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Effect of *Fagonia cretica* linn ethanolic extract on different hematological parameters in albino rats in Sudan

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Abstract
Objectives: To determine the effects of ethanolic extract of *fagonia cretica* linn on different hematological parameters, in albino rats, in Sudan (January – February) 2011.
Materials & Methods: Different methods were adopted in this study; the Harborne extraction method was applied. A total of (30), young adult Wistar rats of age (8-12) weeks, weighing (42.6 – 72.2) grams, maintained at standard laboratory conditions, obtained from Sudan NCR. Rats were divided into (4) groups, (3) x (7) rats (study groups), and control group (9) rats. All rats were sacrificed for inspection, and safety of internal organs. Ethical approval had been obtained. Before experiments started, rats were fasted overnight for (14 – 16) hours. the control group (C), received orally (10) ml/kg distilled water, while groups (1,2,3) were orally receiving single, daily doses (100, 300 and 600) mg/kg of body weight of the extract in distilled water (1 g/10 ml) respectively, for (14) days using acute oral toxicity (425) protocol [36]. (CBC) blood samples were collected in (*EDTA)* tubes - from the rat's eyes using non-heparinized capillary tubes. The assay was done at Shendi University using (Shenzhen Mindray BC-3000 Plus Auto Hematology Analyzer).
Results: The ethanolic extract of Fagonia *cretica* in doses of (100, 300 and 600) mg/kg/body weight) has different effects on the major blood cells in rats after the study period (14 - days) compared to the control group.
Conclusion: Statistical analysis for evaluation of the extract affects different variant hematological parameters, but in general it is concluded that it raises the main blood parameters.

Keywords: *Fagonia cretica linn*, extraction, toxicity, hematological parameters. NCR, National Centre for Research.

1. Introduction
Life and diseases go together: Where there is life, diseases are bound to exist. Dependency and sustainability of man and animal life has been revolving around plants through the uses as foods, fibers and shelter, but also plants have been used to control and ease diseases, therefore the use of the plants as medicines is an ancient and reliable practice [1]. The plant is a small spiny under shrub, mostly found in dry calcareous rocks throughout Pakistan [2]. It is reputed to be a medicinal plant in scientific and folkloric literature and its medicinal values are well documented [3].

Vern names: (Ar) Umm Showeika, Sholib, UmmShok.

Family: Zygophyllaceae.

Habitat: Sandy hills (Quos), low land plains.

In Sudan: ElMazroub, also widespread throughout Northern and central Sudan [4]. It is present abundantly in Shendi region.

Universally: It is found in India, Pakistan, China, Bangladesh and Egypt

Medicinal properties of the plant are attributed to its variety of active phytochemical constituents. In the last fifteen years, this plant and related species have been investigated mainly for the presence of flavonol and terpenoid glycosides. Most of the flavonol glycosides have been isolated from various Egyptian *Fagonia species* and their phylogenetic affinities

have also been investigated [5]. Several saponin glycosides have been separated and Characterized [6]. Other constituents, such as docosyl docosanoate from hexane extract and water soluble proteins from aqueous extract of air-dried *F. cretica* plants have been isolated. Furthermore nahagenin (hederagenin, ursolic acid and pinitol from other Fagonia species have also been separated and characterized [7]antimicrobial activity of its flavonoid compounds has been explored previously. While the nutritive values of it and of other species growing wild in the Rajasthan region of India, have also been evaluated [8].

A case control study was adopted to achieve the objectives of this research. Ethical approval had been obtained from the Omdurman Islamic University, Faculty of Pharmacy, and department of the Pharmacology, under the number (01/0/2013)

No specified area in Sudan was chosen for completion of this work. The work was shared between Khartoum, Omdurman and Shendi Towns. Experimental procedures involving the experimental animals and their care were conducted in compliance with the procedure adopted in department of pharmacology, faculty of pharmacy, Omdurman Islamic University.

Blood samples for (*CBC)* were collected in (*EDTA)* tubes from the rat's eyes using non-heparinized capillary tubes. The assay was done at Shendi University using Mindray BC-3000 Plus Auto Hematology Analyzer (Shenzhen Mindray Bio-Medical Electronics Co, LTD).

