

Fagonia Arabica L. : A Comprehensive Review of Its Phytochemistry, Pharmacological Activities, And Therapeutic Potential

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ABSTRACT

Fagonia arabica L., a medicinal plant belonging to the family Zygophyllaceae, has gained considerable scientific attention due to its diverse pharmacological activities and rich phytochemical composition. Traditionally, the plant has been extensively utilized in Ayurvedic, Unani, and folk medicine systems for the management of various ailments including inflammation, fever, diabetes, liver disorders, infections, and metabolic abnormalities. Recent pharmacological investigations have demonstrated that *Fagonia arabica* possesses significant antioxidant, anti-inflammatory, antimicrobial, hepatoprotective, anticancer, antidiabetic, neuroprotective, and metabolic regulatory activities. These therapeutic effects are primarily attributed to the presence of bioactive phytoconstituents such as flavonoids, saponins, alkaloids, tannins, phenolic compounds, and triterpenoids

KEYWORDS: *Fagonia arabica*; Dhamasa; Zygophyllaceae; flavonoids; phenolics; antioxidant; antithrombotic; phytopharmacology.

I. INTRODUCTION :

Fagonia arabica L. is a medicinal plant classified within the Zygophyllaceae family, extensively acknowledged for its therapeutic potential and traditional applications across various regions, particularly in arid and semi-arid environments. This drought-resistant shrub is distinguished by its thorny branches and small, delicate flowers, and it prospers under harsh climatic conditions where few other species can survive. *Fagonia arabica* has garnered significant scientific interest owing to its diverse bioactive constituents, including flavonoids, alkaloids, and saponins, which underpin its pharmacological activities such as anti-inflammatory, antioxidant, antimicrobial, and anticancer effects. The plant's traditional uses encompass the treatment of fever and inflammation as well as the management of chronic diseases, underscoring its importance in ethnomedicine. Contemporary research endeavors seek to substantiate these traditional claims and investigate its potential for the development of novel therapeutic agents. ^[1,2,3]



Photographic image of *fagonia arabica* L .

TAXONOMY : [4,5,6]

Kingdom	Plantae
Division	Zygophyllaceae
Class	Magnoliopsida
Order	Zygophyllales
Family	Zygophyllaceae
Genus	Fagonia
Species	Fagonia arabica L.

Table No. 1: Botanical classification of FA

BOTANICAL DESCRIPTION

Fagonia arabica L. is a small, spiny shrub belonging to the Zygophyllaceae family. It is commonly found in arid and semi-arid regions, including parts of India, Pakistan, Saudi Arabia, and North Africa.^[7,8]

Botanical Characteristics

- ❖ Leaves: Small, trifoliate (three-lobed), with spiny stipules.
- ❖ Stem: Thin, wiry, and covered with sharp spines.
- ❖ Flowers: Purple or pink, five-petaled, and typically bloom in dry conditions.
- ❖ Fruit: Small, capsule-like, containing tiny seeds.
- ❖ Roots: Deep taproot system, allowing survival in harsh desert environments.

This plant is well-adapted to dry climates, thriving in rocky and sandy soils. It has been traditionally used in herbal medicine due to its bioactive compounds.^[9]

Phytochemical Components

Fagonia arabica contains a variety of phytochemicals with potential medicinal properties. Some of the key phytochemicals identified in this plant include flavonoids, saponins, sterols, glycosides, tannins, alkaloids, carbohydrates, and amino acids. These compounds contribute to its antioxidant, antimicrobial, and pharmacological activities, making it a valuable plant in traditional medicine.^[10,11,12]

1. **Flavonoids:** These are polyphenolic compounds with strong antioxidant properties. They help neutralize free radicals, reducing oxidative stress and inflammation. Some flavonoids in *Fagonia arabica* include kaempferol-7-O-rhamnoside and acacetin-7-O-rhamnoside, which have been studied for their potential anticancer and cardioprotective effects.^[10,11,12]

2. **Saponins:** These compounds have surfactant properties and are known for their ability to lower cholesterol levels, boost immune function, and exhibit antimicrobial and antifungal effects. They also play a role in promoting apoptosis in cancer cells.^[10,11,12]

3. **Sterols:** Plant sterols, such as β -sitosterol, help regulate cholesterol levels and support cardiovascular health. They also contribute to cell membrane stability and have anti-inflammatory properties.^[10,11,12]

