob in method (Jam, 1986).

2.6. Statistical Analysis

The results obtained were expressed as Mean±S.D of 4 animals and were subjected to one-way analysis of variance (ANOVA) followed by Duncan multiple range tests to determine significant differences in all the parameters. Values were considered statistically significant at $p < 0.05$.

3. Results

The administration of the aqueous extract of the leaf of *Ficus exasperata* at 100, 200, 300, and 400 mg/kg body weight caused a reduction in the body weights relative to the control (Table I). The result of the extract on red blood cell count, packed cell volume, haemoglobin concentration, white blood cell count and platelet count are shown in Table 2. The extract had no significant effect on RBC, PCV, Hb. In contrast however, the extract caused significant reduction in WBC, PLC.

Group/Treatment	Mean Initial Weight(g)	Mean final weight (g)	Percentage Weight gained
Group I Control	211	236	11.8
Group II 100 mg/kg	220	239	8.6
Group III 200 mg/kg	233	247	6.0
Group IV 300 mg/kg	246	260	5.7
Group V 400 mg/kg	251	265	5.5

Table 1: Body weight variation of rat administered with *Ficus exasperata* extract

Parameter	Group I (Control)	Group II (100 mg/kg)	Group III (200 mg/kg)	Group IV (300mg/kg)	Group V (400 mg/kg)
PCV (%)	46.10±0.01 ^a	46.32±0.01 ^a	48.00±0.02 ^a	49.32±0.02 ^a	50.93±0.02 ^a
Hb(g/L)	13.80±0.82 ^a	14.55±0.94 ^a	14.80±1.00 ^a	15.10±1.20 ^a	14.88±1.00 ^a
RBC(x10 ⁶ /mm ³)	7.57±0.53 ^a	8.00±0.35 ^a	8.20±0.42 ^a	7.93±0.53 ^a	8.42±0.78 ^a
WBC (x10 ³ /mm ³)	12.94±0.81 ^a	7.60±1.04 ^b	7.72±1.04 ^b	8.40±1.00 ^b	8.93±1.08 ^b
PLC (x 10 ³ /mm ³)	824.42±1 2.05 ^a	693.28±10.33 ^b	684.60±10.33 ^b	728.00±11.99 ^c	691.32±10.33 ^b

Table 2: Effect of aqueous extract of the leaf of *Ficusexasperata* on some haematological parameters of Wistar rat
Means with the same superscripts across the row for each parameter are not significantly different ($p < 0.05$).

4. Discussion

The administration of herbal preparations without any standard dosage coupled with non-availability of adequate scientific studies on their safety has raised concerns on their toxicity (Saad et al., 2006). Alteration in weight is an indication of impairment in the normal functioning of the organisms.

Assessment of haematological parameters can be used to determine the extent of deleterious effect of foreign compounds including plant extracts on the blood constituents of an animal (Ashafa et al., 2009). It can also be used to explain blood relating functions of chemical compounds/plant extract (Yakubu et al., 2007). The various haematological parameters investigated in this study are useful indices that can be employed to assess the toxicity potentials of plant extracts/botanicals in living systems (Sunmonu and Oloyede, 2010). Such toxicity testing is relevant to risk evaluation as changes in the haematological system have higher predictive value for human toxicity, when data are translated from animal studies (Olson et al., 2000).

The non-significant effect of the extract on RBC count could mean that the balance between the rate of production and destruction of blood corpuscles (erythropoiesis), was not affected negatively. RBC, Hb and PCV are associated with the total population of the red blood cells. Therefore, the absence of observable significant effect of the extract on these parameters may be an indication that neither

the incorporation of haemoglobin into the red blood cells nor the morphology and osmotic fragility of the red blood cells was altered (Adebayo et al., 2005).

The reduction in platelets, WBC in this study suggests selective and localized toxicity. Reduction in platelets count in experimental animals has been reported to indicate adverse effect on the oxygen-carrying capacity of the blood as well as thrombopoietin (Li et al., 1999; McLellan et al., 2003).

