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## RESEARCH PAPER

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## Effect of *Fagonia cretica Linn* Ethanolic Extract on Many Biochemical Parameters in Albino Rats in Sudan

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### ABSTRACT

*The study targeted to determine the effects of ethanolic extracts of Fagonia cretica linn plant on many biochemical parameters in Albino rats Khartoum, Omdurman, and Shendi towns in Sudan during January – February, 2011.*

*To determine the medicinal properties of the plant and to study the effects of the plant on many biochemical parameters.*

*Different methods were adopted to achieve the objectives of this study, including Harborne methods for extraction. A total of 30 young adult Wistar rats, of age of 8-12 weeks were obtained from the Sudan National Centre for Research, Khartoum Sudan. These rats were divided into 4 groups, three groups are study groups ,where the 4th group was control group. The rats were fed standard rat food and water d libitum, were maintained at standard laboratory conditions.*

*Ethical approval had been obtained from Omdurman Islamic University, Faculty of Pharmacy, and department of Pharmacology, under the number (01/0/2013) .Before the experiment was beginning; rats were fasted overnight for 14 – 16 hours. Group C, which was the control group, received 10 ml/kg body wt. distilled water, orally, throughout the study period while Groups 1, 2 and 3 were orally administered single, daily doses, 100, 300 and 600 mg/kg of body weight, respectively of the Fagonia cretica ethanolic extract dissolved in distilled water 1gm/10ml for 14 days using acute oral toxicity 425 protocol.*

**Blood samples for biochemical tests were collected in (heparin) tubes from the rat's eyes using non-heparinized capillary tubes. The assay was done at Shendi University using colorimetric and spectrophotometry methods.**

**The ethanolic extract of *Fagonia cretica* in doses of 100, 300 and 600 mg/kg/body weight) has no effects on the major biochemical tests in albino rats after the study period of 14 days compared to the control group.**

**The statistical analysis for evaluation of the ethanolic extract of *Fagonia cretica* linn effect on different biochemical parameters showed no effects, but in general it is concluded that, there is no difference between the results of biochemical parameters in test and control**

**Keywords: *Fagonia cretica* linn, Ethanolic Extraction, Albino Rats, Biochemical Parameters, Colorimetric and Spectrophotometry Methods.**

## 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 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 (Sarfraz et al., 2010). The *fagonia cretica* linn plant is a small spiny under shrub, mostly found in dry calcareous rocks throughout Pakistan (Chopra et al., 1982). It is reputed to be a medicinal plant in scientific and folkloric literature and its medicinal values are well documented (Saied, 1969).

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 (Gamal et al., 1994). 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 (Crack et al., 2003). Several saponin glycosides have been separated and characterized (Taylor and Weber, 1993). 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<sup>1</sup> hederagnin, ursolic acid and pinitol from other *Fagonia* species have also been separated and characterized (Titz, 1969) 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 (Paglia, and Valentine, 1967).

A case control study was adapted to achieve the objectives of this research. Ethical approval had been obtained from Omdurman Islamic University, Faculty of Pharmacy, and department of Pharmacology, under the number (2013/001).

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 (*Biochemical tests*) were collected in (*Heparin*) tubes from the rat's eyes using non-heparinized capillary tubes. The assay was done at Shendi University using colorimetric and spectrophotometry methods

A total of 30 young adult Wistar rats of both sex, of age of 8-12 weeks were obtained from the Sudan National Centre for Research, Khartoum Sudan. These rats were divided into 4 groups, three groups are study groups, where the 4th group was control group. The rats were fed standard rat food and water *ad libitum*, were maintained at standard laboratory condition. 2 to 3 mls of blood were collected in each of *heparinized* bottles from each of the 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), 2 kg of plant sample was 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 (**Harborne, 1984**).

Blood samples for (*Biochemical tests*) were collected in (*Heparin*) tubes from the rats eyes using non-heparinized capillary tubes after induction of anesthesia using *diethyl ether* on a glass desiccators, were assayed using colorimetric and spectrophotometry methods

The determined parameters included urea, creatinine as renal function tests, total protein, albumin, AST and, ALT, as liver function tests.

