

## REVIEW

# Antiuro lithiatic plants: Formulations used in different countries and cultures

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**Abstract:** About 12% of world population is affected by different forms of urolithiasis in which the recurrence rate in female is 47-60% and in male is 70-80%. According to WHO 75% people rely on traditional medicines for the prevention and cure of different ailments. Similarly, the majority of the world population use a number of plants to treat problems related to the urinary tract system in which urolithiasis is the major cause. The aim of the review is to collect the data of the plants used in different parts and cultures of the world against urolithiasis with their parts, mode of preparation, dosage and administration. A literature review was conducted for traditionally used antiuro lithiatic plants. The articles mentioning plant, parts, mode of preparation, dose and route of administration were selected. This information was extracted to compose Mono and Poly herbal antiuro lithiatic formulations used in Appalachia (region in Eastern United States), Canada, India, Iran, Israel, Italy, Jordan, Latin America, Pakistan, Turkey and Yemen. The review provides an important data about plants used as antiuro lithiatic in different parts of the world. The information not only useful for common people, but also for the scientific community to carry out further phytochemical, pharmacological and toxicological studies for the discovery of new, effective and safer molecules against urolithiasis.

**Keywords:** Antiuro lithiatic plant, herbal formulations, ethnomedicinal information.

## INTRODUCTION

Urolithiasis is estimated as 12% of the world population with a 70-80% and 47-60% recurrence in male and female respectively. Dissolution and prevention of the stone recurrence are the main focus of urolithiasis treatment. Generally, physicians do not treat kidney stone they just medicate the pain until the stones pass out their own. Standard pharmaceutical drugs (allopurinol, citrate, cystone and thiazide diuretics) are used to prevent and treat urolithiasis but these are not effective in all cases due to common kidney stone recurrence and potential side effects. Surgical treatment causes long term renal damage, hypertension and stone recurrence (Khan *et al.*, 2011, Tiwari *et al.*, 2012). Now, the Extracorporeal Shock Wave Lithotripsy and percutaneous nephrolithotomy, have almost become the standard procedure for eliminating kidney stones but the traumatic effect of shock waves, persistent residual stone fragments as potential nidus for new stone formation, acute renal injury, decrease in renal function and an increase in stone recurrence ESWL induced hypertension, sever haematuria, steinstrasse (multiple small stone blocking the ureter), pancreatitis and infection are reported as after effects (Tiwari *et al.*, 2012). These complications can lead to large perfusion of the collecting system, extravasations of irrigating fluid, urosepsis, ureteral injury. ESWL is less

effective in calcium oxalate monohydrate (COM) and cystine stones (Khan *et al.*, 2011). Antiuro lithiatic plants are used since ancient periods before inventing modern treatments for treating (dissolution or elimination) kidney stones and to avoid their recurrence (Joy *et al.*, 2012). A number of plants are employed to cure and prevent urolithiasis. Although medicinal plants produce slow recovery, these are affordable and less expensive, evidence based traditionally proven dissolution or elimination of kidney stones, less relapse of urolithiasis, their successful prophylactic use, less side effects, not only revealing their therapeutic potential but encourages patient's belief and increasing their interest in traditional practices to find an herbal cure for kidney stones. The use of antiuro lithiatic plants in the form of decoction, infusion, juice, powder taken along with water, raw eaten are cheaper than modern medicine / techniques (Ahmed and Singh, 2011). Increasing demand for medicinal plants in both developing and developed countries make them to become as one of the leading areas of research. However, closer attention is required for bioactivity-safety evaluation, phytochemical analysis and plant conservation. Extraction and isolation along with clinical trials may develop proactive antiuro lithiatic compounds. This could be helpful in creating mass awareness about conservation of such plants to promote ethno- medicobotany knowledge within the region, besides contributing to the preservation of such medicinally important species before they are extinct (Talele *et al.*, 2012). This review

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**Table 1:** Mono herbal antiuro lithiatic formulations.

