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Gule Dhawa in Focus: A timeless remedy through the lens of unani wisdom

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Abstract

Plant derived medicinal herbs have a significant place both in traditional and modern system of healthcare. Among the various plant species utilized by tribal people as folk medicine, (*Gule dhawa*) *Woodfordia fruticosa kurz* has been prescribed for the treatment of multiple ailments across various systems of treatment practices. Among all the other parts of this medicinal plant its flowers are majorly considered to possess great therapeutic activity. Hence, the plant is considered to be of considerable economic value. Plenty of phytochemical compounds has been identified from the flower of (*Gule dhawa*) *Woodfordia fruticosa Kurz*. The various phytochemicals isolated from this plant are tannins, flavonoids, anthra-quinone, glycosides and polyphenols. These bioactive compounds possess several pharmacological properties, such as antimicrobial activity, hepato-protective, cardio-protective, antioxidant, immune-modulatory, antifertility and anti-tumour. These pharmacological activities of *Woodfordia fruticosa* plant are mentioned in the classical texts of Unani system of medicine and other traditional systems of medicine as well. The purpose of this concise review is to present a comprehensive account of *Woodfordia fruticosa* (Gule Dhawa), highlighting its phytochemical profile, traditional folk applications, contemporary therapeutic uses, and documented biological activities. In addition, insights from classical Unani literature are integrated, where the plant holds an esteemed position as a potent medicinal agent prescribed for various gynaecological, gastrointestinal, and systemic ailments.

Keywords: *Woodfordia fruticosa*, Gule Dhawa, gynaecological, phytochemical profile, unani wisdom

Introduction

Since early ages, medicinal plants have been regarded as a vital source of therapeutic agents, contributing significantly to the prevention and management of human ailments. Across civilizations, their value has been deeply acknowledged, forming the basis of diverse traditional medical systems while concurrently offering leads for modern drug discovery. India, enriched with exceptional floral biodiversity, possesses an immense storehouse of medicinal plants that continues to play a vital role in healthcare, both in classical traditions such as Ayurveda and Unani and in contemporary biomedical research.

Countries with ancient civilizations such as China, India, South America, Egypt, etc. and a number of plant-derived extracts are used against diseases in various systems of medicine. The demand for plant based medicines has been on the rise in the areas of marketing healthcare products, pharmaceuticals industries, agro industries, phytonutrients, nutraceuticals, food supplement and cosmetics etc., Sharma A *et al*, 2008^[1]. The use of medicinal plants in the treatment of diseases dates back to the very onset of human civilization and the earliest emergence of illnesses.

In India use of medicinal plants has a cultural and traditional background, and the World Health Organization (WHO) has consistently highlighted the growing global interest in plant-based remedies for treating different health conditions. One such valuable plant is *woodfordia Kurz* (also known as *woodfordia cordifolia Salisb.*), which has been an important part of traditional medicine practices across South East Asia for centuries. While every part of this plant is known to have healing properties, the flowers are especially prized for their strong therapeutic potential. These flowers not only make the plant medically significant but also add to its economic value. Their positive health effects are primarily attributed to the presence of a wide range of bioactive compounds within them.

The World Health Organization (WHO) has been attempting to emphasize the use of medicinal plants and their products in the treatment of various ailments. Amongst the numerous species used in conventional system of medicine, *Woodfordia fruticosa* Kurz syn, *Woodfordia floribunda* Salisb. Existed universally and used by PR actioners of traditional system medicine in different South East Asian countries since long back [2].

The therapeutic potential of *Woodfordia fruticosa* has been substantiated through extensive in vitro and in vivo studies. Recent investigations emphasize the necessity of identifying the specific bioactive constituents responsible for its pharmacological effects. Phytochemical analyses have confirmed the presence of approximately sixty-one compounds, including glycosides, terpenes, flavonoids, tannins, sterols, phenolics, and essential oils, isolated from different parts of the plant [3].

Woodfordia fruticosa (L.) Kurz is a medicinally important plant belonging to the family Lythraceae and is well recognized across many parts of Asia. The name *Woodfordia* commemorates E. James Alexander Woodford (1771-1837), a botanist and physician known for being the first to grow the species to bloom within a greenhouse environment. This genus consists of only two species: *W. fruticosa* which is widely distributed in Asia, and *W. uniflora* found only in Africa. The species name *fruticosa* originates from Latin word *frutex* meaning "a shrub" [4].