A total of (30), young adult Wistar rats of both sex, weighting (42.6 – 72.7) g of age of (8-12) weeks were obtained from the Sudan National Centre for Research, Khartoum Sudan .These rats were divided into (4) groups, (3) of them are study groups which consist of (7) rats each and the (4^{th}) group was control group, that consist of (8) rats. The rat number (30) was sacrificed for the inspection of its internal organs to check its safety. (2) to (3) mls of blood were collected in each of heparinized and (*EDTA)* bottles from each of the (27) live rats at the end of the study period, using non heparinized capillary tubes, from rats' eyes after Anesthesia Induction.

The *Fagonia cretica* plants were collected from uncultivated and waste areas of Shendi town near the Faculty of medicine and health sciences, University of Shendi, Sudan during January-February (2011). Then the plant samples were authenticated by the Herbarium staff, Department of Botany, Sudan national centre for research, Khartoum, Sudan. A voucher specimen was deposited in there for future reference.

Extraction was carried out according to the method described by Harborne (1984), (2000) g of plant. Samples were extracted successively with chloroform and (80%) ethanol using shaker apparatus. For (72) hours for chloroform and (5) days for ethanol. The plant was washed with distilled water and allowed to dry completely before ethanolic extraction was carried out. Extraction was carried till the color of the solvent returned colorless. Solvents were evaporated under reduced pressure using rotary evaporator apparatus. Finally extracts were allowed to dry completely under air [9].

Blood samples for (*CBC)* were collected in (*EDTA)* tubes from the rats eyes using non-heparinized capillary tubes after induction of anesthesia using *diethyl ether* on a glass desiccators, were assayed using (Mindray BC-3000 Plus) [10].

The determined parameters included packed cell volume (*PCV*), platelet count, total leukocyte counts, (*Hb)* and, absolute values.

The ethanolic extract of *Fagonia cretica* in doses of (100, 300 and 600) mg/kg/body weight) has different effects on the major blood cells in rats after the study period of (14) days compared to the control group, this can be shown in (Table 1).

Table 1: Effect of ethanol leaves extract of *Fagonia cretica* on the major Blood cells in rats.

Blood cells [Mean ± S.E.M]			
Doses (mg/ kg)	**WBCs [cmm]**	**RBCs[cmm]**	**PLTs [cmm]**
Control	3.4 ± 0.3	6.8 ± 0.2	667.3± 65.2
100	5.5 ± 0.6**	7.8 ± 0.1***	926.3± 33.8**
300	6.5 ±1.0**	6.6 ±1.2	954.0± 66.6*
600	6.3 ±1.1*	7.2 ± 0.1	962.7 ± 62.3**

***Reference Values (Blood Cells)**

Parameter	Normal range
WBCs	6.6-12.6 x 10^3/mm.
RBCs	6.76-9.75 x 10^6 /mm.
Platelets	150-460 x 10^3/mm.

The ethanolic extract of *Fagonia cretica* in doses of (100, 300 & 600 mg/kg/body weight) has different effects on the Hemoglobin level *Hb* and the mean cell hemoglobin concentration *MCHC* in rats blood after the study period of (14) days compared to the control group, this can be shown in (Fig 1).

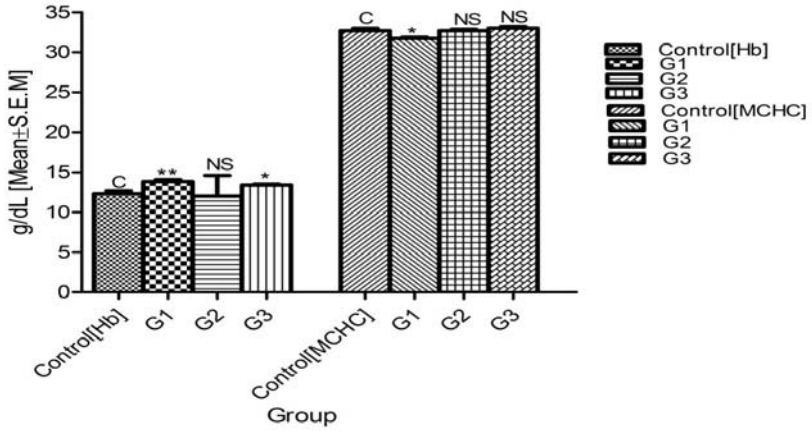

Fig 1: Effect of ethanol leaves extract of *Fagonia cretica* on *Hb* and *MCHC* of the different rats groups.