4. **Glycosides:** These bioactive compounds include cardiac glycosides, which can help regulate heart function. Some glycosides in *Fagonia arabica* have been linked to antimicrobial and anti-inflammatory effects.^[10,11,12]

5. **Tannins:** These polyphenolic compounds have strong antioxidant and antimicrobial properties. They help in wound healing, reduce inflammation, and may have astringent effects beneficial for digestive health.^[10,11,12]

6. **Alkaloids:** These nitrogen-containing compounds have potential therapeutic effects, including pain relief, antimicrobial activity, and neuroprotective properties. Some alkaloids in *Fagonia arabica* have been studied for their role in treating neurological disorders.^[10,11,12]

7. **Carbohydrates:** These provide essential energy for metabolic functions and contribute to the plant's medicinal properties by acting as precursors for bioactive compounds.^[10,11,12]

8. **Amino Acids:** Essential for protein synthesis, muscle repair, and overall bodily functions. Some amino acids found in *Fagonia arabica* may play a role in supporting immune health and metabolic processes.^[10,11,12]

TRADITIONAL USES

Fagonia arabica are traditionally well known for the treatment of hemorrhoids, Wound healing, Anti-inflammatory, Pain reliever, and fever in the form of internal and external conventional formulation *Fagonia arabica*, commonly known as "Dhamasa," has a rich history of traditional uses in various parts of the world, particularly in South Asia and the Middle East. It's been used in traditional medicine systems like Ayurveda and Unani for centuries. The plant has been reported to have a wide range of traditional uses, including treating various ailments such as fever, skin diseases, smallpox, and even some cancers.^[13,14]

- ❖ **Fever:** A decoction of the whole plant has been used to treat fever in various regions.

- ❖ Skin Diseases: *Fagonia arabica* has been used for skin problems like pimples, itching, and other skin conditions.
- ❖ Smallpox: In some areas, it has been used as a prophylactic against smallpox and for treating the disease.
- ❖ Stomatitis: Infusion of the plant has been used to treat mouth sores and other stomatitis related issues.
- ❖ Blood and Hormonal Disorders: The plant has been used for treating blood and hormonal disorders.
- ❖ Diuretic Properties: The dried leaves and stems are known to have diuretic properties.
- ❖ Tumours: The plant has been traditionally used to treat tumours.
- ❖ Snake Bites: The twigs of the plant have been used as a remedy for snake bites.
- ❖ Pain Relief: *Fagonia arabica* is used to alleviate pain, particularly in inflammatory conditions like arthritis.
- ❖ Inflammation Reduction: Its anti-inflammatory properties are believed to help reduce the swelling and redness associated with inflammation.
- ❖ Wound Healing: It's traditionally used for wound healing and to address various skin conditions, including abscesses and ulcers.
- ❖ Other Uses: It has been used for various other ailments, including blood purification, thrombolysis, and even in the treatment of liver cancer in its early stages.^[15]

PHARMACOLOGICAL ACTIVITY

1. Anti-inflammatory and Wound healing property : diclofenac sodium sol and wound rheovascular povidone-iodine (betadine) drugs. Natural gels and diclofenac sodium alm oil were applied topically to the calf-growing (0.5 g) surface of the left hand claw and a calming effect was observed within 3 hours. Corrective effects of wounds were found with the use of 0.5 g or F. Schweinfurtti gel. And betadine was seen once every 19 to 19 days with yellow skinned individuals and for rat extraction injury over a 4-day period. It can be observed that there is time to reduce the reformist influence to prison definitions and to increase the wound closer. the plant could be made into a preventive specialist to reduce various gel definitions and heal wounds^[16]
2. Androgenically active : *Fagonia* focuses on *arabica* .in. F. Alcoholic focus on the aerial parts of the Creticon estrus cycle and the effect of implantation in female yellow-skinned rats. On examination, he learned that *Fagonia* was facing criticism. Stability of the estrus pattern in rats with arbitrary overshoot of

the warm period (estrus phase). Its invisible list is +53.33, which reduces the desire to coexist with women. When controlled over 250 mg / kg p.o.it share the point went entirely to the enemy of the implantation specialist. Susp drug has respect to control of suspension and has a massive androgenic movement in the form of dilation of both the primary vesicles and the abdominal prostate. Symptoms obtained by treatment with testosterone propionate having any antiandrogenic action.^[17]

