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Exploring globally used antiurolithiatic plants of S to Z families: Including Saxifragaceae, Scrophulariaceae, Solanaceae, Urticaceae, Vitaceae, Zingiberaceae and Zygophyllaceae

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Abstract
Urolithiasis is a common worldwide problem with high recurrence. This review covers twenty three (23) families starting from alphabet S to Z. It includes Solanaceae (12); Zingiberaceae (09); Scrophulariaceae and Urticaceae (08); Verbenaceae (07); Ulmaceae, Valerianaceae and Vitaceae (05); Zygophyllaceae (04); Sapotaceae, Saxifragaceae and Typhaceae (03); Smilacaceae (02); Salicaceae, Salvadoraceae, Santalaceae, Simaroubaceae, Tamaricaceae, Tiliaceae, Theaceae, Tropaeolaceae, Violaceae and Xanthorrhoeaceae (01) plant used globally in different countries. Hopefully, this review will not only be useful for the general public but also attract the scientific world for antiurolithiatic drug discovery.

Keywords: Urolithiasis, antiurolithiatic, natural products, drug development

Introduction
Urolithiasis is a common worldwide problem with high recurrence. Medicinal plants have been used globally in different countries and cultures for its prophylactic management and treatment. Current attempt is one of the parts of the study entitled "Searching globally (orally) used antiurolithiatic plants belonging to different plant families". The plants of the family Asteraceae[1], Apiaceae[2], Fabaceae[3], Lamiaceae[4] and Rosaceae[5] have already been discussed in a similar way. The presented review article covered Salicaceae, Salvadoraceae, Santalaceae, Sapotaceae, Saxifragaceae, Scrophulariaceae, Simaroubaceae, Smilacaceae, Solanaceae, Tamaricaceae, Theaceae, Tiliaceae, Tropaeolaceae, Typhaceae, Ulmaceae, Urticaceae, Valerianaceae, Verbenaceae, Violaceae Vitaceae, Xanthorrhoeaceae, Zingiberaceae and Zygophyllaceae families in this regard (Table-1). The summarized information about each family is as follows.

1. **Salicaceae:** Bark / leaf infusion was found to use in Middle East countries.
2. **Salvadoraceae:** Indian population used a whole plant decoction.
3. **Santalaceae:** Indians used sandal wood powder orally for urolithiasis management.
4. **Sapotaceae:** It covers three (03) plants used in India and Mexico. Among the plant parts seeds were noted the most common (66.66%) followed by a bark (33.33%). In terms of preparation, only decoction was observed.
5. **Saxifragaceae:** It covers three (03) plants used in India, Kashmir, Nepal and Pakistan. Only rhizome decoction was observed as antiurolithiatic management and treatment.
6. **Scrophulariaceae:** It covers the eight (08) plants used in 07 different countries such as Bangladesh, Canada, Colombia, India, Kyrgyzstan, Turkey and Uzbekistan**.** The whole plant was noted the most common (75%) followed by roots and leaves (12.5% each). In terms of preparation, the decoction was observed the most common (63.63%), followed by infusion (27.27%) and juices (9.09%).
7. **Simaroubaceae:** Brazilian used wood powder infusion.
8. **Smilacaceae:** The root decoction of two (02) plants was observed in India and Palestine against urolithiasis.
9. **Solanaceae:** Twelve (12) plants were found in 7 different countries such as Bulgaria, Iran, Italy, Pakistan, Palestine, Serbia and Tunisia. Among the plant parts roots were noted the most common (37.5%) followed by fruits (18.75%), whole plant, flowers, leaves (13.33% each) and seeds (6.25%). In terms of preparation, the decoction was observed more commonly (90%), followed by juices (10%).