Plant name	Method of preparation	Dose (References)
<b>Appalachia (region in Eastern United States)</b>		
<i>Capsella bursa-pastoris</i> (L.) Medik.	add 2 tbsp. of dried herb in 250ml of boiling water, cover and keep for 15mins	250ml BD till stone expulsion. (Church, 2006)
<i>Chimaphila maculata</i> (L.) Pursh.	mix 2 tsp. of dried leaves with 250ml of boiling water, keep cover for 10mins then filter	250ml TID for 7 days (Church, 2006)
<i>Galium aparine</i> L.	pour 250ml of boiling water over 2-3 tsp. of dried herb; steep covered 10-15mins.	250ml TID till stone expulsion(Church, 2006)
<i>Glechoma hederacea</i> L.	mix 1 tsp. of dried leaves with 250ml of boiling water	250 ml OD till stone expulsion(Church, 2006)
<i>Taraxacum officinale</i> (L.) Weber ex F.H.Wigg.	boil 1 ounce of chopped root in 500ml of water	drink several times a day for at least 10 days (Church, 2006)
<b>Canada</b>		
<i>Alisma orientale</i> (Sam.) Juz.	2 tsp. dried root, 10 oz. water, decoct 20 mins, steep 30mins	4 oz. TID till stone expulsion.(Winston, 2013)
<i>Althea officinalis</i> L.	1-2 tsp. dried herb, 8 oz. hot water, steep covered 20 mins	4-8 oz. TID till stone expulsion. (Winston, 2013)
<i>Ammi visnaga</i> (L.) Lam.	1 tsp. dried seeds, 8 oz. hot water, steep covered 30 mins	4 oz. TID till stone expulsion. (Winston, 2013)
<i>Asparagus racemosus</i> Willd.	1 tsp. dried, powdered root, 8 oz. water, decoct 10 mins, steep 40 mins	250ml BD till stone expulsion. (Winston, 2013)
<i>Berberis vulgaris</i> L.	1 tsp. dried root bark to 10 oz. water, decoct 10-15 minutes, steep 30mins	4 oz. BD till stone expulsion. (Winston, 2013)
<i>Boerhavia diffusa</i> L.	mix 1 tsp. root powder in 250ml of water	250ml TID till stone expulsion. (Winston, 2013)
<i>Bonnaya reptans</i> (Roxb.) Spreng.	boil 1 tsp. dried plant in one L of water, keep cover for 30mins then filter	expulsion. (Winston, 2013)
<i>Crataeva nurvala</i> Buch.-Ham.	2 tsp. dried bark, 12 oz. water, boil for 15 mins, keep cover for 30mins then filter	8 oz. BD till stone expulsion(Winston, 2013)
<i>Desmodium styracifolium</i> (Osbeck) Merr.	2-3 tsp. dried herb in 8 oz. hot water, cover and keep for 40 mins.	250ml BD till stone expulsion(Winston, 2013)
<i>Elymus repens</i> (L.) Gould.	2-3 tsp. dried rhizome in 12 oz. water, boil for 30mins, keep cover for 30mins then filter	250ml TID till stone expulsion(Winston, 2013)
<i>Equisetum arvense</i> L.	1 tsp. dried herb in 8 oz. water, boil for 15mins, keep cover for 60mins then filter	4 oz. TID till stone expulsion(Winston, 2013)
<i>Eupatorium purpureum</i> L.	1 tsp. dried root in 8 oz. water, boil for 15 mins, keep cover for 45mins then filter	250ml BD till stone expulsion(Winston, 2013)
<i>Herniaria hirsuta</i> L.	1 tsp. dried herb in 8 oz. water, boil for 5-10 mins	expulsion(Winston, 2013)
<i>Hibiscus sabdariffa</i> L.	1-2 tsp. dried flowers in 8 oz. hot water, cover for 20mins then filter	8 oz. BD/TID till stone expulsion(Winston, 2013)
<i>Hydrangea arborescens</i> L.	1/2 - 1 tsp. dried bark in 8 oz. water, cover and keep for 1 h	4 oz. TID till stone expulsion(Winston, 2013)
<i>Nigella sativa</i> L.	1/2 tsp. dried seed in 8 oz. hot water, cover for 20 mins then filter	4 oz. BD/TID till stone expulsion. (Winston, 2013)
<i>Parietaria diffusa</i> Merlet & W.D.J.Koch.	1-2 tsp. dried herb in 8 oz. hot water, cover for 30 mins then filter	4 oz. TID till stone expulsion. (Winston, 2013)
<i>Phyllanthus niruri</i> L.	1-2 tsp. dried herb, 8 oz. hot water, cover for 30 mins then filter	250ml TID till stone expulsion. (Winston, 2013)
<i>Piper methysticum</i> G.Forst.	1-2 tsp. dried root in 8 oz. water, boil for 15mins, cover for 60mins then filter	4 oz. QID till stone expulsion. (Winston, 2013)
<i>Rosa canina</i> L.	1 tsp. rose hips in 8 oz. hot water, cover for 60mins then filter	4 oz. TID till stone expulsion. (Winston, 2013)

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Plant name	Method of preparation	Dose (References)
<b>India</b>		
<i>Abrus precatorious</i> L.	leaves juice	3-4 tbsp. in empty stomach daily early in the morning for 15days. (Dinesh et al., 2013)
<i>Abutilon indicum</i> (L.) Sweet.	leaves	3 leaves in empty stomach daily early in the morning for 15days. (Dinesh et al., 2013)
	leaves juice	250ml BD for 15days. (Prachi et al., 2009) (Ghatapanadi et al., 2010)
<i>Achyranthes aspera</i> L.	mix 1tsp. of plant powder with water	250ml OD till stone expulsion(Mahmood et al., 2011)
<i>Aegle marmelos</i> (L.) Corrêa.	mix 1tsp. fruit pulp powder with 100ml coconut water	100ml OD for 14 days(Ghatapanadi et al., 2010)
	mix 1tsp. leaf powder with 100ml coconut water	100ml BD till stone expulsion (Ghatapanadi et al., 2010)
	mix 1tsp. of fruit pulp powder with 250ml coconut water	250ml OD for 14 days. (Tiwari et al., 2012)
<i>Aerva javanica</i> (Burm.f.) Juss. ex Schult.	mix 15 g whole plant paste with one L of water	250ml OD for 15 days. (Lakshmi, 2014)
<i>Allium cepa</i> L.	onion bulb extract	10-15ml along with sugar candy TID till stone expulsion. (Varghese et al., 2013)
<i>Allium odorum</i> L.	boil 250g of leaves in one L of water	250ml leaves decoction OD till stone expulsion. (Ahmed and Singh, 2011)
<i>Amaranthus spinosus</i> L.	mix 3g of whole plant ash with water	250ml BD for 30days. (Lakshmi, 2014)
<i>Anacardium occidentale</i> L.	mix paste of tender leaves and cumin seed in 250ml coconut water	250ml water BD till stone expulsion. (Kumar et al., 2014)
<i>Ananas comosus</i> (L.) Merr.	fruit juice	25-30ml BD till stone expulsion. (Varghese et al., 2013)
<i>Anneslea fragrans</i> Wall. / <i>Aquilegia fragrans</i> Benth.	boil 10g of dry leaves in one L of water	250ml TID till stone expulsion. (Deb et al., 2011)
	boil roots in water for 2 to 3 h.	250ml empty stomach daily early in the morning till stone expulsion. (Rani et al., 2013)
<i>Areca catechu</i> L.	1.5g of nut powder along with 250ml of water	250ml BD for 7days. (Lakshmi, 2014)
<i>Asparagopsis adscendens</i> (Roxb.) Kunth. / <i>Asparagus officinalis</i> L.	3-5g of root powder in one L of water	250ml TID till stone expulsion. (Khare, 2007)
<i>Asparagus racemosus</i> Willd.	mix 1 tsp. of dried rhizome with 500ml of cow milk	250ml BD till stone expulsion. (Varghese et al., 2013)
<i>Averrhoa carambola</i> L.	mix 2.8 g silver element in 300 ml fruit juice	125ml OD for 5days. (Ahmed and Singh, 2011)
<i>Azadirachta indica</i> A. Juss.	2 g of leaf ash with water	250ml OD for 30days. (Lakshmi, 2014)
<i>Bambusa nutans</i> Wall. ex Munro	boil 250 gm of sliced bamboo shoots in one L of water	250ml OD for 7days. (Ahmed and Singh, 2011)
<i>Basella alba</i> L.	leaf extract	25 ml in early morning on empty stomach till stone expulsion. (Lakshmi, 2014)
<i>Benincasa hispida</i> (Thunb.) Cogn.	fruit juice	2-3tbsp. BD till stone expulsion. (Varghese et al., 2013)
<i>Bergenia ligulata</i> Engl.	mix 0.5 g of rhizome with 250ml of water	250ml BD till stone expulsion. (Kapoor, 2000) (Tiwari et al., 2012)
<i>Beta vulgaris</i> L.	rhizome juice	500ml in empty stomach daily early in the morning for 7days. (Dinesh et al., 2013)
<i>Betula utilis</i> D.Don.	leaves infusion	50ml TID till stone expulsion. (Khare, 2007)
<i>Biophytum abyssinicum</i> Steud. ex A. Rich.	root /leaves decoction	250ml BD till stone expulsion. (Zahid et al., 2013)

