



PHYTOCHEMICAL SCREENING OF *FAGONIA CRETICA LINN*

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ABSTRACT

Objectives: The study targeted the determination of the active components of *Fagonia cretica linn* February, 2013. **Materials & Methods:** Different methods were adopted in this study; The phytochemical tests were done according to the methods stated in phytochemical methods a guide to modern techniques of plant analysis. **Plant material collection, identification. Plant collection and Identification:** 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 (2013). 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. **Results:** The phytochemical screening yields :-The crude plant powder showed the presence of flavonoids, saponin, steroids, alkaloids, tannins, and absence of anthroquinone, cyanogenic glycosides and Cardiac glycosides. **Conclusion:** The coarse powdered plant yields the presense of flavonoids, saponin, steroids, alkaloids, tannins, and absence of anthroquinone, cyanogenic glycosides and Cardiac glycosides.

KEYWORDS: *Fagonia cretica linn*, flavonoid, saponin, phytochemical.

INTRODUCTION

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 practice¹ *Fagonia cretica linn*:- Taxonomy

Botanical description

Description: The plant is a small spiny under shrub, mostly found in dry calcareous rocks throughout Pakistan. It is reputed to be a medicinal plant in scientific and folkloric literature and its medicinal values are well documented¹

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^[2] It is present abundantly in Shendi region.

Universally: It is found in India, Pakistan, China, Bangladesh and Egypt^[3] 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. Indigenously different plants have been used to cure a disease or several diseases at a time, but towards the middle of the (20th) century the contribution of medicinal plants to medicine was reduced by approximately (1/4th) as research and development favored the use of synthetic chemicals. Now this trend is reversing once again in favor of plants, as they have been discovered to possess natural products that are chemically balanced, effective, and least injurious with none or much reduced side effects of synthetic chemicals. Therefore, herbal cures and medicines have attraction, particularly for those who failed to get use of or disappointed with other methods of treatment.^[1]

Literature review of the selected plant: *Fagonia cretica l.*

Taxonomy

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Botanical description

Description: Spine scent glabrous woody diffused annual herbs up to (50) cm long leaves opposite, compound, (1-3) foliate; leaflets linear lanceolate, (1-2x0.2) cm stipulate; stipule spine scent, inflorescences axillary, solitary. Flowers purple with petals more than twice as long as sepals. Fruits capsules, ovate, (4-5) cm long (5 -sided, with persistent style.

Is a small spiny under shrub, mostly found in dry calcareous rocks throughout Pakistan.^[4] It is reputed to be a medicinal plant in scientific and folkloric literature and its medicinal values are well documented.^[5]

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The medicinal properties of the plant

In the last (15) 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.^[7] Several saponin glycosides have been separated and characterized.^[8] Other constituents, such as docosyl docosanoate from hexane extract^[9] and water soluble proteins from aqueous extract of air-dried *Fagonia cretica* plants, have been isolated^[10] furthermore nahagenin^[11] (hederagnin, ursolic acid and pinitol from other *Fagonia* species have also been separated and characterized^[12] antimicrobial activity of its flavonoid compounds has been explored previously^[13] while the nutritive values of it and of other species growing wild in the Rajasthan region of India, have also been evaluated.^[14]

A-Folkloric Use of *Fagonia cretica* l.

An aqueous decoction of the plant is a popular remedy for cancer in the indigenous system of medicine^[5] the maceration of the whole plant is used as antispasmodic. The powdered fruits mixed with sour milk are taken instantly as anti-purgative.^[6]

Rubia cordifolia, *Fagonia cretica* linn and *Tinospora cordifolia* are tropical herbs and have been extensively used in the treatment of various types of hematological, hepatic, neurological and inflammatory conditions.^[15]

The plant is bitter and used for the treatment of fever, thirst, vomiting, dysentery, asthma, urinary discharges, liver troubles, typhoid, toothache, stomach troubles, and skin diseases. Boiled residues of the plant in water are used to induce abortion. Externally applied as a paste on

tumors and other swellings of the neck. Leaves and twigs are used for snake bite. Reported to possess potent antibacterial properties against pathogenic organisms.⁴

MATERIALS AND METHODS

Plant material collection, identification

Plant collection and Identification: 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 (2013). 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.

Phytochemical screening methods: The coming phytochemical tests were done according to the methods stated in phytochemical methods a guide to modern techniques of plant analysis.

Tests for flavonoids: (2) Grams of the powder were boiled with distilled water for (5) minutes in water bath and filtered through a filter paper the filtrate was used for the following tests

A-Cyanidin reaction: About (2) ml of the filtrate was taken, and then a small piece of Mg^{2+} metal followed by drop wise addition of conc. *HCl* was added; an orange color will be produced after (2-3) minutes if flavonoids (flavones type) are present.