- **Temperament:** Single drugs are classified based on the temperament of the herbs.
- **Cold and Dry:** Which in medicinal systems (like Unani) refers to the plant's effect on the body. A "cold" temperament is associated with cooling, calming, and soothing actions, while a "dry" temperament indicates desiccating or drying effects [5].

The genus woodfordia includes the following species: [3]

Woodfordia fruticosa (L.) [1]

Woodfordia floribunda Salisb.

Woodfordia tomentosa Bedd

Woodfordia uniflora koehne: A species in the genus *Woodfordia* [6].

Botanical Description

Woodfordia fruticosa Kurz (Figure 1), a member of the Lythraceae family, is a perennial, leafy shrub that can grow up to about 3.5 meters in height. It bears long, spreading branches with distinctly fluted stems. The bark is smooth, fibrous, and cinnamon-brown in color, often peeling off in thin strips. The young shoots are softly covered with fine white hairs, giving them a delicate appearance. The leaves are arranged oppositely along the branches, enhancing the plant's dense, bushy look. The plant has leaves that grow opposite or slightly off from each other. Its flowers are a vivid red and appear in abundance, forming dense clusters along the branches. Each flower sits on a short stalk covered with tiny soft hairs. The calyx, which surrounds the base of the flower, is long, ridged, and speckled with fine glands. It has a small bell-shaped base and a slender, slightly curved red tube that narrows near the fruit inside. The petals are a little longer than the calyx teeth and taper into fine pointed tips. The fruits are small, thin-walled, and ellipsoid in shape. They usually split open irregularly near the base of the calyx to release the seeds. The seeds themselves are numerous, brown, smooth, shiny, and somewhat angular, with an obovate form [7]. It remains a symbol of beauty and vitality in folklore and traditional ancient tribal people. The bright red and orange flowers of *Woodfordia fruticosa* (*Gule dhawa*) are admired for their beauty, often symbolizing life and energy in local art and decoration. These flowers are sometimes used to adorn homes or sacred places during festivals.

Distribution

It is native of Asia and Africa (text supriya), throughout India, but more abundant in north India up to 1600m. It is also abundantly found in low gully of Himalaya [8].

Brief description about the medicinal plant: [4]

Botanical name	<i>Woodfordia fruticosa</i> linn.
kingdom	Plantae
Phylum	Tracheophyta
Class	Magnoliopsida 3
Order	Myrtales
Family	Lythraceae 5
genus	<i>Woodfordia</i>
Species	<i>Fruticosa</i>
Vernacular names	Unani: <i>Gule dhawa</i>
Habitat	It grows widely across India, with natural populations found in the southern regions, the eastern Himalayan slopes along the Ravi river up to about 1,400 meters, the upper stretches of the Godavari, the Melghat forests, and parts of Rajasthan. It is also common in North India, particularly in the lower valleys of the Garhwal Himalaya, and is distributed across many other regions of the country.5
Parts used	Flowers and gum; fruits and leaves;
Mijaz (Temperament)	Cold ^{2o} and Dry ^{2o} ; Cold ^{2o} and Dry ²
Af aal (Pharmacological Actions)	Flowers are holds properties like, astringent, refrigerant, haemostatic, anthelmintic, antibacterial, enhance wound healing, dessicative, constipating, antidiysentric, febrifuge, stimulant, styptic, uterine sedative.
Therapeutic uses	Antihelmintic, Antidiarrhoel, blood purifier, Styptic used in menorrhagia, and haemorrhoids. <i>Abzan</i> (Sitz bath) in conditions like procidentia, leucorrhoea, and as an appetizer.
Muziraat(Adverse effects)	Excessive Phlegm accumulation 6
Musleh (corrective)	<i>Zingiber officinale</i> or <i>Punica granatum</i> Juice
Badal (Substitute)	<i>Pistacia vera</i>
Phytochemical constituents	Ellagic acid, polystachoside, myricetin-3- galactoside and pelargonidine3,5-diglucoside,cyaniding-3,5-diglucoside, octosanol,b sterol and chrysaphanol-8-o-b-dglucopyranoside. Galactoside, anthocyanins pelargonidine-3,5-diglucoside and cyaniding 3,5-diglucoside; octacosanol, chrysophanol-8-obeta-d-glucopyranoside, mesoinositol, polytachoside and myricetin-3- flavone Polyphenols-ellagic acid, i.e. glycosides-