10. **Tamaricaceae:** Algerian and Pakistani used leaves and bark decoction for the same purpose.
11. **Theaceae:** Leaf decoction of one plant was found to use by Indians.
12. **Tiliaceae:** Flowered aerial part of a plant used in Spain.
13. **Tropaeolaceae:** In Bolivia and Peru roots decoction of a plant is considered useful against urolithiasis.
14. **Typhaceae:** Only root decoction of three (03) plants was found to use against urolithiasis in India and Pakistan.
15. **Ulmaceae:** Only leaves decoction of five (05) plants was observed to use against urolithiasis in China, India and Iran.
16. **Urticaceae:** It covers the eight (08) plants used in 12 different countries such as Algeria, Canada, Cyprus, Iran, Italy, Morocco, Mt. Pelion area of Greece, Palestine, Serbia, Spain, Tunisia and Turkey. Their historical antiurolithiatic background shared in well-known book of Dioscorides. Among the plant parts leaves were noted the most common (41.66%), followed by whole plant (33.33%), aerial parts, roots and seeds (8.3% each). In terms of preparation, the decoction was observed the most common (70%), followed by infusion (30%).
17. **Valerianaceae:** Only roots and rhizome decoction of five (05) plants were observed to use against urolithiasis in India, Iran and Turkey. Their historical antiurolithiatic background shared in well-known books of Dioscorides and Ibn Sina.
18. **Verbenaceae:** This review covers the seven (07) medicinal plants of the family Verbenaceae used in Pakistan, India and Turkey. Among the plant parts roots were noted the most common (28.57%) followed by whole plant, fruits, leaves, seeds and aerial parts (14.28% each). In terms of preparation, the decoction was observed more commonly (71.42%), followed by infusion and juices (14.28% each).
19. **Violaceae:** Palestinian used seed oil of a plant orally for the same purpose.
20. **Vitaceae:** The decoction of leaves and fruits of five (05) plants was observed to use in Australia, India, Iran and Malaysia. Their historical background shared in well-known books of Dioscorides and Al Razi.
21. **Xanthorrhoeaceae:** Leaf decoction of a plant is used by Indians.
22. **Zingiberaceae:** This review covers the nine (09) medicinal plants of the family Zingiberaceae used in Brazil, India and Iran. Their historical antiurolithiatic background shared in well-known books of Dioscorides and Al Baitar. Among the plant parts roots and rhizomes were noted the most common (50%) followed by whole plant (25%), fruits and stem (12.5% each). In terms of preparation, the decoction was observed more commonly (66.66%), followed by infusion (33.33%).
23. **Zygophyllaceae:** It covers four (04) medicinal plants of the family Zygophyllaceae used in Algeria, India, Iran, Mexico, Pakistan, Turkey and Yemen. Their historical antiurolithiatic background shared in well-known books of Dioscorides and Ibn Sina. Among the plant parts fruits were noted the most common (37.5%) followed by leaves (25%), flowers, roots and seeds (12.5% each). In terms of preparation, the decoction was observed the most common (80%), followed by infusion (20%).

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.
Brushite = Calcium hydrogen phosphate dihydrate
Whewellite: Calcium oxalate monohydrate

Table 1: Antiurolithiatic plants of different families.

Antiurolithiatic plants	Explanation
Salicaceae (01)	
Populus alba L.	Dioscorides (De Materia Medica): Bark / leaves are diuretic [6].
	Bark / leaves infusion --- Middle East [7].
	Pharmacological activities: Anti-inflammatory, diuretic [8].
Salvadoraceae (01)	
Salvadora persica L.	Whole plant decoction --- India [9].
	India: Boil 10–20 g dried plant in one L of water, keep cover for 30mins then filter. 250 ml TID till stone expulsion [9].
Santalaceae (01)	
Santalum album L.	Sandalwood powder --- India [10].
	Pharmacological activities: Anti-inflammatory, antioxidant, diuretic [8], lithotriptic [11].
Sapotaceae (03)	
Manilkara zapota (L.) P. Royen.	Seeds decoction --- Mexico [12].
	India: Mix 3 – 5 g of kernel paste with 50 ml water. 50 ml BD for 30 days [13].
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant [8].
Mimusops elengi L.	Bark decoction --- India [12].
	Pharmacological activities: Antioxidant, diuretic, litholytic [8], lithotriptic [14].
	Antiurolithiatic spectrum (reported): Bark against whewellite [14].
Pouteria sapota (Jacq.) H. E. Moore & Stearn.	Seeds decoction --- Mexico [12].
Saxifragaceae (03)	
Bergenia ciliata (Haw.) Sternb.	Rhizome decoction --- India [12], Nepal [15].
	India: Boil 3–6 g of dried rhizome in one L of water. 125 ml OD till stone expulsion [9]. Nepal: 5 tsp. of rhizome decoction TDS for 7 days [15].
	Pharmacological activities: Anti-inflammatory, antioxidant [8], litholytic [16].
	Antiurolithiatic spectrum (reported): Leaves against whewellite [17].
Bergenia ligulata (Wall.) Engl.	Rhizome decoction --- India [12].