***Reference values (Hemoglobin)**
Parameter Normal range
Hemoglobin 11.5-16.1g/dl

The ethanolic extract of *Fagonia cretica* in doses of (100, 300 & 600 mg/kg/body weight) has different effects on the (*RBCs-Hct),* platelets-hematocrit *Pct* and the (*RBCs)* distribution width cell volume (*RDW-CV)* in the rats blood after the study period of (14) days comparable to the control group, this can be shown in (Fig. 2).

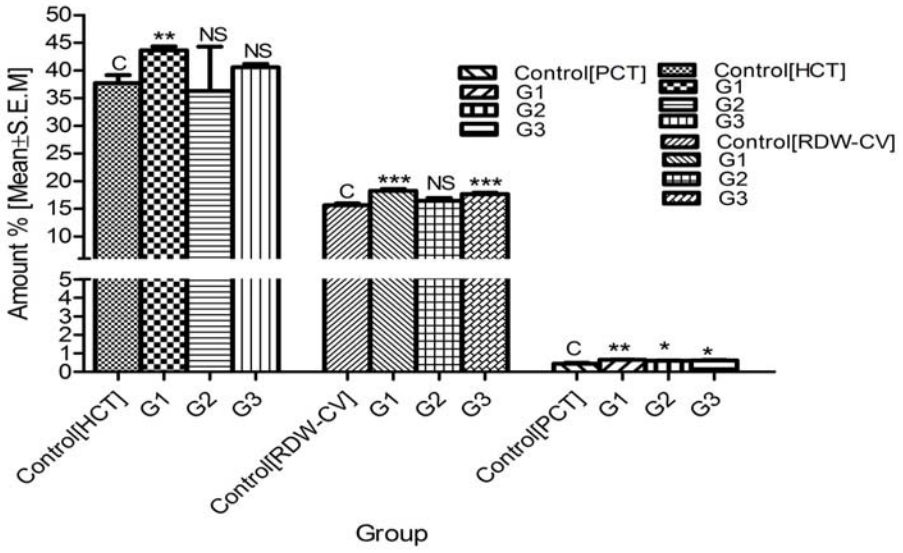

Fig 2: Effect of ethanol leaves extract of *Fagonia cretica* on (*Hct), (RDW-CV),* and (Pct) of the different rats groups

*** Reference values (Red blood cells hematocrit)**
Parameter Normal range
Hct 37.6-50.6%)

The ethanolic extract of *Fagonia cretica* in doses of (100, 300 & 600 mg/kg/body weight) has different effects on the mean cell volume (*MCV),* mean platelets volume (*MPV)* and the (*RBCs)* diameter width standard deviation (*RDW-SD)* in the rat's blood after the study period of (14) days compared to the control group, this can be shown in (Fig. 3).