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Plant name	Method of preparation	Dose (References)
<i>Borassus flabellifer</i> L.	steamed tender buds	5-10ml OD till stone expulsion. (Varghese <i>et al.</i> , 2013)
<i>Bryophyllum pinnatum</i> (Lam.) Oken.	leaves juice	2tsp. BD till stone expulsion. (Mahmood <i>et al.</i> , 2011)
<i>Bombax ceiba</i> L.	dried fruit powder	OD in empty stomach till stone expulsion. (Zahid <i>et al.</i> , 2013)
<i>Borassus flabellifer</i> L.	jelly like kernel of fruit	eat OD till stone expulsion. (Lakshmi, 2014)
<i>Butea monosperma</i> (Lam.) Taub.	mix 1 tsp. of seed powder with 250ml of water	250ml OD after meals till stone expulsion. (Zahid <i>et al.</i> , 2013)
<i>Cassia fistula</i> L.	0.25-0.5 tsp fruit powder in 100ml water	50ml BD for 90-120days. (Ghatapanadi <i>et al.</i> , 2010)
<i>Cedrus deodara</i> (Roxb. ex D.Don) G. Don.	28-56ml of decoction prepared from 3-6gms of wood	25ml BD till stone expulsion. (Kapoor, 2000)
<i>Celastrus paniculatus</i> Willd.	crush fresh leaves and mix with curd	Gives before breakfast and no intake except water up to 3pm.OD till stone expulsion. (Zahid <i>et al.</i> , 2013)
<i>Celosia argentea</i> L.	boil 1 tsp. dried roots in one L of water, keep cover for 30mins then filter	250ml in the morning OD till stone expulsion. (Zahid <i>et al.</i> , 2013)
	boil 1tbsp. seed powder with 300 ml of water until it reduces to 75 ml	35ml BD for 7-10days. (Korpenwar and Borkar, 2011)
<i>Celtis timorensis</i> Span.	boil 10 g of leaves in 2 L of water	250ml BD for 10 days. (Ahmed and Singh, 2011)
<i>Cinnamomum verum</i> J. Presl.	boil 10g of bark and 5g of leaves in one L of water	20 ml BD for 10 days. (Varghese <i>et al.</i> , 2013)
<i>Citrus limon</i> (L.) Osbeck.	boil 40-80g of root / root bark in one L of water	25ml BD till stone expulsion. (Varghese <i>et al.</i> , 2013)
<i>Cocos nucifera</i> L.	30 ml of flower extract mix with 50 ml of goat milk and sugar	80ml OD till stone expulsion. (Lakshmi, 2014)
<i>Coleus amboinicus</i> Lour.	leaf juice	5-10ml OD till stone expulsion. (Khare, 2007)
<i>Colocasia esculenta</i> (L.) Schott.	rhizome juice	100ml OD for 5days.(Dinesh <i>et al.</i> , 2013)
<i>Crateva adansonii</i> subsp. <i>odora</i> (Buch.-Ham.) Jacobs	bark decoction	before breakfast till stone expulsion. (Zahid <i>et al.</i> , 2013)
<i>Crataeva magna</i> (Lour.) DC.	bark decoction	BD for 7 days (Varghese <i>et al.</i> , 2013)
<i>Crataeva nurvala</i> Buch.-Ham.	boil 20-30g of stem bark in one L of water	250ml BD till stone xpulsion (Khare, 2007)
<i>Cucumis melo</i> L.	fresh fruit juice	1 tbsp. BD till stone expulsion. (Varghese <i>et al.</i> , 2013)
	mix 5-10 g fruit peel paste with 250ml of coconut water	250ml OD for 15 days. (Lakshmi, 2014)
<i>Curculigo orchioides</i> Gaertn.	2tsp. of fresh rhizome decoction with 1tsp. of honey	OD for 30days in empty stomach. (Behera <i>et al.</i> , 2006)
<i>Daucus carota</i> L.	root juice	500ml BD for 15days(Prachi <i>et al.</i> , 2009)
<i>Emblica officinalis</i> Gaertn.	4 tsp. of fruit juice extracted with 250ml lime water	250ml BD for 7 days. (Ahmed and Singh, 2011)
<i>Enhydra fluctuans</i> Lour.	boil 5g plant powder in one L of water	100ml BD for 7 days(Ahmed and Singh, 2011)
<i>Ensete superbum</i> (Roxb.) Cheesman	mix powder of one seed with 250ml of milk	250ml BD till stone expulsion(Varghese <i>et al.</i> , 2013)
<i>Eupatorium birmanicum</i> DC.	boil 250g of leaves in one L of water	250ml BD with a pinch of salt till stone expulsion(Lokendrajit <i>et al.</i> , 2011)
<i>Euphorbia hirta</i> L.	mix 100 ml whole plant extract with 200 ml goat milk	200 ml OD for 30 days. (Lakshmi, 2014)
<i>Fragaria nilgerrensis</i> Schltld. ex J. Gay	boil 5 gm of plant in one L of water with a little sugar candy.	100 ml OD till stone expulsion (Ahmed and Singh, 2011)
<i>Gmelina arborea</i> Roxb.	fruit juice	250 ml OD for 7 days(Choudhury <i>et al.</i> , 2012)