	quercetin-3 rhamnoside, naringenin-7- glucoside and kaempferol. A high proportion of ellagic acid and polyphenols. The flowers contain 24.1%, tannins. Dimeric hydolyzable tannins woodfordins a, b and c, and trimeric tannins woodfordin d and oenothien a and b. isoschimawalin betasitosterol, hecogenin, and five oligomers-woodfordin e, f, g, h and i.
Pharmacological activities	Antibacterial, hepato-tonic, anti-cancerous, anti-proliferative, DNA inhibitory, cytotoxic, antioxidant, anti-ulcer agent, immuno modulatory effects has been clinically proven. ⁹
Famous unani formulations	Safoof sailan, majune zanjabeel



Fig 1: Gule Dhawa (*Woodfordia fruticosa* Linn.)



Fig 2: Dried flowers (*Woodfordia fruticosa* L.)

Traditional and Ethnomedicinal uses

The flowers are traditionally and ethnomedicinally recognized for their versatile therapeutic properties. They possess astringent (*qabiz*), stimulant (*muharrrik*), haemostatic (*habisuddumn*), anthelmintic (*qatil kirm shikam*), desiccative (*mujaffif*), wound-healing (*mundamile qurooh*), and refrigerant (*mubarrid*) effects. Additionally, dried flowers are used to treat constipation (*qabide aama*), act as a styptic (*habis*), exhibit antibacterial (*dafa-e-taffun*)

properties, reduce fever (*dafa-e-humma*), function as a uterine sedative (*mussakine rehm*), provide further stimulation (*muharrrik*), and alleviate dysentery (*dafa-e-pechis*)^[10].

Therapeutic application methods

The plant offers various therapeutic applications, including oral use of its flower extract to expel intestinal worms, enhance appetite, premature ejaculation, excessive thirst,

blood purification, and menorrhagia. It is combined with *jaiphal* (nutmeg) and *qhand* (jaggery) for gastric issues like bloating and pain, and with honey for diarrhoea in pediatric age group. *Gule Dhawa* extract is used for haemorrhoids, while its ashes aid in wound healing and burns. It also addresses diarrhoea, menorrhagia, haemorrhoids, rectal prolapse, and leucorrhoea through oral administration or sitz baths with its decoction ^[11-14].

Phyto chemical profile

Contains a variety of bioactive compounds including

The flower extracts have been reported to exhibit notable abortifacient activity in experimental mice. Phytochemical analyses indicate the presence of ellagic acid, β -sitosterol polystacoside, octacosanol, myricetin-3-galactoside, cyanidin-3,5-diglucoside, and chrysophanol-8-O- β -D-glucopyranoside. In addition, the flowers are also enriched with tannins/phenolic compounds, steroids/terpenoids, carbohydrates, resins, and essential mineral elements such as iron, aluminum, calcium, magnesium, and potassium ^[9].

Pharmacological properties

The *Woodfordia fruticosa* plant has been extensively studied for its pharmacological potential, demonstrating a wide range of therapeutic activities. Various extracts from different plant parts exhibit anti-microbial, anti-tumor, anti-inflammatory, analgesic, anti-hyperglycemic, immunomodulatory, cardio-protective, hepato-protective, anti-oxidant, anti-ulcer, antifertility, anti-hyperlipidemic, and antihelmintic properties ^[9].

Antimicrobial activity

The dried plant extract was reconstituted in suitable solvents at a ratio of 1:10 (w/v) and tested for antibacterial activity against fourteen human pathogenic strains, including *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Salmonella paratyphi A*, *Salmonella typhi*, *Salmonella typhimurium*, *Shigella flexneri*, *Shigella sonnei*, *Staphylococcus aureus*, *Streptococcus faecalis*, along with clinical isolates of *Citrobacter* sp., *Salmonella paratyphi B*, and *Shigella boydii* ^[15].