	India: Mix 0.5 g of rhizome with 250 ml of water. 250ml BD till stone expulsion [13].
	Pharmacological activities: Antioxidant, astringent, diuretic, lithotriptic [8], litholytic [18].
	Antiurolithiatic spectrum (reported): Leaves against whewellite [17].
Bergenia stracheyi (Hook. f. & Thorns.) Engl.	Rhizome decoction --- India, Kashmir, Pakistan [12, 19].
Scrophulariaceae (08)	
Artanema sesamoides (Vahl) Benth.	Roots decoction --- India [20].
Bonnaya brachiata Link & Otto	Whole plant decoction --- India [12].
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant [8] lithotriptic [11].
Bonnaya reptans (Roxb.) Spreng.	Plant decoction / infusion --- Canada, India [12, 13].
	Canada: Boil 1 tsp. dried plant in one L of water, keep cover for 30mins then filter. 250ml TID till stone expulsion [13].
	Pharmacological activities: Lithotriptic [8].
Buddleja polystachya Fresen.	Plant decoction --- India [12].
	Pharmacological activities: Anti-inflammatory, astringent [8].
Russelia equisetiformis Schlecht. & Cham.	Whole plant decoction --- Colombia [21].
Scoparia dulcis L.	Leaves juice --- India [22]; roots infusion --- Bangladesh, India [12, 23].
	Pharmacological activities: Antispasmodic, anti-inflammatory [23], litholytic [8], leaves possess lithotriptic properties [22].
	Antiurolithiatic spectrum (reported): Fruits against whewellite [24].
Verbascum thapsus L.	Plant decoction --- Uzbekistan, Kyrgyzstan [12].
	Pharmacological activities: Antioxidant [8].
Veronica orientalis Miller.	Whole plant decoction / infusion --- Turkey [12, 25].
	Pharmacological activities: Antioxidant [8].
Simaroubaceae (01)	
Quassia amara L.	Wood infusion --- Brazil [26].
	Brazil: 2 tsp. of wood powder soaked in 250 ml of water overnight and used OD [26].
Smilacaceae (02)	
Smilax aspera L.	Leaves / roots infusion --- India [8], Palestine [27].
	Pharmacological activities: Diuretic [8].
Smilax lanceifolia Roxb.	Rhizome decoction --- India [8].
	Pharmacological activities: Analgesic [8], lithotriptic [11].
Solanaceae (12)	
Lycopersicum esculentum Mill.	Fruits / flowers / leaves --- Iran [28]; leaves decoction --- Italy, Tunisia [29].
Physalis alkekengi L.	Fruit decoction --- Bulgaria, Iran [12]; fruits eaten --- Serbia [30].
	Serbia: 10- 20 berries (fruits) with honey or jam before breakfast for 10 days [30].
	Pharmacological activities: Diuretic, lithotriptic [8].
Solanum anguivi Lam.	Root decoction --- India [8].
	Pharmacological activities: Litholytic [8].
Solanum incanum L.	Roots decoction --- India [8].
	Pharmacological activities: Analgesic [8].
Solanum nigrum L.	Plant decoction --- India, Pakistan [12].
	Pharmacological activities: Anti-inflammatory, diuretic [8] seeds possess lithotriptic properties [11].
Solanum surattense Burm. f.	Whole plant decoction--- Pakistan [31]; roots --- India, Pakistan [12].
	Pharmacological activities: Diuretic [8], lithotriptic [11].
Solanum torvum SW.	Fruit / seeds decoction --- India [12].
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant [8].
Solanum incanum L.	Roots juice --- India [12].
Solanum virginianum L.	Roots decoction --- India [12].
	India: Mix root powder with curd. OD for 7days [13].
	Pharmacological activities: Lithotriptic [22].
Solanum xanthocarpum Schrad. & H. Wendl.	Fruits --- India [32].
	Pharmacological activities: Lithotriptic [32].
	Antiurolithiatic spectrum (reported): Fruits against whewellite [32].
Solidago virgaurea L.	Flowers / leaves --- India [8].
	Pharmacological activities: Diuretic, lithotriptic [8].
Withania somnifera (L.) Dunal.	Whole plant decoction --- India [8], Pakistan [12]; roots decoction --- Palestine [33].
	Palestine: Boil 50 g of roots powder in 100 ml of water. 50 ml of this decoction TID [33].
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, diuretic [8].
Tamaricaceae (01)	
Tamarix aphylla (L.) Karst.	Leaves decoction --- Pakistan [12]; bark decoction --- Algeria [34].
Theaceae (01)	
Anneslea fragrans Wall.	Leaves decoction --- India [12].
	India: Boil 10 g of dry leaves in one L of water. 250 ml TID till stone expulsion. OR Boil roots in water for 2 to 3 h. 250 ml empty stomach daily early in the morning till stone expulsion [13].
Tiliaceae (01)	
Tilia platyphyllos Scop.	Flowered aerial part --- Spain [35].