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Plant name	Method of preparation	Dose (References)
<i>Gossypium herbaceum</i> L.	fruit juice	250 ml OD till stone expulsion(Dinesh et al., 2013)
<i>Hedychium aurantiacum</i> Roscoe.	boil 10 gm of stem in one L of water	125ml OD till stone expulsion(Ahmed and Singh, 2011)
<i>Helianthus annuus</i> L.	pound 20 g of roots with 100 ml of butter milk.	100ml OD for 15 days. (Lakshmi, 2014)
<i>Heliotropium strigosum</i> Willd.	keep 3-4 g of dried plant overnight in an earthen pot containing 500ml of water, then filter	250ml before breakfast till stone expulsion(Mahmood et al., 2011)
<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult.	boil 20-30g root in one L of water.	250ml TID till stone expulsion(Varghese et al., 2013)
<i>Hibiscus sabdariffa</i> L.	boil leaves extract with crab	250ml OD till stone expulsion (Lokendrajit et al., 2011)
<i>Holarrhena pubescens</i> Wall. ex G.Don	bark powder	1tsp. BD till stone expulsion(Zahid et al., 2013)
	seed powder	1tsp. before breakfast till stone expulsion(Zahid et al., 2013)
<i>Hygrophila auriculata</i> (Schumach.) Heine.	mix 10g dried root powder with milk.	250ml BD till stone expulsion(Dhal et al., 2014)
<i>Hygrophila schulli</i> M.R. Almeida & S.M. Almeida.	root decoction	50-100ml OD till stone expulsion(Varghese et al., 2013)
<i>Lagenaria siceraria</i> (Molina) Standl.	fresh fruits after peeling off the rind and removing seeds are cut into thin slices. Slices are sun dried and preserved in the form of garlands at home for winter season. In winter, boil for 20 mins, cover for 60 mins then filter	4 oz. TID till stone expulsion (in winter) (Lone et al., 2013)
	1tsp. seed powder with 50ml sheep milk	50ml OD for 7 days(Dinesh et al., 2013)
<i>Lindernia ruellioides</i> (Colsm.) Pennell.	boil 5 gm whole plant powder in 2L of water	100 ml OD till stone expulsion. (Ahmed and Singh, 2011)
<i>Ludwigia perennis</i> L.	plant decoction	50-100ml OD till stone expulsion. (Varghese et al., 2013)
<i>Macrotyloma uniflorum</i> (Lam.) Verdc.	decoction of 2-4gms seed powder	14-28ml OD till stone expulsion. (Kapoor, 2000)
	decoction of 2-5g seed powder in 100 ml of water	100ml BD for 30 days. (Lakshmi, 2014)
<i>Manilkara zapota</i> (L.) P.Royen	mix 3-5g of kernel paste with 50 ml water	50ml BD for 30 days. (Lakshmi, 2014)
<i>Melia azedarach</i> L.	fresh leaf extract	50 ml OD for 20 days. (Lakshmi, 2014)
<i>Mentha arvensis</i> L.	crush 250 g of leaves in 50 ml water in mortar and pestle, leave it for 12h then strain / filter	125ml OD for 3-7 days. (Ahmed and Singh, 2011)
<i>Merremia emarginata</i> (Burm. f.) Hallier f.	whole plant extract	50 ml BD for 15 days. (Lakshmi, 2014)
<i>Mimosa pudica</i> L.	root decoction	50-100ml OD till stone expulsion. (Varghese et al., 2013)
<i>Momordica cochinchinensis</i> (Lour.) Spreng.	boil 1 tsp. seed powder in one L of water	100 ml OD for 7 days. (Ahmed and Singh, 2011)
<i>Moringa pterygosperma</i> Gaertn.	root bark juice	10-20ml OD till stone expulsion (Varghese et al., 2013).
<i>Mukia maderaspatana</i> (L.) M. Roem.	plant extract	
<i>Musa × paradisiaca</i> L.	stem juice	10-20ml OD till stone expulsion. (Varghese et al., 2013); 50 ml OD for 40 days. (Lakshmi, 2014)
<i>Myriogyne minuta</i> (G.Forst.) Less.	juice of whole plant in 250ml of water	250ml OD till stone expulsion. (Ahmed and Singh, 2011)
<i>Ocimum tenuiflorum</i> L.	mix ash of a plant with one L of water	250ml TID till stone expulsion. (Zahid et al., 2013)
	juice of leaves in 250ml of water	250ml with honey OD for 60-90days. (Varghese et al., 2013)

