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## Antiuro lithiatic plants of family Fabaceae: A memoir of mechanism of action, therapeutic spectrum, formulations with doses

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**Abstract**

Urolithiasis is a common problem afflicted for many centuries with high recurrence. This review covers the sixty four (64) antiuro lithiatic plants of family Fabaceae used in 18 different countries with their historical antiuro lithiatic background. Hopefully, this review will not only be useful for the general public but also attract the scientific world for antiuro lithiatic drug discovery.

**Keywords:** Urolithiasis, antiuro lithiatic, natural products, drug development, Fabaceae

**Introduction**

Urolithiasis is a common problem afflicted for many centuries with high recurrence. This review covers the medicinal plants of family Fabaceae. It covers sixty four plants used in 18 different countries such as Algeria, Bosnia Herzegovina, Haiti, India, Iran, Israel, Java, Jordan, Malaysia, Morocco, Nepal, Pakistan, Palestine, Peru, Spain, Trinidad, Turkey and Yemen. Their historical antiuro lithiatic background shared in well-known books of Dioscorides, Pliny the Elder, Al Razi and Ibn Sina. In this regard, 8 Fabaceous plants were shared by Dioscorides, 4 by Ibn Sina, 3 by Pliny the Elder and 1 by Al Razi. Among the plant parts leaves, roots and seeds were noted the most common (19-22%) followed by whole plant (10%), aerial parts (8%), bark (7%) and flowers and fruits (5%). In terms of preparation, decoction was observed most common (69%), followed by infusion (20%), juices (8%) and gums (2%). The route of administration is oral in all cases. Hopefully, this review will not only be useful for the general public but also attract the scientific world for antiuro lithiatic drug discovery.

**Abbreviations Used**

h.= hour.

OD= once daily.

QID = four times a day.

tbsp.= table spoon.

TID= three times a day.

tsp.= tea spoon.

Days= days required to dissolve / expel kidney stones.

Before breakfast= every morning in empty stomach.

Whewellite: calcium oxalate monohydrate

Brushite: calcium hydrogen phosphate dihydrate

Struvite: magnesium ammonium phosphate

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**Table 1:** Antirolithiatic plants of family Fabaceae.