Tropaeolaceae (01)	
Tropaeolum tuberosum Ruíz & Pavón.	Roots decoction --- Bolivia and Peru [12].
Typhaceae (03)	
Typha australis K. Schum. & Thonner.	Roots decoction --- India [9].
	India: Boil 3–6 g of dried roots in one L of water. 125 ml OD till stone expulsion [9].
Typha elephantina Roxb.	Root decoction --- India [9].
	India: Boil 10–20 g of dried roots in one L of water. 125 ml OD till stone expulsion [9].
Typha latifolia L.	Leaves decoction --- Pakistan [12].
Ulmaceae (05)	
Celtis australis L.	Leaves --- India [11].
	Pharmacological activities: Lithotriptic [11].
Celtis timorensis Span.	Leaves decoction --- India [12].
Ulmus minor Mill.	Leaves / roots --- Iran [28].
Ulmus parvifolia Jacq.	Leaves --- China [36].
	Pharmacological activities: Lithotriptic [8].
Ulmus pumila L.	Leaves --- China [36].
	Pharmacological activities: Lithotriptic [8].
Urticaceae (08)	
Forsskaolea angustifolia Retz.	Whole plant infusion --- Spain [37].
	Pharmacological activities: Diuretic, litholytic [8].
Forsskaolea tenacissima L.	Leaves decoction --- Morocco [12].
	Pharmacological activities: Antioxidant [8].
Parietaria diffusa Merlet & W. D. J. Koch.	Plant decoction --- Canada [13].
	Canada: 1-2 tsp. dried herb in 8 oz. hot water, cover for 30 mins then filter. 4 oz. TID till stone expulsion [13].
Parietaria judaica L.	Whole plant infusion --- Spain [38]; stem infusion --- Cyprus[39].
Parietaria officinalis L.	Leaves decoction --- Algeria[40].
Urtica dioica L.	Dioscorides (De Materia Medica): Diuretic[6].
	Whole plant decoction --- Turkey [25]; leaves / seeds infusion --- India [41]; leaves decoction --- India [41], Iran, Mt. Pelion area of Greece, Palestine [12, 42, 43], Italy, Tunisia [29], Serbia [30]; roots decoction--- Turkey [44].
	Turkey: 125 ml of plant decoction BD for 10 – 15 days [45].
	Pharmacological activities: Analgesic, antioxidant, anti-inflammatory [8, 25], diuretic [41].
Urtica morifolia Poir.	Leaves decoction --- Spain [37].
	Pharmacological activities: Diuretic, litholytic [8].
Urtica pilulifera L.	Leaves raw eaten --- Palestine [12].
	Pharmacological activities: Anti-inflammatory, astringent, diuretic [8].
Urtica urens L.	Aerial parts decoction --- Turkey [46].
	Turkey: 125 ml of decoction prepared from aerial parts BD [46].
Valerianaceae (05)	
Nardostachys jatamansi (D.Don) DC.	Dioscorides (De Materia Medica): Roots are diuretic [6].
	Rhizomes --- India [11].
	Pharmacological activities: Lithotriptic [11].
	Antiurolithiatic spectrum (reported): Rhizome against whewellite [47].
Nardostachys grandiflora DC.	Dioscorides (De Materia Medica): Roots are diuretic [6].
Valeriana celtica L.	Dioscorides (De Materia Medica): Diuretic [6].
Valeriana officinalis L.	Aerial parts decoction --- Turkey [12].
	Pharmacological activities: Antioxidant [8].
Valeriana wallichii DC.	Ibn Sina (Al Qanoon Fit Tibb): Roots are diuretic [6]
	Roots decoction --- Iran [12].
	Pharmacological activities: Antioxidant, astringent [8].
Verbenaceae (07)	
Clerodendrum serratum (Linn.) Moon.	Roots decoction --- India [12].
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant [8].
Gmelina arborea Roxb.	Fruits infusion --- India [12].
	India: 250 ml of fruit juice OD for 7 days [13].
Phyla nodiflora (L.) Greene.	Whole plant decoction --- India [48].
	Pharmacological activities: Litholytic [8].
	Antiurolithiatic spectrum: Whole plant against whewellite [49].
Stachytarpheta indica (L.) Vahl.	Leaves juice --- India [12].
Verbena officinalis L.	Aerial parts decoction --- India, Turkey [12].
	Pharmacological activities: Antioxidant [8].
Vitex agnus-castus L.	Seeds decoction --- Pakistan[12]; fresh fruit is eaten --- Turkey [46].
	Pharmacological activities: Antioxidant [8].
Vitex negundo L.	Root decoction --- India [12].
	India: Boil 100 g of root in one L of water. 250 ml OD in empty stomach for 14 days [13].
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant [8].
Violaceae (01)	