NH₄OH test: To (10) ml of the extract (5) ml of *NH₄OH* followed by few drops of conc. *H₂SO₄* was added. A yellow color will be produced and disappears on standing, if flavonoids are present. (1) ml of the filtrate few drops of *diluted NaOH* were added. A yellow color will be produced and then disappears on addition of *diluted HCl* if flavonoids are present. To (7) ml of extract (20) ml distilled water were added and filtered through cotton wool. The filtrate was acidified with few drops of *diluted HCl* and then tested for Flavonoid as follows: (i) A (10) ml of the aliquot of the filtrate was separately shaken with (5) ml of amyl alcohol in a small separating funnel; if the alcoholic layer (upper) is faintly yellow colored this indicates the presence of free flavonoid aglycones, while if it remains colorless it indicates the absence of free aglycones. (ii) A (10) ml of the aliquot of the filtrate was separately shaken with (5) ml of the amyl alcohol to remove any free aglycones. The aqueous layer was separated and boiled with (10) ml of conc. *HCl* for (2) minutes and treated as above with *amyl alcohol*; if the alcoholic layer is faintly yellow colored this indicates the presence of flavonoid glycosides.

Test for anthraquinones: (0.5) Grams of the powdered drug was boiled with (10) ml of *diluted H₂SO₄* for (2) minutes. The extract was filtered while hot through a

filter paper, cooled and extracted with (5) ml *chloroform*. The chloroformic layer was separated and (3) ml of (10%) *ammonia solution* was added to it. A rose, pink or red color in the ammonia layer indicates the presence of anthraquinones.

Test for cyanogenic glycosides: Little amount of the powdered *Fagonia cretica* was moistened with a little amount of water in a closed flask. A small piece of *sodium picrate* paper was fixed at the mouth of the flask. The flask was heated in a water bath to allow liberation of *HCN*. Turning of sodium picrate paper to brick-red will be taken as evidence of presence of either cyanogenic glycosides or glucosinolates.

Test for alkaloids: (2) Grams of the plant powder were moistened with (2) ml of (10%) *ammonia solution*, and then boiled with (10) ml *methanol* for 5 minutes, filtered through a cotton wool. The volume completed to (10) ml with *methanol* and transferred to a separatory funnel and portioned with equal volume of *chloroform*. The chloroform layer was taken and acidified with *HCl* in alcohol (*HCl* 1% + 95% alcohol). The aqueous layer was separated and divided into three test tubes, these were tested with: Mayer, Dragendorff and Hagers' reagents. Formation of precipitate in a form of turbidity indicates the presence of alkaloids.

Test for Saponin: (1) Gram of the plant powder was boiled with (15) ml distilled water for (3) minutes and filtered while hot through a cotton wool. The filtrate was used for the following tests.

A-Frothing properties

(1) ml of the above extract was placed in a test tube and shaken for (30) seconds. Formation of a persistent froth that lasts for at least a few hours will be taken as an evidence for the presence of Saponin. If not add few *Na HCO₃* foam persist for more than (1) hour.

B-Hemolytic properties

Place (5) ml of (5%) suspension of *red blood cells* in *normal saline* into each of (2) test tubes. To (1) test tube add (5) ml of normal saline solution. To the other add (5) ml of the plant extract into (0.045) *sodium chloride* which has been previously dissolved to render it isotonic with normal saline shake each of the test tubes (Positive in the test while control remains free of hemolysis).

Test for cardiac glycosides

(2) Grams of the of the plant powder were boiled with (20) ml (70%) alcohol for (5) minutes; filtered while hot and the volume was adjusted to (25) ml by distilled water. (1) ml of strong lead acetate was added and the solution was filtered. The filtrate was used for the following tests

A- Kedde's test (for lactone ring): To (3) ml of the filtrate (1) of dinitrobenzoic acid in ethanol and (1) ml of 2 (M) *NaOH* were added; a reddish-brown or a yellow-

brown colour indicates the presence of unsaturated lactone ring.

B- Bal jet's test (for lactones ring): To (5) ml of the filtrate equal volume of *picric acid* was added, and then the solution was made and used for the following tests.

B-1: alkaline by addition of *NaOH* and allowed to stand for more than (15) minutes. Appearance of orange colour indicates the presence of lactones ring.

B-2: Test for deoxysugars (Keller Killiani's test)

(10) ml of the filtrate was extracted with equal volume of *chloroform*. The chloroformic extract was evaporated to dryness in a porcelain dish; cooled and the residue was dissolved in (3) ml of *glacial acetic acid*. The glacial acetic acid was carefully transferred on the side of a test tube (2) ml of *conc. H₂SO₄*. A ring with reddish brown color will be produced at the junction of liquids, and a gradually produced bluish green color in the upper layer indicates the presence of deoxysugars.