The alterations in weight and certain haematological parameters observed in the present study point to selective toxicity of aqueous extract of *Ficusexasperata* on the immune system of experimental animals. Therefore, the herb may not be completely safe as an oral remedy at the doses investigated.

5. References

- i. Abbiw, T. (1990). Study of tropical shrubs and plants. *J. Biogeography*, 23, 591-602.
- ii. Adebayo, I.O.; Adesokan, A. A.; Olatunji, L.A.; Buora, D.O. and Soladoye, A. O. (2005). Effect of Ethanolic extract of *Bougainvillea spectabilis* leaves on haematological and serum lipid variables in rats. *Biokem*, 17,45-50.
- iii. Ashafa A. O. T.; Yakubu, M.T. Grierson, D. S; and Afolayan., A.J (2009) Effect of aqueous leaf extract from the leaves of *chrysocomaciliate* L. on some biochemical parameters of Wistar rats. *Afr. J. Biotechnol.*, 8,1425-1430
- iv. Ashafa, A.O.T., Summonu, T.O. and Afolayan, A.J. (2010): "Effect of Leaf and Berry Extract of *Phytolaccadioica* L. on Haematological and Weight Parameter of Wistar Rats." *Afr. J. Pharmacy and Pharmacolo*, 5 (2), 150-154.
- v. Berg, C. C. (1991). *Flora of West Tropical Africa*. 9 (6): 13.
- vi. Bouquet, A.J. (1969): *Natural products as alternative remedy*. 4th Ed. Royal Botanic Gardens. Kew, pp 166-179.
- vii. Burkill, H.M.(1997): "The Useful Plants of Tropical West Africa". 3rd Ed: Royal Botanic Garden Kew, Pp 166-179.
- viii. Ganong, W.F. (2005): "A Review of Medical Physiology". 20th Ed: Appleton and Large. Pp 369-382.
- ix. Ijeh, I.I. and Ukweni, A.I. (2007): Acute effect of administration of ethanolic extracts *F. exasperate vahl* on kidney function albino rats. *J. Med. Plant. Res*, 1(2), 27-29.
- x. Jain, N.C. (1986). *Schalm's Veterinary Haematology*, 4th Ed. Lea and Febiger, Philadelphia.
- xi. Li, J. Xia, Y. and Kuter, D.J. (1999). Interaction of thrombopoietin with the platelet complements receptor in plasma: binding, internalization, stability and pharmacokinetics. *Br. J. Haematol.*, 106,345-349.
- xii. McLellan, S.A., McLellan, D.B.L; and Walsh, T.S. (2003): Anaemia and red blood cell transfusion in the critically ill patient. *Blood Rev.*, 17,195-208.
- xiii. Ochie, J. and Kolhatkar.A. (2000): "Medical Laboratory Theory and Practice". McGraw Hills companies, New Delhi. pp 286-289.
- xiv. Olson, H.; Bett, Lilly, P; Berger, B and Heller, A. (2000): Concordance of toxicity of pharmaceuticals in humans and animals. *Regul.Toxicol.Pharmacol.*, 32,56-67.
- xv. Saad, B., Azaizeh, H. Abu-Hijleh, G. and Said, S. (2006): Safety of traditional Arab herbal medicine. *Evid.Based complement.Alternate. Med.*, 3,433-439
- xvi. Sunmomu, T.O. & Oloyede, D.B. (2010): Performance and Haematological indices in rats exposed to monocrophos contamination. *Hum. Exp. Toxicol.* 10,111-117.
- xvii. Yakubu, M.T.; Akanji, M.A. and Oladiji, A.T. (2007): Haematological evaluation in male albino rats following chronic administration of aqueous extract of *Fadogiaagrestis* stem. *Pharmacol. Mag.*, 3,34.