Viola kitaibeliana Schult.	Seeds oil --- Palestine [33].
	Palestine: 10 drops of seeds oil orally BD [33].
Vitaceae (05)	
Cissus adnata Roxb.	Leaves decoction --- India [12].
	Pharmacological activities: Antioxidant, diuretic, litholytic [8].
Cissus gongylodes (Burch. ex Baker) Planch.	Leaves decoction --- Australia [12].
Cissus quadrangularis L.	Fruits --- India, Malaysia [50].
Vitis silvestrii Pamp.	Dioscorides (De Materia Medica): Duiretic [6].
Vitis vinifera L.	Dioscorides (De Materia Medica): Fruits are litholytic [6]. Al Razi / Rhazes (Al-Hawi fi al-Tibb): Fruit are diuretic [6].
	Fruit juice --- Iran [12].
	India: 20 ml of leaves extract BD for 20 days. OR Mix 5-15 g stem with one L of water. 250 ml TID for 20 days [13].
	Pharmacological activities: Anti-inflammatory, antioxidant [8].
	Antiurolithiatic spectrum (reported): Fruit against brushite [17].
Xanthorrhoeaceae (01)	
Asphodelus tenuifolius Cav.	Leaves decoction --- India [8].
	Pharmacological activities: Antioxidant, litholytic [8].
Zingiberaceae (09)	
Amomum subulatum Roxb.	Al-Baitar (Al Advia Wal Aghdia): Fruit rind is litholytic [6].
Costus arabicus L.	Roots oil --- Iran [12].
	Antiurolithiatic spectrum (reported): Whole plant against whewellite [51].
Costus spiralis (Jacq.) Roscoe.	Whole plant --- Brazil [52], India [11].
	Pharmacological activities: Diuretic [52], lithotriptic [11].
	Antiurolithiatic spectrum (reported): Whole plant against whewellite [53].
Curcuma angustifolia Roxb.	Whole plant --- India [11].
	Pharmacological activities: Lithotriptic [11].
Curcuma longa L.	Roots --- Iran [54].
Elettaria cardamomum (Linn.) Maton.	Dioscorides (De Materia Medica): Seeds are litholytic and used against dysuria [6].
	Fruit --- India [12].
	Pharmacological activities: Antioxidant, diuretic [8].
Hedychium aurantiacum Rosc.	Stem --- India [12].
	India: Boil 10 g of stem in one L of water. 125 ml OD till stone expulsion [13].
	Pharmacological activities: Lithotriptic[11].
Hedychium coronarium J. Koenig.	Rhizome decoction / infusion --- India [12, 41].
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, litholytic [8], lithotriptic [11].
	Antiurolithiatic spectrum (reported): Rhizome against whewellite [17].
Zingiber officinale Roscoe.	Rhizome decoction --- India [8].
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, astringent, litholytic [8].
	Antiurolithiatic spectrum (reported): Rhizome against whewellite [55].
Zygophyllaceae (04)	
Larrea tridentata (DC.) Coville.	Leaves decoction --- Mexico [12].
	Latin America: Boil 10 g of leaves in one L of water. 250 ml TID till stone expulsion [13].
	Antiurolithiatic spectrum (reported): Whole plant against whewellite [17].
Paliurus spina—christi Miller.	Fruit decoction --- Turkey [12].
Peganum harmala L.	Ibn Sina (Al Qanoon Fit Tibb): Fruits are litholytic and expel stone [6].
	Fruits decoction --- Iran [12]; flowers --- Iran [28].
	Pharmacological activities: Fruits possess antioxidant properties [8].
Tribulus terrestris L.	Dioscorides (De Materia Medica): Fruits / leaves are litholytic [6]; Ibn Sina (Al Qanoon Fit Tibb): Fruits / roots are litholytic and expel stones [6].
	Whole plant infusion --- Algeria [56]; leaves / seeds / fruits or roots decoction ---- India, Iran, Pakistan, Turkey, Yemen [12, 57].
	India: 250 ml of leaves decoction BD till stone expulsion. OR Decoction prepared by 100 g of root in one L of water. 250 ml TID for 14 days. OR Mix 1 g leaf / fruit powder in 100 ml water. 50 ml BD for 30 days. OR Boil 5 g root powder in 2 L of water. 50 ml BD for 15 days [13].
	Pharmacological activities: Analgesic, anti-inflammatory, antioxidant, diuretic, litholytic [8], lithotriptic [22].
	Antiurolithiatic spectrum (reported): Fruits against whewellite [17].