Plants	Explanations
<i>Agrimonia eupatoria</i> L.	Seeds --- India <sup>[1]</sup> .
	Pharmacological activities: Antioxidant, astringent, diuretic <sup>[1]</sup> .
	Antirolithiatic spectrum (reported): Seeds against whewellite <sup>[2]</sup> .
<i>Abrus precatorious</i> L.	Leaves juice --- India <sup>[3]</sup> .
	India: 3 - 4 tbsp. leaves juice in empty stomach daily early in the morning for 15 days <sup>[4]</sup> .
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, astringent, diuretic, lithotriptic <sup>[1]</sup> .
<i>Acacia Jacquemontii</i> Benth.	Leaves infusion --- Pakistan <sup>[3]</sup> .
<i>Acacia modesta</i> Wall.	Whole plant --- Pakistan <sup>[5]</sup> .
<i>Acacia senegal</i> (L.) Willd.	Gum --- Palestine <sup>[6]</sup> .
	Palestine: 20 g of gum with 250 ml of milk BD <sup>[6]</sup> .
<i>Acacia tortilis</i> (Forssk.) Hayne subsp. <i>raddiana</i> (Savi) Brenan.	Fruit decoction --- Morocco <sup>[3]</sup> .
	Antirolithiatic spectrum (reported): Bark against brushite and struvite <sup>[7]</sup> .
<i>Alhagi camelorum</i> Fisch.	Aerial parts --- Iran <sup>[8]</sup> .
<i>Alhagi mannifera</i> Jaub. & Spach.	Root decoction --- India <sup>[9]</sup> .
	Pharmacological activities: Litholytic <sup>[1]</sup> , lithotriptic <sup>[10]</sup> .
	Aerial parts decoction --- Iran <sup>[11]</sup> ; roots decoction --- Jordan, Palestine <sup>[3]</sup> .
<i>Alhagi maurorum</i> Medik. OR <i>Alhagi camelorum</i> DC.	Jordan: Boil 100 g of root in one L of water. 250 ml TID till stone expulsion <sup>[4]</sup> .
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, litholytic <sup>[1]</sup> .
	Aerial parts --- Iran <sup>[8]</sup> .
<i>Alhagi persarum</i> Boiss. & Buhse.	Gum --- Palestine <sup>[6]</sup> .
<i>Astracantha gummifera</i> (Labill.) Podlech.	Palestine: 50 g of gum with 250ml of water BD <sup>[6]</sup> .
	Dioscorides ( <i>De Materia Medica</i> ): Whole plant is diuretic <sup>[12]</sup> .
<i>Astragalus boeticus</i> L.	Dioscorides ( <i>De Materia Medica</i> ): Resin is diuretic <sup>[12]</sup> .
<i>Astragalus gummifera</i> Labill.	Pliny the Elder ( <i>Naturalis Historis</i> ): Resin is diuretic <sup>[12]</sup> .
	Fruit decoction --- Iran <sup>[3]</sup> .
<i>Astragalus hamosus</i> L.	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant <sup>[1]</sup> .
	Leaves decoction --- India <sup>[3]</sup> .
<i>Bauhinia forficata</i> Link.	Pharmacological activities: Antioxidant <sup>[1]</sup> .
<i>Bauhinia purpurea</i> L.	Bark infusion --- India <sup>[3]</sup> .
	Pharmacological activities: Analgesic, anti-inflammatory <sup>[1]</sup> .
	Leaves decoction, seeds powder, stem bark paste --- India <sup>[3]</sup> .
<i>Butea monosperma</i> (Lam.) Taub.	India: Mix 1 tsp. of seed powder with 250ml of water. 250 ml OD after meals till stone expulsion <sup>[4]</sup> .
	Pharmacological activities: Anti-inflammatory, antioxidant <sup>[1]</sup> .
	Antirolithiatic spectrum (reported): Seeds against whewellite <sup>[7]</sup> .
<i>Cassia italica</i> (Mill.) Spreng. / <i>Senna italica</i>	Plant decoction --- Pakistan <sup>[3]</sup> .
<i>Caesalpinia nuga</i> (L.) Aiton.	Pharmacological activities: Analgesic, anti-inflammatory <sup>[1]</sup> .
	Root decoction --- India <sup>[9]</sup> .
<i>Caesalpinia pulcherrima</i> (L.) Sw.	Pharmacological activities: Diuretic, litholytic <sup>[1]</sup> .
	Leaves decoction --- Peru <sup>[3]</sup> .
<i>Cassia occidentalis</i> L.	Latin America: 250 g of leaves in one L of water, boil for 20 mins, keep cover for 30 mins then filter. 250 ml TID till stone expulsion <sup>[4]</sup> .
	Flowers --- India <sup>[3]</sup> .
<i>Cassia senna</i> L.	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant <sup>[1]</sup> .
<i>Ceratonia siliqua</i> L.	Bark, leaves --- India, Malaysia <sup>[13]</sup> .
<i>Cicer arietinum</i> L.	Pliny the Elder ( <i>Naturalis Historis</i> ): Whole plant is diuretic <sup>[12]</sup> .
	Dioscorides ( <i>De Materia Medica</i> ): Fruits are diuretic <sup>[12]</sup>
	Pliny the Elder ( <i>Naturalis Historis</i> ): Fruits are diuretic <sup>[12]</sup>
	Al Razi / Rhazes (Al-Hawi fi al-Tibb): Fruits infusion is litholytic <sup>[12]</sup> ; Ibn Sina (Al Qanoon Fit Tibb): Fruits are diuretic and litholytic <sup>[14]</sup> .
<i>Clitoria ternatea</i> L.	Fruit infusion --- Iran <sup>[3]</sup> .
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, diuretic, litholytic <sup>[1]</sup> .
	Root bark decoction --- India <sup>[3]</sup> .
<i>Crotalaria albida</i> Roth.	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, litholytic <sup>[1]</sup> .
	Antirolithiatic spectrum (reported): Roots against whewellite <sup>[15]</sup> .
<i>Crotalaria burhia</i> Buch.-Ham.	Root decoction --- India <sup>[3]</sup> .
<i>Crotalaria pallida</i> Aiton.	Leaves juice --- India <sup>[3]</sup> .
	Root decoction --- India <sup>[3]</sup> .
<i>Crotalaria sessiliflora</i> L.	Pharmacological activities: Anti-inflammatory, antioxidant <sup>[1]</sup> .
	Root decoction --- India <sup>[3]</sup> .
<i>Faba vulgaris</i> Moenchris.	Pharmacological activities: Anti-inflammatory, antioxidant <sup>[1]</sup> .
<i>Flemingia strobilifera</i> (L.) W.T. Aiton.	Leaves / seeds --- Iran <sup>[8]</sup> .
<i>Desmodium microphyllum</i> (Thunb.) DC.	Whole plant decoction --- Trinidad <sup>[16]</sup> .
<i>Desmodium styracifolium</i> (Osbeck) Merr.	Whole plant decoction --- India <sup>[3]</sup> .
	Plant decoction --- Canada, China <sup>[4,17]</sup> .
	Canada: 2-3 tsp. dried herb in 8 oz. hot water, cover and keep for 40 mins. 250 ml BD till