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<i>Oenothera biennis</i> L.	2 tsp. dried leaf in 8 oz. hot water, steep 45mins	8 oz. BD till stone expulsion. (Winston, 2013)
<i>Oxalis corniculata</i> L.	boil 250g of leaves in one L of water	250ml BD with a pinch of salt till stone expulsion(Lokendrajit <i>et al.</i> , 2011)
	boil 100g of plant in one L of water	250ml OD for 7 days(Ahmed and Singh, 2011)
<i>Pedaliium murex</i> L.	4 g fruit powder in 50ml sheep milk	50ml OD for 7 days(Lakshmi, 2014)
<i>Phyllanthus niruri</i> L.	plant juice	12-24ml OD till stone expulsion. (Varghese <i>et al.</i> , 2013)
<i>Piper nigrum</i> L.	boil 1 tsp. of seed powder in one L of water	100 ml OD for 7 days. (Ahmed and Singh, 2011)
<i>Plectranthus amboinicus</i> (Lour.) Spreng.	fresh leaves extract	5ml with sugar candy BD for 7 days. (Varghese <i>et al.</i> , 2013)
<i>Pongamia pinnata</i> (L.) Pierre.	mix 25g seed powder with 50 ml cow milk	50ml OD for 20 days. (Lakshmi, 2014)
<i>Prunus puddum</i> Roxb. ex Wall. OR <i>Prunus coracoides</i> D. Don.	kernel	24-45g daily(Kapoor, 2000)
<i>Punica granatum</i> L.	fruit juice	50ml before breakfast till stone expulsion. (Zahid <i>et al.</i> , 2013)
	boil rind of 1 fruit in one L of water, cover and keep for 30mins then filter	250ml BD / TID for 7 days. (Varghese <i>et al.</i> , 2013)
<i>Raphanus sativus</i> L.	root juice	TID after meals. (Zahid <i>et al.</i> , 2013)
	leaf juice	before breakfast after this no intake up to lunch. (Zahid <i>et al.</i> , 2013)
	seed powder	before breakfast. (Zahid <i>et al.</i> , 2013)
	dried tuber pieces burn to ashes and mix 3g of this ash with water	250ml OD for 30days. (Lakshmi, 2014)
<i>Rubia cordifolia</i> L.	boil 100 gm of plant in one L of water	200ml in empty stomach daily till stone expulsion. (Varghese <i>et al.</i> , 2013)
<i>Saccharum spontaneum</i> L.	mix 3-6g of root powder with water	200ml OD till stone expulsion. (Khare, 2007)
<i>Solanum virginianum</i> L.	mix root powder with curd	OD for 7days (Dinesh <i>et al.</i> , 2013)
<i>Sphaeranthus indicus</i> L.	boil 10g of powdered plant in oneL of water	500ml BD for 7 days(Varghese <i>et al.</i> , 2013)
<i>Strychnos potatorum</i> L.f.	decoction of handful roots	250ml BD for 20days(Dinesh <i>et al.</i> , 2013)
<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry	boil 1 tsp powder of flower buds in one L of water	100 ml OD for 7 days. (Ahmed and Singh, 2011)
<i>Syzygium cumini</i> (L.) Skeels	fruit pulp powder	1tsp. with water BD for 15days (Dinesh <i>et al.</i> , 2013)
<i>Tamarindus indica</i> L.	boil 20g of leaves in one L of water	250ml OD for 7 days. (Ahmed and Singh, 2011)
	boil dry exocarp of the pod in one L of water and filter	250ml BD till stone expulsion. (Zahid <i>et al.</i> , 2013)
	250g of leaves in one L of water	250ml with sugar candy for 15days. (Varghese <i>et al.</i> , 2013)
<i>Tectona grandis</i> L.f.	mix 10g of seed powder with 50ml of milk	50ml BD for 8 days. (Varghese <i>et al.</i> , 2013)
<i>Tephrosia purpurea</i> (L.) Pers.	mix 1g root powder in 100 ml water	100ml BD till stone expulsion. (Zahid <i>et al.</i> , 2013)
	leaves decoction	250ml before breakfast till stone expulsion. (Zahid <i>et al.</i> , 2013)
<i>Tinospora cordifolia</i> (Willd.) Miers.	boil 20-30g of stem in one L of water	250ml BD till stone expulsion (Varghese <i>et al.</i> , 2013)
<i>Trianthema portulacastrum</i> L.	fresh leaf juice	250ml BD for 7 days(Prachi <i>et al.</i> , 2009)
<i>Tribulus terrestris</i> L.	leaves decoction	250ml BD till stone expulsion. (Zahid <i>et al.</i> , 2013)
	decoction prepared by 100g of root in one L of water	250ml TID for 14days(Prachi <i>et al.</i> , 2009)
	mix 1g leaf / fruit powder in 100 ml water	50ml BD for 30days(Ghatapanadi <i>et al.</i> , 2010)
	boil 5 gm root powder in 2L of water	50ml BD for 15 days. (Lakshmi, 2014)

Continue...