Test for steroids (Liebermann Burchard's method)

(1) mg of the dried alcoholic extract was dissolved in (3) drops of glacial acetic acid and (3) ml of a mixture of (5) parts acetic anhydride and (1) part of *conc. H₂SO₄*, green color or pink color indicates the presence of steroids or triterpenoid respectively.

Tests for Tannins

(1) Gram of the plant powder was decocted in (25) ml of *distilled water* was used for the following tests

A-Ferric chloride test

To (2) ml of the filtrate, (5%) *FeCl₃* solution was added drop by drop. Appearance of green color indicates the presence of condensed tannins, while blue color indicates the presence of hydrolysable tannins.

B-Formaldehyde test

To (2) ml of the filtrate, (3) drops of *formalin solution* plus 6 drops of (10%) *HCl* were added and boiled for (1) minute. Formation of a precipitate which is insoluble in *hot water*, *alcohol* and (5) *KOH* indicates the presence of condensed tannins.

C- Sodium nitrite test: To (3) ml of the extract, few crystals of *NaNO₂* were added. Appearance of green color indicates the presence of ellagitannins, while brown color indicates the presence of other tannin.^[3]

RRSULT

Phytochemical screening of the main components

The coming phytochemical tests were done according to the methods stated in phytochemical methods a guide to modern techniques of plant analysis.

(Table 1): The main chemical components of the plant

Test	Test results
Flavonoids	+ve
Anthroquinone	-ve
Cynogenic glycosides	-ve
Alkaloids	+ve
Saponins	+ve
Cardiac glycosides	-ve
Steroids	+ve
Tannins	+ve

DISCUSSION

The phytochemical screening of the crude powder of *Fagonia cretica* revealed the presence of flavonoid, saponin, steroids, tannins, alkaloids and absence of anthraquinones, cyanogenic glycosides and Cardiac glycosides. This agrees with (Shahina & Ghazafar, 1994), who proved the presence of the following Phytochemical components.

CONCLUSION

The coarse powdered plant yields the presense of flavonoids, saponin, steroids, alkaloids, tannins, and absence of anthroquinone, cyanogenic glycosides and Cardiac glycosides.

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.

REFERENCES

1. Sarfraz Khan Marwat, Mir Ajab Khan, Mushtaq Ahmad, Muhammad Zafarand Fazal-ur Sarhad ethnophytomedicine for treatment of various diseases in D. I. Khan district Int J Pharm Biomed Sci 2010; 1(1): 16-19 J. Agric. 24(2): 2008.
2. Hans Woblmuth, in : Terry Robson, An Introduction to Complementary Medicine, 2003, South Australia, Griffin Press, chapter ten, Herbal medicine , page 191.
3. Terry Robson BA, Introduction to Complementary Medicine, Allen and Unwin, Victoria, 2003, page 3-4.
4. Chopra, R.M., Handa, K, L; Kapur, L, D., and Chopra, I.C., Indigenous Drugs of India. 2nd ed. India, Academic Press,, New Delhi 1982; 507.
5. Saeed MA. Hamdard Pharmacopoeia of Eastern Medicine. Hamdard. Academy,Karachi, Pakistan, phytochemicals and biological activities of fagonia indica, 1969; 41-43.
6. Gamal,E.B.ELGhazali,Mahgoub,S.ELToham.Awati f,A.B.ELEgami. Waiel. S.Abdalla, Medicinal Plants of the Sudan, National Centre for Research, Medicinal & Aromatic Plants Research Institute, Khartoum, 1994; 52-53.
7. 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.
8. Taylor CP, Weber ML: Effect of temperature on synaptic function after reduced oxygen and glucose in hippocampal slices. Neuroscience, 1993; 52(3): 555-562.
9. Titz F, Enzymatic method for quantitative determination of nanogram amounts of total and oxidised glutathione: Applications to mammalian blood and other tissues. Anal Biochem 1969; 27(3): 502-522.
10. Paglia DE, Valentine WN: Studies on the quantitative and qualitative characterization of erythrocyte glutathione peroxidase. J Lab Clin. Med 1967; 70(1): 158-169.
11. Green LC, Wagner DA, Glogowaski J, Skipper PL, Wishnok JS, Tannenbum SR: Analysis of nitrate, nitrite and [15N] nitrate in biological fluids. Analytical Biochemistry 1982; 126(1): 131-138.
12. Lowry OH, Rosebrough NJ, Farr AL, Randall RJ: Protein measurement with the Folin phenol reagent. J Biol Chem 1951; 193(1): 265-275.
13. 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.
14. Sakamoto A, Ohnishi ST, Ohnishi T, Ogawa : Relationship between free radical production and lipid peroxidation during ischemia reperfusioninjury in rat brain. Brain Res 1991; 554(1-2): 186-192.
15. Saeed MA. Hamdard Pharmacopoeia of Eastern Medicine. Hamdard. Academy,Karachi, Pakistan; phytochemicals and biological activities of fagonia indica, 1969; 41-43.