References

1. Ahmed S, Hasan MM, Mahmood ZA. Globally used antiurolithiatic plants of family Asteraceae: Historical background, mechanism of action, therapeutic spectrum, formulations with doses. Journal of Pharmacognosy and Phytochemistry. 2017; 6(3):394-402.
2. Ahmed S, Siddiqui MUA, Hasan MM. Globally used antiurolithiatic plants of family Apiaceae. World Journal of Pharmaceutical Research. 2017; 6(7):358-364.
3. Ahmed S, Hasan MM, Mahmood ZA. Antiurolithiatic plants of family Fabaceae: A memoir of mechanism of action, therapeutic spectrum, formulations with doses. Journal of Pharmacognosy and Phytochemistry. 2017; 6(3):592-596.
4. Ahmed S, Khatri MS, Hasan MM. Plants of family Lamiaceae: A promising hand for new antiurolithiatic drug development. World Journal of Pharmacy and Pharmaceutical Sciences. 2017; 6(7):90-96.
5. Ahmed S, Gilani SMU, Hasan MM. Antiurolithiatic potential of globally used medicinal plants belonging to

the family Rosaceae. Journal of Pharmacognosy and Phytochemistry. 2017, 6(4): 1028-1031.
6. Ahmed S, Hasan MM, Mahmood ZA. Urolithiasis management and treatment: Exploring historical vistas of Greco-arabic contribution. Journal of Pharmacognosy and Phytochemistry. 2016; 5(5):167-178.
7. Yaniv Z, Dudai N. Medicinal and aromatic plants of the Middle-East. 2014, 2.
8. Ahmed S, Hasan MM, Mahmood ZA. Antiurolithiatic plants: Multidimensional pharmacology. Journal of Pharmacognosy and Phytochemistry. 2016; 5(2):4-24.
9. Kasote DM, Jagtap SD, Thapa D, Khyade MS, Russell WR. Herbasl remedies for urinary stones used in India and China: A review. Journal of Ethnopharmacology. 2017; 203:55-68.
10. Khare CP. Indian medicinal plants: an illustrated dictionary. Springer-Verlag Berlin/Heidelberg, 2007.
11. Chanchal DK, Niranjan P, Alok S, Kulshreshtha S, Dongray A, Dwivedi S. A brief review on medicinal plant and screening method of antilithiatic avtivity. International Journal of Pharmacognosy. 2016; 3(1):1-9.
12. Ahmed S, Hasan MM, Mahmood ZA. Antiurolithiatic plants in different countries and cultures. Journal of Pharmacognosy and Phytochemistry. 2016; 5(1): 102-115.
13. Ahmed S, Hasan MM, Alam Mahmood Z. Antiurolithiatic plants: Formulations used in different countries and cultures. Pakistan Journal of Pharmaceutical Sciences. 2016; 29(6):2129-2139.
14. Ashok P, Koti BC, Vishwanathswamy AHM. Antiurolithiatic and antioxidant activity of *Mimusops elengi* on ethylene glycol-induced urolithiasis in rats. Indian Journal of Pharmacology. 2010; 42(6):380-383.
15. Malla B, Gauchan DP, Chhetri RB. An ethnobotanical study of medicinal plants used by ethnic people in Parbat district of western Nepal. Journal of Ethnopharmacology. 2015; 165:103-117.
16. Saha, Verma RJ. *Bergenia ciliata* extract prevents ethylene glycol induced histopathological changes in the kidney. Acta Poloniae Pharmaceutica. 2011; 68(5):711-715.
17. Ahmed S, Hasan MM, Mahmood ZA. *In vitro* urolithiasis models: An evaluation of prophylactic management against kidney stones. Journal of Pharmacognosy and Phytochemistry. 2016; 5(3):28-35.
18. Bashir S, Gilani AH. Antiurolithic effect of *Bergenia ligulata* rhizome: An explanation of the underlying mechanisms. Journal of Ethnopharmacology. 2009; 122(1):106-116.
19. Rinchen T, Pant S. Ethnopharmacological uses of plants among inhabitants surrounding Suru and Zanskar valleys of cold desert, Ladakh. International Journal of Pharma and Bio Sciences. 2014; 5(1):486-494.
20. Nambiar VPK, Sasidharan N, Renuka C, Balagopalan M. Studies on the medicinal plants of Kerala forests. Kerala Forest Research Institute: Peechi, Thrissur, India, 1985.