Plant name	Method of preparation	Dose (References)
<i>Trigonella foenum-graecum</i> L.	1-2 tsp. dried seed in 10 oz. water, boil for 15-20 mins, cover and keep for 30mins then filter	4-6 oz. TID till stone expulsion. (Winston, 2013)
<i>Vigna unguiculata</i> (L.) Walp.	seed decoction	100ml BD for 30days(Dinesh <i>et al.</i> , 2013)
<i>Vitis vinifera</i> L.	leaves extract	20 ml BD for 20 days (Lakshmi, 2014)
	mix 5-15 g stem with one L of water	250ml TID for 20 days(Lakshmi, 2014)
<i>Vitex negundo</i> L.	boil 100g of root in one L of water	250ml OD in empty stomach for 14days. (Varghese <i>et al.</i> , 2013)
<i>Xenostegia tridentata</i> (L.) D.F. Austin & Staples.	1tsp of fruit pulp powder with 250ml coconut water	250ml in empty stomach till stone expulsion. (Varghese <i>et al.</i> , 2013)
<i>Zea mays</i> L.	tea of corn silk	BD for 14days(Bhat <i>et al.</i> , 2012)
	decoction of styles obtained from female inflorescence or immature cobs	BD for 7 days. (Prachi <i>et al.</i> , 2009)
	boil 50g silky hairs from the female inflorescence (tassel) in 2L of water till reduced to half	50ml 10x/ day for 2days. (Ghatapanadi <i>et al.</i> , 2010)
	corn silk extract	50 ml OD for 30days. (Lakshmi, 2014)
<b>Iran</b>		
<i>Cynodon dactylon</i> (L.) Pers.	boil 15g of dried roots in one L of water for 10 mins	250ml BD for 21days. (Miraldi <i>et al.</i> , 2001)
<i>Rosa canina</i> L.	infusion of 2 tsp. dried fruits in 250ml of water	250ml OD till stone expulsion. (Miraldi <i>et al.</i> , 2001)
<i>Thymus kotschyanus</i> Boiss. & Hohen.	leaves infusion in one L of water	3-4 tsp. QID till stone expulsion. (Miraldi <i>et al.</i> , 2001)
<b>Israel</b>		
<i>Brassica napus</i> L.	leaves juice	1 tsp. TID till stone expulsion. (Said <i>et al.</i> , 2002)
<i>Eriobotria japonica</i> L.	boil 7 to 8 leaves in one L of water	150ml BD for 14 days. (Said <i>et al.</i> , 2002)
<i>Lupinus varius</i> subsp. <i>varius</i>	soak 200g of seeds in 500 ml water for 24h	50 ml BD till stone expulsion(Said <i>et al.</i> , 2002)
<i>Portulaca oleracea</i> L.	boil 50g foliage in one L of water	150ml TID till stone expulsion. (Said <i>et al.</i> , 2002)
<i>Prosopis farcta</i> (Banks & Sol.) J.F.Macbr.	boil 50g of aerial parts in one L of water	
<i>Ruscus aculeatus</i> L.	boil 50g stems / leaves in one L of water	
<i>Zea mays</i> L.	boil kernels and fibers in one L of water	
<b>Jordan</b>		
<i>Alhagi maurorum</i> Medik.	boil 100g of root in one L of water	250ml TID till stone expulsion. (Hudaib <i>et al.</i> , 2008)
<i>Paronychia argentea</i> Lam.	boil 150g plant in one L of water	150ml TID till stone expulsion. (Hudaib <i>et al.</i> , 2008)
<i>Petroselinum sativum</i> Hoffm.	leaves decoction	
<b>Latin America</b>		
<i>Bauhinia forficata</i> Link.	boil 250 gm of leaves in one L of water	250ml TID till stone expulsion. (Duke, 2008)
<i>Boerhavia diffusa</i> L.	root decoction	250ml TID for 7 days(Duke, 2008)
<i>Caesalpinia pulcherrima</i> (L.) Sw.	250g of leaves in one L of water, boil for 20 mins, keep cover for 30mins then filter	250ml TID till stone expulsion. (Duke, 2008)
<i>Chondrodendron tomentosum</i> Ruiz & Pav.	mix 1 tsp. dried root to 10 oz. water, boil for 10-15 mins, keep cover for 30mins then filter	BD till stone expulsion. (Duke, 2008)
<i>Cordia ecalyculata</i> Vell.	fruits roasted and brewed for 30-60mins.	BD in empty stomach till stone expulsion. (Duke, 2008)
<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult.	boil 3 leaves in 250ml water for 10 mins then strain /filter	250ml OD till stone expulsion(Duke, 2008)
<i>Larrea tridentata</i> (Sessé & Moc. ex DC.) Coville.	boil 10gms of leaves in one L of water	250ml TID till stone expulsion(Duke, 2008)
<i>Phaseolus vulgaris</i> L.	seeds	100g OD till stone expulsion. (Duke, 2008)
<i>Phyllanthus niruri</i> L.	boil 3-6g of powdered herb in one L of water	250ml TID till stone expulsion. (Duke, 2008)

Continue...

Antiurolithiatic plants: Formulations used in different countries and cultures

Plant name	Method of preparation	Dose (References)
<b>Pakistan</b>		
<i>Rheum emodi</i> Wall.	mix 1 tsp. dried root with egg and fried in ghee / fat	BD till stone expulsion. (Sher and Hussain, 2009)
<i>Sageretia brandrethiana</i> Aitch.	boil 2kg of roots in 7-8L of water for 2-3h. when 2L of water is left filter with a cloth and store in a glass bottle.	For adults: 250ml of decoction (at one time) mix with 250ml of water then 250ml BD for 8-10 days. For children: 125ml of decoction (at one time) mix with 250ml of water then 250ml BD for 7-8 days. (Abbasi et al., 2012)
<b>Turkey</b>		
<i>Alcea pallida</i> (Willd.) Waldst. & Kit.	seeds decoction	250ml before meal TID for 7days. (Uysal et al., 2012)
<i>Equisetum ramosissimum</i> Desf.	250g of aerial parts in one L of water boil for 10-15 mins, keep cover for 30mins then filter	250ml before breakfast for 7-8days. (Uysal et al., 2012)
<i>Lavandula stoechas</i> L.	250g of leaves in one L of water, boil for 20mins, cover for 30mins then filter	250ml before breakfast till stone expulsion(Uysal et al., 2012)
<i>Myrtus communis</i> L.	boil 2-5g of seed powder in one L of water, cover for 30 mins then filter	250ml before breakfast for 10-15days (Uysal et al., 2012)