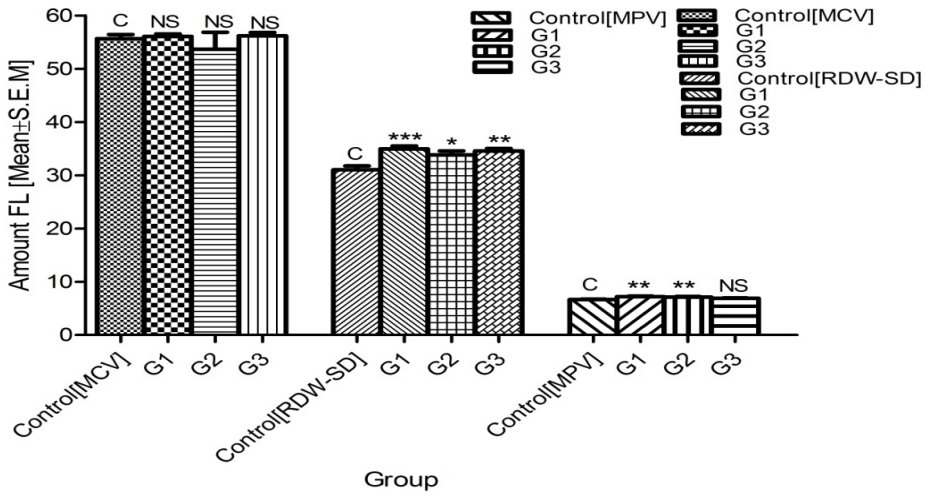

Fig 3: Effect of ethanol leaves extract of *Fagonia cretica* on (*MCV), (RDW-SD)* and (*MPV)* of the different rats groups.

The ethanolic extract of *Fagonia cretica* in doses of (100, 300 & 600 mg/kg/body weight) has no effects on the (*MCH)* and the platelets diameter width (*PDW)* in the rat's blood after the study period of (14) days compared to the control group, this can be shown in (Fig.4).

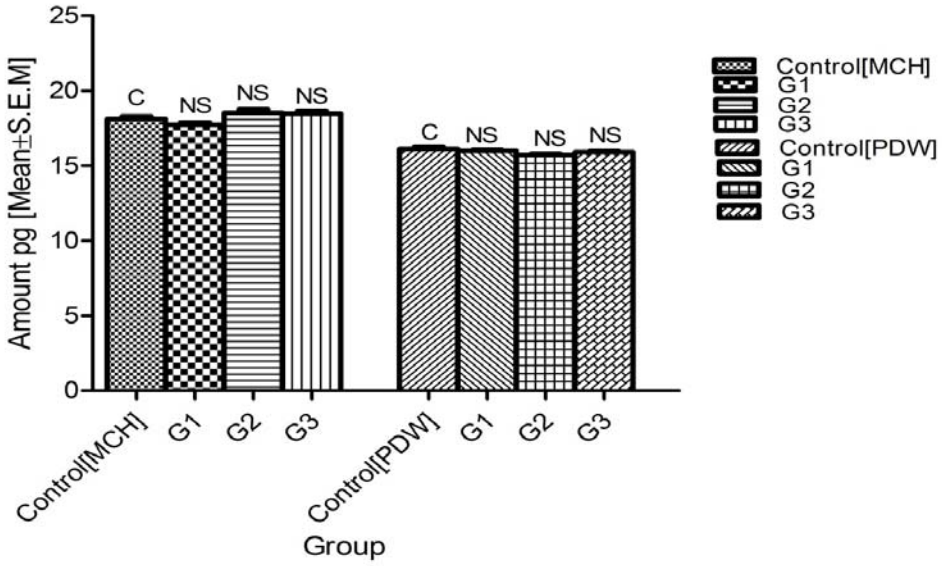

Fig 4: Effect of ethanol leaves extract of *Fagonia cretica* on (*MCH)* and (*PDW)* of the different rats groups

2. Discussion

Different effects were observed on hematological parameters, For (*WBCs)* which significantly increased in dose-dependent manner which indicated the immunopotentiation property, that supported the antioxidant property, this result is different from the result of (Asif, *et al*., 2003) [11]. Who reported the consistent (WBCs) reduction during the (16) days treatment, in contrast, it agrees with (Mitani, *et al* 1993) [12]. Who explored the antimicrobial activity of its flavonoides compounds.

The (*RBCs)* with its hemoglobin increased in the low dose of (100) mg which means that the extract either contain erythropoietin hormone, or erythropoietin like substances that stimulate the production, of (*RBCs)* masking the (*RBCs)* fragility property of the saponin, leading to more (*RBCs)* production these findings contradict with (Asif Saeed *et al* 2003) [11] .Moreover, the extract was with potential use in treating anemia, a similar conclusion was reached by (Rashid. S.) [13]. Who succeeded to manage Thalassemia major. These results were confirmed by the Hematocrit data.