3. Counter-Activity : The cell-strengthening capacity of *Fagonia arabica* in pheochromocytoma (PC12) in rats with synthetic ischemia and the relevant component of the cancer prevention agent Guard [Satput et al. (2009)]. Variation in cell cancer prevention agent proteins (Turf, Cat, GSHPX and GH-R) has been estimated. Anti-cancer agent spice potential (ABTS), lipid peroxidation degree (MDA and 4-HAE), total cell reinforcement status (TAS) and total glutathione (reduction, oxidation and their ratios were evaluated, *Fagonia arabica* free extremities rumors ABTS) Fixation showed subordinate cell reinforcement activity up to a maximum of 1000 / g / ml. Its treatment with ischemic cells raises GSH, which helps to restore TAS levels and subsequent cell carcinogenic agent stimulants and subsequently lowers lipid peroxidation levels. Is. *Fagonia arabica* prevents free radicals and interferes with oxidative stress during ischemia. I then test guided tests to check for counter oxidants and additionally check for free end room room action related to plant extracts.^[18]

4. Clotlytic activity : The focus of the whole plant of *Fagonia arabica* exhibits a clear level of cluster level streptokinase negative control and water negative control (75.6%)^[18]

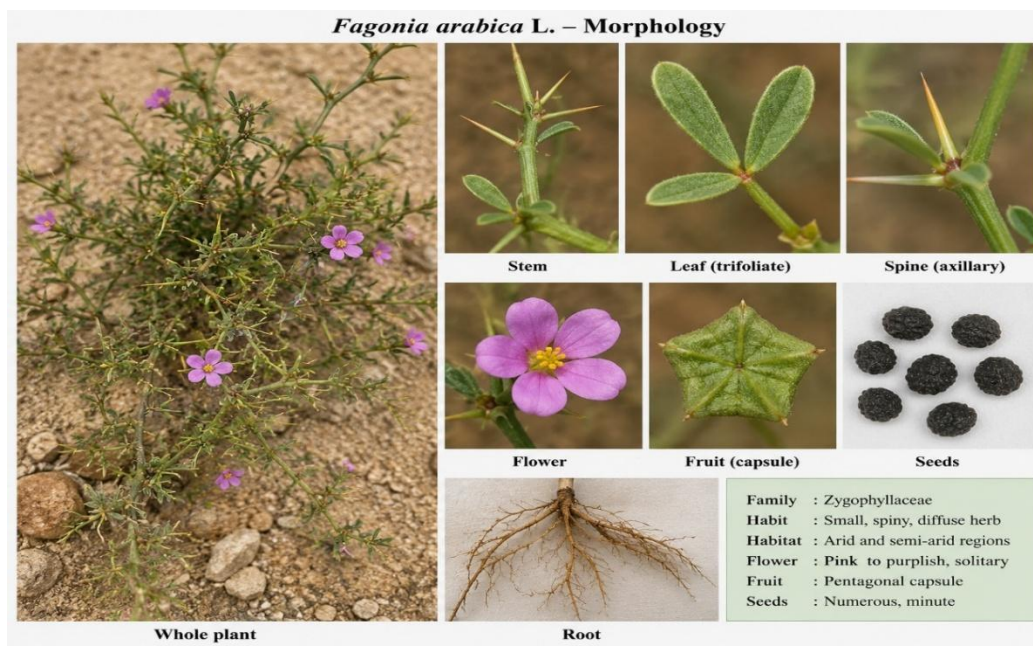
5. Neuroprotective activity : neuroprotective movement of three spices *Rubia cardifolia* (RC), *Fagonia Cretica* Linn (FC) and *Tinosorpa cordifolia* (TC). In which Test hippocampal fragments OGD (oxygen glucose difficult) and Divided into 3 synagogues: control, OGD and OGD + .drug. Cytosolic Cu-Zn Superoxide dismutase (Cu- Zn SOD), glutathione (GSH), glutathione monoxide (GPx), nitric oxide (NO) estimated to be nitrate (NO₂) in supernatant and protein tests work was done in different meetings at different times. Used to make EPR Superoxide ion (O₂.-) for cell reinforcement effects of RC, FC and TC Hydroxyl radical (.OH), nitric oxide (NO) radical and peroxinitrite ion (ONOO) is made individually from pyrogallol, menadione, DETA-NO and sin-1. RT-PCR GCLC, iNOS, Cu Zn SOD and GAPDH are displayed for quality for all three conferences Certainty. As a result

they were found to be viable within the three spices. Flushing of GSH levels, galling of gamma glutamylcysteine ligase. Spices in addition, solid free end search features are displayed against sensitive oxygen and nitrogen species concentrated by electron paramagnetic resonance spectroscopy. In the expansion of the three spices basically reduces iNOS quality advertising 48 hours later considered an important part of the neurological physical problem Hypoxia / Ischemia.[62] [16]