**Table 2:** Poly herbal antiurolithiatic formulations.

Plant name	Method of preparation	Dose (References)
<b>Appalachia (region in Eastern United States)</b>		
<i>Citrus limon</i> (L.) Osbeck. (fruit)+ <i>Olea europaea</i> L. (oil)	125ml of fruit juice and 250ml of olive oil.	Drink the olive oil first and then the lemon juice. Lie down on the right side and elevate the hip. Stay there for two or three hours and the stone will be passed (Crellin et al., 1990)
<b>India</b>		
<i>Aerva lanata</i> (L.) Juss. (plant)+ <i>Cuminum cyminum</i> L. (seeds)	50-60ml of <i>Aerva lanata</i> plant extract with 1tsp. seeds of <i>Cuminum cyminum</i> and sugar	50-60ml OD for 10-15 days(Dinesh et al., 2013)
<i>Aerva lanata</i> (L.) Juss. (plant)+ <i>Ricinus communis</i> L. (fruit)+ <i>Tribulus terrestris</i> L. (fruit)	250ml of <i>Aerva lanata</i> plant decoction with fruits of <i>Ricinus communis</i> and <i>Tribulus terrestris</i>	250ml BD for 15days. (Prachi et al., 2009)
<i>Aerva lanata</i> (L.) Juss. (leaves)+ <i>Boerhavia diffusa</i> L.(leaves)+ <i>Musa x paradisiaca</i> L. (stem) + <i>Benincasa hispida</i> (Thunb.) Cogn. (fruits)	Pound 30 leaves of <i>Aerva lanata</i> and 15 leaves of <i>Boerhavia diffusa</i> with 5 ounce stem juice of <i>Musa paradisiaca</i> and <i>Benincasa hispida</i> fruits	OD in empty stomach for 7 days. (Varghese et al., 2013)
<i>Allium cepa</i> L. (bulb)+ <i>Oryza sativa</i> L. (grain)	Mix handful of chopped onion bulbs with boiled rice ( <i>Oryza sativa</i> ), keep it overnight	250g of paste in empty stomach OD till stone expulsion (Varghese et al., 2013)
<i>Allium cepa</i> L.(bulb)+ rice ( <i>Oryza sativa</i> ) + <i>Aerva lanata</i> (L.) Juss. (leaves)	rice bran ( <i>Oryza sativa</i> ) soup along with handful of chopped onion ( <i>Allium cepa</i> ) and leaves of <i>Aerva lanata</i>	250ml soup OD till stone expulsion. (Varghese et al., 2013)
<i>Arctium lappa</i> L.(roots)+ <i>Bergenia ligulata</i> Engl. (roots)+ <i>Spondiix axillaris</i> (fruits)	1 tsp. dried roots of <i>Arctium lappa</i> and <i>Bergenia ligulata</i> and 1 tsp. of <i>Spondiix axillaris</i> fruit , 30 oz. water, boil for 20mins, cover for 30mins then filter	4 oz. TID till stone expulsion. (Ballabh et al., 2008)
<i>Bergenia stracheyi</i> (Hook.f. & Thomson) Engl. (roots)+ <i>Bergenia ligulata</i> Engl. (roots)+ <i>Spondiix axillaris</i> (fruits)	1 tsp. dried roots of <i>Bergenia stracheyi</i> and <i>Bergenia ligulata</i> and same quantity of <i>Spondiix axillaris</i> fruits , 30 oz. water, boil for 20mins, cover for 30mins then filter	
<i>Bryophyllum pinnatum</i> (Lam.) Oken. (leaves)+ <i>Piper nigrum</i> L. (fruit)	250ml of leaves juice along with powder of 2-3 grain of <i>Piper nigrum</i>	250ml BD for 15 days. (Prachi et al., 2009)
<i>Boerhavia diffusa</i> L.(roots)+ <i>Tribulus terrestris</i> L. (seeds)	boil 1 tsp. dried roots of <i>Boerhavia diffusa</i> and same quantity of <i>Tribulus terrestris</i> seeds, in one L of water, cover for 30mins then filter	250ml TID in empty stomach till stone expulsion. (Varghese et al., 2013)

Continue...