	stone expulsion <sup>[4]</sup> .
	China: 1 kg of dried herb in 5 L of water, boil and filter <sup>[17]</sup> .
	Pharmacological activities: Litholytic <sup>[18]</sup> , lithotriptic <sup>[10]</sup> .
	Antiurolithiatic spectrum (reported): Whole plant against whewellite <sup>[19]</sup> .
<i>Dalbergia sissoo</i> DC.	Heart wood powder / decoction --- India <sup>[17]</sup> .
	India: Boil 10 - 20 g of heart wood in one L of water. 250 ml BD till stone expulsion. OR Mix 5 – 10 g of heart wood powder in 100 ml water. 100 ml BD till stone expulsion <sup>[17]</sup> .
<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	Roots --- India <sup>[20]</sup> .
	Pharmacological activities: Anti-inflammatory <sup>[20]</sup> , litholytic <sup>[21]</sup> .
	Antiurolithiatic spectrum (reported): Roots against whewellite <sup>[20]</sup> .
<i>Genista januensis</i> Viv.	Flowers decoction --- Turkey <sup>[22]</sup> .
<i>Glycine max</i> (L.) Merr.	Seeds decoction --- India <sup>[23]</sup> .
	India: 250 ml of seeds decoction QID for 1 month <sup>[23]</sup> .
<i>Glycyrrhiza glabra</i> L.	Roots decoction / infusion --- Algeria <sup>[24]</sup> , India, Turkey <sup>[3]</sup> .
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant <sup>[11]</sup> .
<i>Indigofera tinctoria</i> L.	Roots decoction --- India <sup>[3]</sup> .
	Pharmacological activities: Anti-inflammatory, antioxidant <sup>[1]</sup> , lithotriptic <sup>[10]</sup> .
	Antiurolithiatic spectrum (reported): Roots against whewellite <sup>[25]</sup> .
<i>Laburnum anagyroides</i> Medik.	Dioscorides ( <i>De Materia Medica</i> ): Whole plant is diuretic <sup>[12]</sup> .
<i>Lupinus albus</i> L.	Seeds infusion --- Jordan <sup>[3]</sup> .
<i>Lupinus pilosus</i> L.	Roasted seeds grinded and boiled as coffee orally taken --- Turkey <sup>[22]</sup> .
<i>Lupinus varius</i> "L., p.p."	Seed infusion --- Israel <sup>[26]</sup> , Palestine <sup>[3]</sup> .
	Israel: Soak 200 g of seeds in 500 ml water for 24 h. 50 ml BD till stone expulsion <sup>[4]</sup> .
	Pharmacological activities: Litholytic <sup>[1]</sup> .
<i>Macrotyloma uniflorum</i> (Lam.) Verdc. (formerly as <i>Dolichos biflorus</i> L.)	Dioscorides ( <i>De Materia Medica</i> ): Seeds are diuretic <sup>[12]</sup>
	Ibn Sina ( <i>Al Qanoon Fit Tibb</i> ): Seeds are litholytic <sup>[12]</sup> .
	Seeds decoction / infusion --- Jordan, India, Iran, Nepal, Pakistan <sup>[3]</sup> .
	India: Decoction of 2 – 4 g seed powder. 14-28ml OD till stone expulsion. OR decoction of 2-5 g seed powder in 100 ml of water. 100 ml BD for 30 days <sup>[4]</sup> .
	Pharmacological activities: Astringent, diuretic, litholytic <sup>[1]</sup> , lithotriptic <sup>[10]</sup> .
	Antiurolithiatic spectrum (reported): Seeds against Whewellite <sup>[7]</sup> , brushite and urate <sup>[27]</sup> .
<i>Medicago sativa</i> L.	Ibn Sina ( <i>Al Qanoon Fit Tibb</i> ): Roots are litholytic and expel stones <sup>[12]</sup> .
	Roots decoction --- Iran <sup>[3]</sup> .
	Pharmacological activities: Antioxidant <sup>[1]</sup> .