6. Antioxidant Activity : It includes flavonoids and triterpenoids which have antioxidant properties and can help with diseases involving reacting oxygen species. Antioxidant activity is present in the intrinsic bio- enhancer entities of fagonia cretica for the creation of silver nanoparticles. NO radical scavenging assay was utilized to investigate the

antioxidant properties of fagonia cretica. Although NO is biologically useful, its chemistry is quite complex. In each of the 96 well plates that needed weels, 175ml sodium phosphate buffer with a pH of 7.4 was added, followed by 20ml sodium nitroprusside and a 5 ml sample. Before adding the Griess reagent, thoroughly mix all of the ingredients and incubate for 3 hours at 37c. Following the incubation, each well-received 20 ml of Griess reagent. After another hour of incubation at room temperature, the absorbance of all samples was measured using the spectrophotometer at 528nm, and all samples were analyzed three times. The following formula was used to calculate nitric oxide scavenging activity: Percentage of NO scavenging activity = [(A528 of control-A528 of sample)/A528 of ethanol] x 100[16]

II. MORPHOLOGY :



Fagonia arabica L. is a small, spiny, diffuse, and highly branched medicinal herb belonging to the family Zygophyllaceae. The plant is commonly distributed in arid and semi-arid regions and is well adapted to dry environmental conditions. Morphologically, the plant possesses slender green stems with sharp axillary spines that provide protection against herbivores. The leaves are opposite, trifoliate, and small in size, with oblong to linear leaflets exhibiting a smooth surface and characteristic green coloration. The flowers are generally solitary, small, and pink to purplish in color, arising from the axillary region. The fruit is a

small pentagonal capsule containing numerous minute seeds. The root system is comparatively thin and fibrous, enabling the plant to survive under harsh climatic conditions. The entire plant possesses characteristic medicinal properties and has been extensively utilized in traditional systems of medicine for the management of various disorders [19]

CLINICAL TRIALS FOR *FAGONIA ARABICA* L.

At present, there are no well-established or registered large-scale clinical trials specifically evaluating the efficacy of *Fagonia arabica* L. in the

treatment of obesity or other metabolic disorders in humans. Most of the available scientific evidence regarding *Fagonia arabica* is limited to in vitro studies, animal experiments, and preliminary pharmacological investigations. Preclinical studies have demonstrated that *Fagonia arabica* possesses significant antioxidant, anti-inflammatory, antidiabetic, antimicrobial, and cytotoxic activities, which support its potential therapeutic importance. However, the absence of sufficient human clinical studies limits the establishment of its safety profile, optimal dosage, pharmacokinetics, and long-term therapeutic efficacy in humans

Recent review articles have emphasized that although *Fagonia arabica* exhibits promising pharmacological properties, further randomized controlled clinical trials are necessary to validate its medicinal applications in humans. Researchers have suggested that future clinical investigations should focus on standardization of extracts, toxicity evaluation, dose optimization, and assessment of therapeutic efficacy against chronic diseases such as obesity, diabetes, inflammation, and cancer. Therefore, despite encouraging preclinical findings, additional clinical research is essential before *Fagonia arabica* can be recommended as a clinically approved therapeutic agent^[20]

KEY RESEARCH GAPS IN *FAGONIA ARABICA* L. RESEARCH

Despite the promising pharmacological potential of *Fagonia arabica* L., several significant research gaps still limit its therapeutic and clinical application. Most available studies are confined to in vitro experiments and animal models, while well-designed human clinical trials remain scarce. Consequently, the efficacy, safety, optimal dosage, pharmacokinetics, and long-term therapeutic reliability of *Fagonia arabica* in humans are not yet fully established. In addition, there is a lack of standardized extraction protocols, quality control parameters, and universally accepted marker compounds, leading to variability in phytochemical composition and pharmacological outcomes. Furthermore, detailed molecular and mechanistic studies explaining its exact mode of action in metabolic disorders, obesity, inflammation, and oxidative stress are still insufficient.