Among the five solvent systems evaluated, the petroleum ether extract showed the strongest antibacterial activity, in some cases even surpassing the effect of gentamicin. According to a study by Bains *et al.*, the extract exhibited the largest zones of inhibition against *S. aureus*, followed by *Salmonella typhimurium*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*, with inhibition zones ranging from 24 $\pm$ 0.7 mm to 30 $\pm$ 0.05 mm. The heightened sensitivity of *S. aureus* is likely due to its Gram-positive nature, characterized by a thick, hydrophobic cell wall. This structural feature allows proteins, lipids, peptidoglycans, and other bioactive components of the extract to effectively penetrate and disrupt the bacterial cell membrane ^[16, 17].

Anti-bacterial

The antibacterial potential of *Woodfordia fruticosa* was evaluated using dry plant extracts dissolved in different solvents (1:10 w/v). The extracts were tested against fourteen human pathogenic bacteria, including *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Salmonella paratyphi A*, *Salmonella typhi*, *Salmonella typhimurium*, *Shigella*

flexneri, *Shigella sonnei*, *Staphylococcus aureus*, and *Streptococcus faecalis*, along with isolates of *Citrobacter* sp., *Salmonella paratyphi B*, and *Shigella boydii*. Among the five solvents tested, petroleum ether extract demonstrated significant antibacterial activity comparable to gentamicin ^[17].

Immunomodulatory Activity

Experiments with yeast strains isolated from commercial Nimba arishtas confirmed traditional findings that adding *Woodfordia* significantly boosts alcohol production. Moreover, when *Woodfordia* flowers were tested in petri dishes, they noticeably increased the ability to inhibit human complement activity and reduced the chemiluminescence generated by zymosan stimulated human polymorphonuclear leukocytes. Further investigations showed that this enhanced biological effect wasn't due to any microbial contamination but was caused by immune-active compounds released directly from the flowers of *Woodfordia* ^[18].

Hepatoprotective Activity

Among the four extracts tested, the aqueous extract (WF4) showed the strongest protective effect on the liver. In cases of liver injury caused by carbon tetrachloride, WF4 significantly restored normal levels of serum enzymes (transaminases, alkaline phosphatase), bilirubin, and triglycerides. It also improved the function of the endoplasmic reticulum, as seen from the recovery of microsomal enzyme activities (aniline hydroxylase and amidopyrine-N-demethylase). The extract's ability to reduce lipid peroxidation and replenish glutathione levels highlights its antioxidant potential. Furthermore, the improvement in bromosulphalein clearance and the stimulation of bile secretion indicated enhanced excretory and secretory functions of liver cells. Microscopic examination of liver tissue confirmed that WF4 reversed much of the damage caused by the toxin ^[19].

Cardioprotective Activity

The formulation named as "Arjunaristha" an ayurvedic preparation was found to be beneficial for cardiac disorders. It was prepared using flowers of *Woodfordia fruticosa* by the process of fermentation ^[20].

Antioxidant Activity

The antioxidant activity of *Woodfordia fruticosa* was demonstrated in the flowers by using ABT and DPPH free radical scavenging models. The plant also showed significant antioxidant activity in petroleum ether, chloroform and methanol extracts ^[21].

Antiulcer Activity

Significant antiulcer activity in the stomach of female Wister albino rats was reported. The antiulcer activity was exhibited against diclofenac sodium-induced female Wister albino rats using chloroform and methanol extract of roots of *Woodfordia fruticosa* ^[22].

Antifertility Activity

The alcoholic extract of the plant showed significant abortifacient effects in female albino rats. Noticeable Antifertility activity from various extract of dried flowers of *Woodfordia fruticosa* was spotted in white female rats ^[23].

Antitumour activity

Anti-tumor Activity was observed in dried flower extract of *Woodfordia fruticosa* plant. The results revealed that macro ring hydrolysable tannin dimer was found to possess anti-tumor activity^[24].