<i>Melilotus officinalis</i> (L.) Pall.	Aerial parts decoction --- Turkey <sup>[3]</sup> .
	Pharmacological activities: Antioxidant, diuretic <sup>[1]</sup> .
<i>Mimosa invisa</i> Colla.	Roots infusion --- India <sup>[28]</sup> .
<i>Mimosa pudica</i> L.	Leaves juice / roots decoction --- India <sup>[1]</sup> ; roots decoction --- Trinidad <sup>[16]</sup> .
	India: 50 – 100 ml of root decoction OD till stone expulsion <sup>[4]</sup> ; OR root juice BD for 2 weeks <sup>[29]</sup> .
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, diuretic, litholytic <sup>[1]</sup> and lithotriptic <sup>[10]</sup> .
	Antiurolithiatic spectrum (reported): Whole plant against brushite and whewellite <sup>[7]</sup> .
<i>Mucuna pruriens</i> (L.) DC.	Whole plant --- India <sup>[30]</sup> .
	Pharmacological activities: Lithotriptic <sup>[30]</sup> .
	Antiurolithiatic spectrum (reported): Whole plant against whewellite <sup>[7]</sup> .
<i>Ononis antiquorum</i> L.	Dioscorides ( <i>De Materia Medica</i> ): Whole plant is diuretic and litholytic <sup>[12]</sup> .
<i>Ononis spinosa</i> L. subsp. <i>leiosperma</i> (Boiss.) Sirj.	Aerial parts decoction --- Iran <sup>[8]</sup> , Turkey <sup>[22]</sup>
	Roots decoction / infusion --- Bulgaria, Italy, Turkey <sup>[3]</sup> .
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, diuretic, lithotriptic <sup>[11]</sup> .
<i>Phaseolus vulgaris</i> L.	Seeds decoction / infusion --- Haiti <sup>[3]</sup> .
	Latin America: 100 g seeds OD till stone expulsion <sup>[4]</sup> .
	Pharmacological activities: Diuretic <sup>[1]</sup> .
	Antiurolithiatic spectrum (reported): Seeds against whewellite <sup>[31]</sup> .
<i>Prosopis farcta</i> (Sol. Ex Russell) J. F. Macbr.	Foliage decoction --- Palestine <sup>[3]</sup> .
	Israel: Boil 50 g of aerial parts in one L of water. 150 ml TID till stone expulsion <sup>[4]</sup> .
	Pharmacological activities: Anti-inflammatory, litholytic <sup>[1]</sup> .
<i>Pongamia pinnata</i> (L.) Pierre.	Seeds --- India <sup>[4]</sup> .
	India: Mix 25 g seed powder with 50 ml cow milk. 50 ml OD for 20 days <sup>[4]</sup> .
<i>Saraca asoca</i> (Roxb.) Willd.	Bark / seed decoction --- India <sup>[3]</sup> .
	Pharmacological activities: Bark possess antioxidant <sup>[32]</sup> ; bark and seeds have analgesic, anti-inflammatory; roots possess lithotriptic and litholytic properties <sup>[33]</sup> .
<i>Senna bacillaris</i> (L.f.) H.S. Irwin & Barneby.	Leaves and stem decoction --- Trinidad <sup>[16]</sup> .
<i>Sesbania bispinosa</i> (Jacq.) W. Wight.	Leaves and roots --- India <sup>[34]</sup>
	India: Root powder 3–6 g mixed with sugar solution in water is taken <sup>[17]</sup> .
	Pharmacological activities: Roots possess antioxidant and leaves have lithotriptic properties <sup>[34]</sup> .
	Antiurolithiatic spectrum (reported): Leaves against whewellite <sup>[34]</sup> .
<i>Smithia sensitiva</i> Aiton.	Whole plant decoction --- Java <sup>[35]</sup> .
<i>Tamarindus indica</i> L.	Fruit / leaves decoction --- India <sup>[3,4]</sup> .