Another major limitation is the inadequate toxicological and bioavailability data associated with

Fagonia arabica. Comprehensive acute, sub-chronic, chronic toxicity, genotoxicity, and reproductive toxicity studies are limited. Moreover, only a few studies have focused specifically on its anti-obesity potential, adipogenesis modulation, lipid metabolism, and inflammatory pathways in comparison with standard anti-obesity drugs such as orlistat. Advanced pharmaceutical approaches including nanoformulations, targeted drug delivery systems, and clinical standardization studies are also lacking. Therefore, future investigations should emphasize mechanistic research, isolation of active constituents, toxicity profiling, pharmacokinetic evaluation, and evidence-based clinical trials to establish *Fagonia arabica* as a safe, standardized, and effective therapeutic agent for obesity and other chronic disorders^[21]

III. FUTURE PROSPECTS OF *FAGONIA ARABICA* L.

Fagonia arabica possesses considerable therapeutic potential due to the presence of diverse bioactive phytoconstituents such as flavonoids, saponins, alkaloids, tannins, and phenolic compounds. In recent years, increasing scientific interest has been directed toward medicinal plants as safer alternatives to synthetic drugs for the management of chronic metabolic disorders. Based on its reported antioxidant, anti-inflammatory, hepatoprotective, antimicrobial, and metabolic regulatory activities, *Fagonia arabica* may emerge as a promising candidate for the development of novel phytopharmaceutical formulations.

Future research should focus on detailed phytochemical characterization and isolation of active constituents responsible for its pharmacological effects. Advanced molecular and mechanistic studies are required to elucidate its exact mode of action in obesity and related metabolic disorders. Additionally, toxicity profiling, pharmacokinetic evaluation, and long-term safety studies are essential to establish its therapeutic reliability. Clinical investigations and controlled human trials are also necessary to validate its efficacy and safety in humans. Furthermore, development of standardized herbal formulations, nanoformulations, and targeted drug delivery systems may enhance its bioavailability and therapeutic effectiveness.



Thus, *Fagonia arabica* holds significant future potential as a natural therapeutic agent for the management of obesity and associated metabolic complications, and may contribute to the development of safe, effective, and affordable herbal medicines.

IV. CONCLUSION

Fagonia arabica L. has emerged as a medicinal plant of considerable pharmacological importance due to its wide spectrum of bioactive phytoconstituents and diverse therapeutic activities. Accumulating scientific evidence indicates that the plant possesses significant antioxidant, anti-inflammatory, antimicrobial, hepatoprotective, antidiabetic, anticancer, neuroprotective, and metabolic regulatory properties. These biological effects are primarily attributed to the presence of flavonoids, saponins, alkaloids, phenolic compounds, tannins, and triterpenoids, which collectively contribute to its multifaceted pharmacological actions.

Recent experimental investigations have highlighted the potential role of *Fagonia arabica* in the management of chronic metabolic disorders, particularly obesity and its associated complications. Its ability to modulate oxidative stress, inflammatory mediators, lipid metabolism, and cellular signaling pathways suggests that the plant may act through a multi-target therapeutic mechanism, which is highly

advantageous in complex disorders involving multiple pathological pathways. In comparison to conventional synthetic drugs, herbal therapeutics derived from *Fagonia arabica* may offer improved safety, reduced adverse effects, and better long-term tolerability.

Despite promising preclinical findings, substantial gaps still exist regarding standardization, bioavailability, molecular mechanisms, pharmacokinetics, and clinical validation of *Fagonia arabica*. Most currently available studies are limited to in vitro and experimental animal models, while well-designed clinical trials in humans remain scarce. Therefore, future research should focus on isolation and characterization of active constituents, advanced molecular investigations, toxicity profiling, and evidence-based clinical studies to establish its therapeutic efficacy and safety.

In conclusion, *Fagonia arabica* represents a promising source of novel phytotherapeutic agents with broad pharmacological potential. The integration of traditional medicinal knowledge with modern scientific approaches may facilitate the development of standardized, safe, and effective plant-based therapeutics from *Fagonia arabica* for the management of obesity and other chronic diseases.