The platelets show a dose dependent increment. This can be taken as evidence that the extract inhibits the bleeding tendency which may be due to the presence of coumarins or substance possesses thrombopoietin or thrombopoietin like action. The impact of this is the use of the herbal tea of the plant as anticancerous, where it increases the platelet number and reduces the bleeding tendency.

3. Conclusion

The evaluation of the hematological effects of the plant, different effects was observed in hematological parameters, For (*WBCs)* significantly increased in dose-dependent manner which indicated the immunopotentiation property. (*RBCs)* with its hemoglobin increased in the lowest dose.

The platelets show dose dependent increment, which can be taken as an evidence that the extract inhibit the bleeding tendency this may be due to the presence of coumarins or substance possess thrombopoietin or thrombopoietin like action. The outcome of this study is considered as a new Sudanese data concerning *Fagonia*

4. Recommendations

1. Further studies targeting the identification of the active phytochemical components of *Fagonia cretica* and their role of action are recommended.
2. Pharmaceutical formulation of *Fagonia cretica* as herbal medicine is highly recommended.
3. The LD_{50} of the plant showed a high margin of safety which encourages its use by human for the treatment of many diseases.
4. Further studies on the Sudanese *Fagonia cretica* as antioxidant, immune modulating agent, anticancerous, and anti-inflammatory is also recommended.

   The effect of ethanolic extract of the plant on hematological parameters encourages its use by human for different types of cancer, even with chemo and radiotherapy

5. References

1. Marwat BSK, Khan MA, Ahmad M, Sarhad MZF. Ethnophytomedicines for treatment of various diseases in D. I. Khan district Int J Pharm Biomed Sci 2010.
2. Chopra RM, Handa KL, Kapur LD, Chopra IC. Indigenous Drugs of India. Edn 2, India, Academic Press, New Delhi 1982, 507.
3. Saied MA. Hamdard Pharmacopoeia of Easter Medicine. Hamdard. Academy, Karachi, Pakistan, 1969, 41–43.
4. Gamal, Ghazali EBEL, Mahgoub, Toham SEL. Awatif, Egami ABEL, Abdalla WS. Medicinal Plants of the Sudan, 1994, National Centre for Research, Medicinal & Aromatic Plants Research Institute, Khartoum, 52-53.
5. Crack PJ, Taylor JM, De-Haan JB, Kola I, Hertzog P, Iannello RC: Glutathione peroxidase-1 contributes to the neuroprotection seen in the superoxide dismutase-1 transgenic. Journal of blood flow and metabolism 2003, 23(1):19-22.
6. Taylor CP, Weber ML. Effect of temperature on synaptic function after reduced oxygen and glucose in hippocampal slices. Neuroscience 1993; 52(3):555-562.

7. Titz F. Enzymatic method for quantitative determination of nanogram amounts of total and oxidized glutathione: Applications to mammalian blood and other tissues. Anal Biochem 1969; 27(3):502-522.
8. Paglia DE, Valentine WN. Studies on the quantitative and qualitative characterization of erythrocyte glutathione peroxidase. J Lab Clin Med 1967; 70(1):158-169.
9. Harborne JB. Phytochemical methods a guide to modern techniques of plant analysis, Edn 2, Chapman and Hall, London, 1984, Page 4-7.
10. SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD Mindray Building, Keji 12Road South, high-tech Industrial Park/Nansha Shenzhen 518057,P. China M.
11. Saeed A, Khan ZAW. Sabir Effects of *Fagonia cretica L*. Constituents on Various Parameters in Rabbits Tr. J of Biology 1999; 23:187-197.
12. Mitani A, Yanase H, Sakal K, Wake Y, Kataoka K: Origin of intracellular Ca2+ elevation induced by *in vitro* ischemia like condition in hippocampal slices. Brain Res 1993; 601(1-2):103-110.
13. Rashid Seyal February 4, 2013 personal communication via facebook.