	India: Boil 20 g of leaves in one L of water. 250 ml OD for 7 days. OR boil dry exocarp of the pod in one L of water and filter. 250 ml BD till stone expulsion. OR 250 g of leaves in one L of water. 250 ml with sugar candy for 15 days [4].
	Pharmacological activities: Analgesic, antioxidant, astringent, litholytic [1] leaves: lithotriptic [10].
	Antiuro lithiatic spectrum (reported): Fruits against brushite [7].
<i>Teline microphylla</i> (DC.) P.E.Gibbs & Dingwall.	Flower infusion --- Spain [36].
	Pharmacological activities: Diuretic, litholytic [1].
	Leaves decoction and root juice --- India [3].
<i>Tephrosia purpurea</i> (L.) Pers.	India: Mix 1 g root powder in 100 ml water. 100 ml BD till stone expulsion. OR 250 ml of leaves decoction before breakfast till stone expulsion [4].
	Antiuro lithiatic spectrum (reported): Roots against whewellite [37].
	Ibn Sina ( <i>Al Qanoon Fit Tibb</i> ): Fruits are litholytic and expel stones [12].
	Seeds decoction / infusion --- India, Jordan, Yemen [3, 4, 38]; Fruit infusion --- Iran [3].
<i>Trigonella foenum - graecum</i> L.	India: 1 -2 tsp. dried seed in 10 oz. water, boil for 15-20 mins, cover and keep for 30 mins then filter. 4-6 oz. TID till stone expulsion [4].
	Pharmacological activities: analgesic, anti-inflammatory, antioxidant, diuretic [1], lithotriptic [39].
	Antiuro lithiatic spectrum (reported): Seeds against whewellite [40].
<i>Vicia ervilia</i> (L.) Willd.	Dioscorides ( <i>De Materia Medica</i> ): Diuretic and used against dysuria [12].
	Dioscorides ( <i>De Materia Medica</i> ): Seeds are diuretic [12].
<i>Vigna unguiculata</i> (L.) Walp.	Seed decoction --- India [4].
	India: Boil 12 g of seed powder in one L of water, cover for 30 mins. 100 ml of seed decoction BD for 30 days [4, 17].

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