REFERENCES

- [1]. Hussain AI, Rathore HA, Iftikhar N, Chatha SA, Ahmad T, Ali Q. *Fagonia arabica* L.: A review of its phytochemistry, pharmacology and traditional uses. *Comb Chem High Throughput Screen* 2022;25:1187-99.
- [2]. Ageely H, Suneet K, Gupta BR. Review of ethnomedicinal plant *Fagonia*. *Int J Pharm Appl* 2014 ; 5:22-8
- [3]. Mahmoud NN. Insight into the biological activities of *Fagonia Arabica* L. *Medicinal Plant Research*. 2025
- [4]. Walbi IA, Alshabi AM, Alkahtani SA, Shaikh IA, Abdel-Wahab BA, Khateeb MM, et al. A preliminary cytotoxicity study of *Fagonia arabica* against breast (MCF-7), oral (KB-3-1), and lung cancer (A-549) cell lines: A study supported by molecular marker analysis using dual staining dyes. *Separations* 2023;10:110.
- [5]. Rasool BT, Tahira B, Mir AK, Mushtaq A, Muhammad Z. Indigenous knowledge of folk medicine by the women of Kalat and Khuzdar regions of balochistan, Pakistan. *Pak J Bot* 2010;42:1465-85.
- [6]. Tawaha K, Alali F, Gharaibeh M, Mohammad M, Elelimat T. Antioxidant activity and total phenolic content of selected Jordanian plant species. *Food Chem* 2007;104:1372-8.
- [7]. Prasad S, Kashyap RS, Deopujari JY, Purohit HJ, Taori GM, Dagainawala HF. Effect of *Fagonia arabica* (Dhamasa) on in vitro thrombolysis. *BMC Complement Altern Med* 2007;7:36.
- [8]. Satpute R, Bhattacharya R, Kashyap SR, Purohit HJ, Deopujari JY, Taori GM, et al. Antioxidant potential of *Fagonia arabica* against the chemical ischemia-induced in PC12 cells. *Iran J Pharm Res* 2012;11:303-13.
- [9]. Basit A, Sultana R, Aziz A. Extraction of phytochemicals from *Fagonia arabica* and their antimicrobial activity. *Int J Chem Biochem Sci* 2019;15:25-7.
- [10]. Abobaker DM. Preliminary phytochemical analysis and antibacterial activity of the aqueous and ethanolic extracts of *Fagonia arabica* L., used as traditional medicinal plant in Libyan. *Int J Sci Res* 2017;6:1056-9.
- [11]. Kasture VS, Gosavi SA, Kolpe JB, Deshapande SG. Phytochemical and biological evaluation of *Fagonia* species: A review. *World J Pharm Pharm Sci* 2014; 3:1206-17.
- [12]. El-Negoumy SI, Al-Wakeel SA, El-Hadidi MN, Saleh NA. The flavonoids of the *Fagonia arabica* complex (Zygophyllaceae). *1986;25:2423-4*.
- [13]. El-Wakil EA. Phytochemical and molluscicidal investigations of *Fagonia arabica*. *Z Naturforsch* 2007; 62:661-7.
- [14]. Perrone A, Masullo M, Bassarello C, Hamed AI, Belisario MA, Pizza C, et al. Sulfated triterpene derivatives from *Fagonia arabica*. *J Nat Prod* 2007; 70:584-8.
- [15]. Anjum I. Flavonoids and alkaloids from *Fagonia arabica* with their anti-inflammatory and antioxidant activities. *Phytochemistry* 2014;100:199-204.
- [16]. Iqbal P, Ahmed D, Asghar MN. A comparative in vitro antioxidant potential profile of extracts from different parts of *Fagonia cretica*. *Asian Pac J Trop Med* 2014;7S1:S473-80.
- [17]. Kanwal I, Fatima N, Wazir A, Khan M, Zaheer M, Masroor D, Syed S. *Fagonia Arabica* Linn, a miraculous medicinal plant with diminutive scientific data but hefty potential. *RADS J Pharm Pharm Sci* 2021;9:185-189.
- [18]. Farheen R, Mahmood I, Parveen R, Anwar KF. Review on medicinal and bioactive role of genus *Fagonia*. Review on medicinal and bioactive role of genus *Fagonia*. *FUUAST J Biol* 2017;7:33-6.
- [19]. Miyase T, Melek FR, El-Gindi OD, Abdel-Khalik SM, El-Gindi MR, Haggag MY, et al. Saponins from *Fagonia arabica*. *Phytochemistry* 1996;41:1175-9.
- [20]. Ahmad ES, Girgis SM, Kassem S, Shoman TM, Hassanane MS. *Fagonia arabica* extract ameliorate the mutagenic and biochemical effects of antitumor drug mitomycin C in male mice. *Res J Pharm Biol Chem Sci* 2016;7:878.
- [21]. Andrew R, Izzo AA. Principles of pharmacological research of nutraceuticals. *Br J Pharmacol* 2017; 174:1177-94.