Plant name	Method of preparation	Dose (References)
<i>Centella asiatica</i> (L.) Urb. (leaves)+ <i>Celtis timorensis</i> Span. (leaves)+ <i>Lindernia ruellioides</i> (Colsm.) Pennell. (leaves)	boil 20 gm of leaves from each plant in one L of water	250ml BD for 7 days. (Ahmed and Singh, 2011)
<i>Citrus limon</i> (L.) Osbeck. (fruit)+ <i>mblica officinalis</i> Gaertn. (fruit)	mix lemon fruit juice with the fruit juice of <i>Emblica officinalis</i> .	4 tbsp. BD for 7 days(Varghese et al., 2013)
<i>Cinnamomum tamala</i> (Buch.-Ham.) T.Nees & Eberm. (leaves) + <i>Celtis timorensis</i> Span. (leaves)	boil 5gm leaves of each plant together in one L of water	250ml BD for 10 days. (Ahmed and Singh, 2011)
<i>Coccinia grandis</i> (L.) Voigt. (leaves)+ <i>Cuminum cyminum</i> L. seeds+ <i>Phoenix sylvestris</i> (L.) Roxb. toddy	mix 20-40ml extract of handful leaves with 1tsp. of <i>Cuminum cyminum</i> seeds and sugar then make volume upto 200ml with <i>Phoenix sylvestris</i> toddy	200ml OD for 5days(Dinesh et al., 2013)
<i>Cucumis melo</i> L.(seeds) + <i>Vitis vinifera</i> L. (fruit)	mix 1 tbsp. of powdered seeds with 1 tbsp. <i>Vitis vinifera</i> fruit juice	2 tbsp. BD till stone expulsion(Varghese et al., 2013)
<i>Equisetum debile</i> Roxb. Ex Vaucher. (plant)+ <i>Piper nigrum</i> L. (fruit)	mix whole plant juice of <i>Equisetum debile</i> along with 1g of <i>Piper nigrum</i>	250ml BD for 7 days(Prachi et al., 2009)
<i>Phyllanthus fraternus</i> G.L.Webster. (plant) + <i>Piper nigrum</i> L. (fruit) + <i>Curcuma longa</i> L. (rhizome)	pound 10g fresh plant extract with 5g <i>Piper nigrum</i> and 5g <i>Curcuma longa</i>	2g OD for 3-5 days. (Ghatapanadi et al., 2010)
<i>Potentilla anserina</i> L. (plant) + <i>Bergenia ligulata</i> Engl. (roots)+ <i>Spondiax axillaris</i> (fruits)	boil 1 tsp. dried plant, same quantity of <i>Bergenia ligulata</i> (roots) and <i>Spondiax axillaris</i> (fruits), in one L of water, cover for 30mins then filter	4 oz. TID till stone expulsion. (Ballabh et al., 2008)
<i>Punica granatum</i> L.(seeds)+ <i>Macrotyloma uniflorum</i> (Lam.) Verdc. (seeds)	250ml infusion of <i>Macrotyloma uniflorum</i> containing 1 tsp of ground seeds of <i>Punica granatum</i>	250ml BD / TID for 7 days(Varghese et al., 2013)
<i>Raphanus sativus</i> L. (roots)+ <i>Bergenia ligulata</i> Engl. (roots) + <i>Spondiax axillaris</i> (fruits)	mix 1 tsp. dried roots of <i>Raphanus sativus</i> and <i>Bergenia ligulata</i> and same quantity of <i>Spondiax axillaris</i> fruits, 30 oz. water, decoct 20 mins, cover and keep for 30mins then filter.	4 oz. TID till stone expulsion(Ballabh et al., 2008)
<i>Ricinus communis</i> L.(roots)+ <i>Zingiber officinale</i> Roscoe. (rhizomes)	mix root decoction along with a half gram of dried and powdered rhizomes of <i>Zingiber officinale</i> , one pinch of salt	250ml BD for 7 days. (Prachi et al., 2009)
<i>Scoporia dulcis</i> L.(plant)+ <i>Musa x paradisiaca</i> L. (stem)	mix entire plant extract with the extract of <i>Musa x paradisiaca</i> stem make into paste and mix with 50 ml water	50 ml BD for 30 days(Varghese et al., 2013)
<i>Sesamum indicum</i> L. (plant)+ <i>Achyranthes aspera</i> L. (plant)	make ash of both plants	1tbsp. BD for 41 days(Dinesh et al., 2013)
<i>Tribulus terrestris</i> L. (roots)+ fresh <i>Kalanchoe pinnata</i> (Lam.) Pers.	crush certain amount of fresh roots of the plant are with 1-2 fresh ( <i>Kalanchoe pinnata</i> ) in specific quantity of curd and same preparation is given internally with a pinch of common salt	OD in early morning with empty stomach till stone expulsion(Salave et al., 2011)
<b>Iran</b>		
<i>Cicer arietinum</i> L. (black fruit)+ <i>Apium graveolens</i> L. (fruit)+ <i>Raphanus sativus</i> L. (fruit)+ <i>Prunus amygdalus</i> var. <i>dulcis</i> (Bork. ex DC.) Koehne. (oil)	mix ¼ - ½ tsp fruit powder of <i>Cicer arietinum</i> , <i>Apium graveolens</i> and <i>Raphanus sativus</i> each with <i>Prunus amygdalus</i> var. <i>dulcis</i> oil	1 tsp. BD till stone expulsion. (Faridi et al., 2012)
<b>Italy</b>		
<i>Olea europaea</i> L. (leaves)+ <i>Allium sativum</i> L. (bulb)	make decoction from three cloves ('strusci') of garlic and seven olive leaves.	50ml early morning in empty stomach till stone expulsion. (Guarrera et al., 2005)
<b>Pakistan</b>		
<i>Achyranthes aspera</i> L. (roots)+ <i>Boerhavia procumbens</i> Banks ex Roxb. (roots)+ <i>Piper nigrum</i> L.(fruit)	grind 100g of fresh roots of <i>Achyranthes aspera</i> , 100g of fresh roots of <i>Boerhavia procumbens</i> and 8-10 grains of <i>Piper nigrum</i> together for 4-5mins. Thick paste like powder then add into 500-750ml of water, boil for 4-5mins and filter with a cloth.	250ml BD for 4-5 days. (Abbasi et al., 2012)

Continue...

Plant name	Method of preparation	Dose (References)
<i>Carissa opaca</i> Stapf ex Haines. (leaves)+ <i>Sageretia brandrethiana</i> Aitch. (roots)	boil 1 kg of fresh leaves of <i>Carissa opaca</i> and 1 kg of fresh roots of <i>Sageretia brandrethiana</i> in 4L of water for 90mins. When 1L of water is left, filter it with cloth. Store decoction in a glass bottle. Mix 250ml of decoction (at one time) with 500ml of water and 10-15g of sugar; then shake well	For adults: 250ml BD for 5-6days. (Abbasi <i>et al.</i> , 2012)
	125ml of decoction (at one time) is mixed with 500ml of water and 10-15g of sugar, then it is shaken well	for children: 250 ml BD for 6-7 days. (Abbasi <i>et al.</i> , 2012)
<i>Zea mays</i> L.+ <i>Piper nigrum</i> L. (fruit) + <i>Elettaria cardamomum</i> (L.) Maton.	boil 30-40g of dry or fresh stigmas of <i>Zea mays</i> , 5-7 ground grains of <i>Piper nigrum</i> and 4-5 grains of <i>Elettaria cardamomum</i> in 750ml of water for 15-20mins. When 500ml of water is left, filter with muslin cloth.	500ml OD for 2-3 days. (Abbasi <i>et al.</i> , 2012)
<b>Yemen</b>		
<i>Anisotes trisulcus</i> (Forssk.) Nees. (leaves)+ <i>Pulicaria orientalis</i> Jaub. & Spach. ( leaves)	250g of leaves in one L of water with the leaves decoction of <i>Pulicaria orientalis</i> .	250ml TID till stone expulsion. (Hehmeyer <i>et al.</i> , 2012)

provides a glimpse of herbal remedies against kidney stone with valuable information regarding their method of preparation and doses. However, for testing the scientific validity of these herbal preparations clinical studies are required, to establish their safe therapeutic use. The present review will not only be useful for the general public but also attract the scientific world for antiuro lithiatic drug discovery.

## CONCLUSION

World population of about 12% suffer with urolithiasis. All over the world in different countries and cultures people use plants as mono herbal and poly herbal formulation, for the prevention and cure of kidney stone according to their ethno pharmacological information. These formulations are very effective that's why these are used for hundreds of years. The present review describes one hundred and fifty one (151) mono herbal and thirty (30) polyherbal formulations against urolithiasis. This valuable ethno pharmacological information may lead towards discovery of new antiuro lithiatic compounds.

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