21. Gómez-Estrada H, Díaz-Castillo F, Franco-Ospina L, Mercado-Camargo J, Guzmán-Ledezma J, Domingo Medina J, *et al.* Folk medicine in the northern coast of Colombia. Journal of Ethnobiology and Ethnomedicine. 2011; 7:27.
22. Kumar SP, Latheef A, Remashree A. Ethnobotanical survey of diuretic and antilithiatic medicinal plants used by the traditional practitioners of Palakkad District. International Journal of Herbal Medicine. 2014; 2(2-A):52-56.
23. Hossan S, Agarwala B, Sarwar S, Karim M, Jahan R, Rahmatullah M. Traditional use of medicinal plants in Bangladesh to treat urinary tract infections and sexually transmitted diseases. Ethnobotany Research and Applications. 2010; 8:61-74.
24. Lakshmi PP. Lethi C, Kokilavani P. Effect of *Scoparia dulcis* (Linn.) and *Aerva lanata* (Linn.) whole plant and fruit part extracts on ethylene glycol induced urolithiasis in male albino rats. International Journal of Science and Research. 2013; 4(4):2002-2008.
25. Altundag E, Ozturk M. Ethnomedicinal studies on the plant resources of east Anatolia, Turkey. Procedia-Social and Behavioral Sciences. 2011; 19:756-777.
26. Taylor L. Database file for Amargo (*Quassia amara*): The Rainforest Plant Database. http://www.rain-tree.com/amargo.htm#.WPHi1LhRXIV. 2013.
27. Abu-Rabia A. Herbs as a food and medicine source in Palestine. Asian Pacific Journal of Cancer Prevention. 2005; 6(3):404-407.
28. Mohsenzadeh A, Ahmadipour S, Ahmadipour S, Eftekhari Z. A review of medicinal herbs affects the kidney and bladder stones of children and adults in traditional medicine and ethno-botany of Iran. Der Pharmacia Lettre. 2015; 7(12):279-284.
29. Leporatti ML, Ghedira K. Comparative analysis of medicinal plants used in traditional medicine in Italy and Tunisia. Journal of Ethnobiology and Ethnomedicine. 2009; 5:31.
30. Jarić S, Popović Z, Mačukanović-Jocić M, Djurdjević L, Mijatović M, Karadžić B, *et al.* An ethnobotanical study on the usage of wild medicinal herbs from Kopaonik Mountain (Central Serbia). Journal of Ethnopharmacology. 2007; 111(1):160-175.
31. Umair M, Altaf M, Abbasi AM. An ethnobotanical survey of indigenous medicinal plants in Hafizabad district, Punjab-Pakistan. PloS one. 2017; 12(6):e0177912.
32. Patel PK, Patel MA, Saralai MG, Gandhi TR. Antiurolithiatic effects of *Solanum xanthocarpum* fruit extract on ethylene-glycol-induced nephrolithiasis in rats. Journal of Young Pharmacists. 2012; 4(3):164-170.
33. Jaradat NA, Zaid AN, Al-Ramahi R, Alqub MA, Hussein F, Hamdan Z, *et al.* Ethnopharmacological survey of medicinal plants practiced by traditional healers and herbalists for treatment of some urological diseases in the West Bank/Palestine. BMC Complementary and Alternative Medicine. 2017; 17:255.
34. Sekkoum K, Cheriti A, Taleb S, Bourmita Y, Belboukhari N. Traditional phytotherapy for urinary diseases in Bechar district (south west of Algeria). Electronic Journal of Environmental, Agricultural and Food Chemistry. 2011; 10(8):2616-2622.
35. Rigat M, Bonet MÀ, Garcia S, Garnatje T, Valles J. Studies on pharmaceutical ethnobotany in the high river Ter valley (Pyrenees, Catalonia, Iberian Peninsula). Journal of Ethnopharmacology. 2007; 113(2):267-277.
36. Duke J, Ayensu E. Medicinal plants of China. Michigan: Reference Publications Algonac, MI, 1985.
37. Darias V, Martin-Herrera D, Abdala S, De la Fuente D. Plants used in urinary pathologies in the Canary Islands. Pharmaceutical Biology. 2001; 39(3):170-180.
38. Benítez G, González-Tejero MR, Molero-Mesa J. Pharmaceutical ethnobotany in the western part of Granada province (southern Spain):