Analgesic Activity

The analgesic activity of *Dhawa* plant was perceived from bark of the plant tested in albino rats. Various types of *Woodfordia fruticosa* extracts, prepared using different solvents, were administered by orally to the rats at a dose of 200mg/kg according to their body weight. The standard group was administered with Analgin (non-steroidal anti-inflammatory drugs). The aqueous and alcoholic extracts were found to exhibit analgesic activity in albino rats. It was also found out that the aqueous extract possessed most durable analgesic effects when compared other solvents like alcoholic extracts^[25].

Antihyperlipidemic activity

The antihyperlipidemic activity of *Woodfordia fruticosa* has been demonstrated in scientific studies where methanolic extracts of its flowers were tested on mice fed a high cholesterol diet. The extract significantly reduced levels of total cholesterol, low-density lipoprotein (LDL), very low-density lipoprotein (VLDL), and triglycerides. Additionally, it improved the ratio of total cholesterol to high-density lipoprotein (HDL), suggesting a beneficial effect on heart health by promoting better cholesterol metabolism and transport. These lipid-lowering effects are thought to be due to the presence of phytochemicals such as glycosides, flavonoids, alkaloids, tannins, and saponins, which may act synergistically to control lipid levels and support cardiovascular protection. This positions *Woodfordia fruticosa* as a promising natural agent for the prevention and management of hyperlipidemia and related cardiovascular diseases^[26].

Anti-inflammatory Activity

The result showed significant anti-inflammatory activity in the male rats methanol extract of *Woodfordia fruticosa* flowers against the carrageenan, histamine, dextran, serotonin and formaldehyde-induced rats reported antiinflammatory activity of^[27].

Antihyperglycemic Activity

The antglycemic (antihyperglycemic) activity of *Woodfordia fruticosa* (Kurz) has been scientifically studied, particularly focusing on its flower extracts. Research shows that both ethanolic and aqueous extracts of *Woodfordia fruticosa* flowers demonstrate significant antidiabetic effects in streptozotocin-induced diabetic rat models. These extracts reduce blood glucose levels, improve insulin secretion, and normalize lipid profiles in treated diabetic rats. The flower extracts also enhance antioxidant enzyme activities, such as catalase, superoxide dismutase, and glutathione peroxidase, while reducing lipid peroxidation. This antioxidant effect contributes to the overall reduction of hyperglycemia and oxidative stress in diabetic conditions. Phytochemical analyses reveal the presence of bioactive compounds like flavonoids, tannins, steroids, and glycosides in the extracts, which likely contribute synergistically to the antglycemic effects. The extracts have shown efficacy comparable to the standard antidiabetic drug glibenclamide in experimental

settings. These findings scientifically validate the traditional use of *Woodfordia fruticosa* flowers in managing diabetes by regulating glucose homeostasis and improving pancreatic beta-cell function^[28].

Discussion

Woodfordia fruticosa (Gule Dhawa) has been widely recognized for its diverse therapeutic properties across traditional medicine systems, particularly within Unani practices. The findings from this review underscore the considerable pharmacological potential of this plant, which has been validated by numerous preclinical studies. Below, we discuss the implications of these findings and the need for future research.

Ecological and environmental importance

- Serves as a good nectar for pollinators.
- Plays a good role in agroforestry systems.
- Known for its adaptability to diverse climates and soil types.

Potential applications

- **Pharmaceuticals:** Development of drugs for gastrointestinal, inflammatory, and microbial conditions.
- **Cosmetics:** Potential use in skin care formulations due to its antioxidant and antimicrobial properties
- **Agriculture:** Use in bio fertilizers or as a natural pesticide.

Research gaps and future directions

- Sustainable cultivation and conservative strategies.
- Exploration of its use in modern medicine and nutraceuticals.
- Need for extensive clinical trials to validate traditional claims.

Conclusion

Numerous studies have been done on this plant to explore and establish its medicinal and pharmacological potential. Scientific validation on Larger-scale trials are still required to demonstrate the clinical efficacy of this plant in areas of focus like skin, immunomodulatory aspects and metabolic syndrome. *Gule dhawa* (*Woodfordia fruticosa*) is more than just a medicinal plant; it serves as a bridge between health, spirituality, tradition and community.

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