The ethanolic extract of *Fagonia cretica* in doses of (100, 300 and 600) mg/kg/body weight) has no effects on the major blood biochemical parameters in rats after the study period of 14 days compared to the control group,

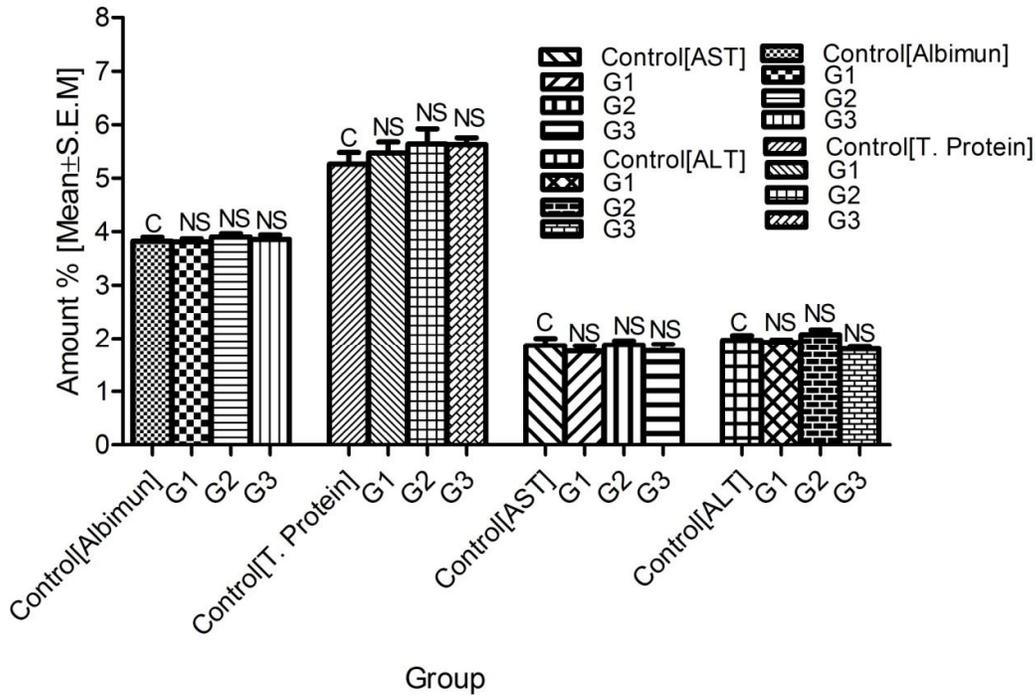
## RESULTS

### Renal function tests

The ethanolic extract of *Fagonia cretica* in doses of (100, 300 & 600 mg/kg/body weight) has no effects on the urea and creatinine as kidney function parameters, except the dose (300) mg effect on the urea level in rats blood after the study period of (14) days compared to the control group, as shown ( table 1 ).

### Liver function tests

The ethanolic extract of *Fagonia cretica* in doses of (100, 300 & 600 mg/kg/body weight) has no effects on the total protein, serum albumin, AST and ALT as liver function parameters levels in rat's blood after the study period of (14) days compared to the control group, as shown in (Fig.1)



**Fig. 1** Effect of ethanol leaves extract of *Fagonia cretica* on albumin, total protein, *AST* and *ALT* of different rats groups.

**Reference value (Liver function tests)**

Parameter	Normal range
Albumin	3.8-4.8 g
T protein	5.6-7.6 g/dL
ALT	17.5-30.2 U/L
AST	45.7-80.8 U/L

**Table 1.** Effect of ethanol leaves extract of *Fagonia cretica* on the kidneys function tests (urea + creatinine) in rats.

Doses (mg/kg)	Kidney function parameter[Mean ± S.E.M]	
	Urea [mg/dl]	Creatinine [mg/dl]
Control	31.9 ± 1.3	0.5 ± 0.1
100	32.6 ± 5.0	0.6 ± 0.1
300	40.9 ± 1.9**	0.6 ± 0.1
600	32.7 ± 5.3	0.5 ± 0.1

**\*Reference values (Kidney function tests)**

Parameter	Normal range
BUN	15-21 mg/dl
Creatinine	0.2-0.8 mg/dl

## DISCUSSION

Regarding the renal function test, the urea level is only affected significantly by ethanolic extract in moderate dose, these results were without significant clinical meaning, because the other parameters, creatinine and urea were not affected, at the same time this was confirmed by the macro pathological observation that revealed absence of any abnormal changes. Besides, these were in line with the toxicological findings which showed higher margin of safety, also the traditional plant was used as urinary antiseptic (Chopra, et al 1982). The ethanolic extract of *Fagonia cretica* in all doses has no effects on the investigated liver enzymes and proteins level, indicating the high safety level and agree with (Avinash, et al 2004), and supported the absence of any toxic substances, on the other hand it encourages its use by mankind

## CONCLUSION

Regarding the renal function test, the urea level is only affected significantly by ethanolic extract in moderate dose; these results were without significant clinical meaning, because the other parameters, Creatinine and urea were not affected. The ethanolic extract of *Fagonia cretica* in all doses has no effects on the investigated liver enzymes and proteins level, indicating the high safety level. The outcome of this study is considered as a new Sudanese data concerning *Fagonia*.

### 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. Further studies on the Sudanese *Fagonia cretica* as antioxidant, immune modulating agent, anticancerous, and anti-inflammatory is also recommended.

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