Ethnopharmacological synthesis. Journal of Ethnopharmacology. 2010; 129:87-105.
39. Broderstad M, Metcalfe I. Medicinal Plants. In: Cyprus Wild Flowers: Searachable database of Wild flowers of Cyprus. 2017; Available at: www.cypruswildflowers.com [Accessed 15th July 2017].
40. Benarba B. Medicinal plants used by traditional healers from South-West Algeria: An ethnobotanical study. Journal of Intercultural Ethnopharmacology. 2016; 5(4):320-330.
41. Khajuria AK, Bisht N. Ethnomedicinal plants used to treat Nephrolithiasis: A case study Pauri (PAURI Garhwal), Uttarakhand. International Journal of Herbal Medicine. 2017; 5(1):10-13.
42. Bahmani M, Baharvand-Ahmadi B, Tajeddini P, Rafieian-Kopaei M, Naghdi N. Identification of medicinal plants for the treatment of kidney and urinary stones. Journal of Renal Injury Prevention. 2016; 5(3):129-133.
43. Brussell D. Medicinal plants of MT. Pelion Greece. Economic Botany. 2004; 58: S174-S202.
44. Yeşilada E, Sezik E, Honda G, Takaishi Y, Takeda Y, Tanaka T. Traditional medicine in Turkey IX:: Folk medicine in north-west Anatolia. Journal of Ethnopharmacology. 1999; 64(3):195-210.
45. Kültür Ş. Medicinal plants used in Kırklareli province (Turkey). Journal of Ethnopharmacology. 2007; 111(2):341-364.
46. Akaydin G, Şimşek I, Arituluk ZC, Yeşilada E. An ethnobotanical survey in selected towns of the Mediterranean subregion (Turkey). Turkish Journal of Biology. 2013; 37(2):230-247.
47. Vidhya G, Sumithira G, Anandhan R, Anand G. Antiurolithiatic activity of *Nardostachys jatamansi* DC on modified lithogenic diet induced urolithiasis in rats. International Journal of Advanced Pharmaceutical Genuine Research. 2013; 1(2):52-65.
48. Shelke T, Bhaskar V, Gunjegaokar S, Antre R. Jha U. A pharmacological appraisal of medicinal plants with antilithiatic activity. World Journal of Pharmacy and Pharmaceutical Sciences. 2014; 3(7):447-456.
49. Dodoala S, Diviti R, Koganti B, Prasad KVSRG. Effect of ethanolic extract of *Phyla nodiflora* (Linn.) Greene against calculi producing diet induced urolithiasis. Indian Journal of Natural Products and Resources. 2010; 1(3):314-321.
50. Madaleno IM. Traditional medicinal knowledge in India and Malaysia. Pharmacognosy Communications. 2015; 5(2):116-129.
51. de Cogain MR, Linnes MP, Lee HJ, Krambeck AE, de Mendonca Uchoa JC, Kim SH, *et al.* Aqueous extract of Costus arabicus inhibits calcium oxalate crystal growth and adhesion to renal epithelial cells. Urolithiasis. 2015; 43(2):119-124.
52. Manjula K, Pazhanichami K, Rajendran K, Kumaran S, Eevera T. Herbal remedy for urinary stones. In: Rana M editor. Vegetables and Human Health. Ansari Road, Daryaganj, India, Scientific Publishers, 2015.
53. Viel TA, Domingos CD, da Silva Monteiro AP, Lima-Landman MTR, Lapa AJ, Souccar C. Evaluation of the antiurolithiatic activity of the extract of *Costus spiralis* Roscoe in rats. Journal of Ethnopharmacology. 1999; 66(2):193-198.
54. Amiri MS, Joharchi MR. Ethnobotanical investigation of traditional medicinal plants commercialized in the markets of Mashhad, Iran. Avicenna Journal of Phytomedicine. 2013; 3(3):254-271.
55. Lakshmi B, Divya V. Antiurolithiatic and antioxidant activity of *Zingiber officinale* rhizomes on ethylene glycol-induced urolithiasis in rats. International Journal of Advances in Pharmacy Medicine and Bioallied Sciences. 2014; 2(3):148-153.
56. Hammiche V, Maiza K. Traditional medicine in Central Sahara Pharmacopoeia of Tassili N'ajjer. Journal of Ethnopharmacology. 2006; 105:358-367.
57. Uysal İ, Onar S, Karabacak E, Çelik S. Ethnobotanical aspects of Kapıdağ Peninsula (Turkey).Biological Diversity and Conservation. 2010; 3(3):15-22.