



Received on 22 July, 2017; received in revised form, 25 September, 2017; accepted, 20 October, 2017; published 01 April, 2018

PHYTOCHEMICAL AND PHARMACOLOGICAL IMPORTANCE OF GENUS URTICA - A REVIEW

Priyanka Rajput*, Maitry Chaudhary and R. A. Sharma

Department of Botany, University of Rajasthan, Jaipur - 302004, Rajasthan, India.

Keywords:

Urtica, nettles,
Phytochemicals, Pharmacological,
Traditional herbal remedy

Correspondence to Author:

Priyanka Rajput

Plant Physiology and Biochemistry
Lab, Department of Botany,
University of Rajasthan, Jaipur -
302004, Rajasthan, India.

E-mail: rajputpriyanka82@gmail.com


ABSTRACT: Genus *Urtica* belongs to family Urticaceae and commonly known by name of nettles. The plant *Urtica* has been used as a folk medicine and as a food source from a long time. It has been used frequently for its medicinal properties since the Bronze age (3000 - 2000 B.C.) as a traditional herbal remedy in treatment of variety of diseases as rheumatism, gout, nephritis, haematuria, jaundice, menorrhagia, anemia, eczema, arthritis. It has been used for a long time as first-aid remedy in treatment of infirmities in case of bites and stings, burns, hives and breast feeding problems. Phytochemicals evaluation of the plant revealed presence of various chemical compounds like phytosterols, saponins, flavonoids, phenolic acids, tannins, proteins and amino-acids that showed beneficial potential of the plant to get commercially cultivated and get used for the natural drugs and medicine. The plant has been reported to have various pharmacological activities as antioxidants, analgesic, anti-inflammatory, anti-ulcer, anti-viral, immuno-modulatory, hepatoprotective, anti-diabetic, anti-colitis and anti-cancer effect.

INTRODUCTION: Environment has provided us with a great source of medicinally active plants and plant products from ages. Thousands of modern drugs were been isolated from these vast natural sources. Many of these isolations have been developed on the basis of traditional knowledge about the usage of plants as medicines¹. People now-a-days are getting more and more interested in the use of herbal medicines because they are safer and cause less damage to human body and also they are available at low-cost compared to synthetic drugs. Therefore, scientists are engaged in screening off plants for active biological compounds making them potential to be used as medicines².

Several medicinal plants have long been traditionally used as remedies against different diseases. Use of herbal medicines has increased in recent years. There is present an enormous amount of information and knowledge about the benefits of herbal drugs in our ancient literature of Ayurveda, Charak samhita, Unani medicines. These literature mentions the use of herbs for medicinal purposes³.

The Genus *Urtica* belongs to family Urticaceae with about 80 species throughout the world. The plant is commonly known by name of stinging nettle. As the name indicates the plant is known for its potential of inducing persistent pain and burning sensation by releasing an irritant on coming in contact with human skin.

The main varieties identified under the *Urtica* species are *U. dioica* L., *U. urens* L., *U. pilulifera* L., *U. cannabina* L., *U. membranacea* Poir., *U. bausskennchtii* Boiss, *U. atrovirens* Req., *U. rupestris* Guss., *U. chamaedryoides* Pursh, *U. ferox* Forst.⁴

QUICK RESPONSE CODE	DOI: 10.13040/IJPSR.0975-8232.9(4).1387-96
	Article can be accessed online on: www.ijpsr.com
DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.9(4).1387-96	

The genus *Urtica* is derived from word 'uro' to burn or 'urere' denotation to sting⁵. Since old era, public have taken advantage of this sting by flailing arthritic or paralytic limbs with fresh plant to stimulate circulation and bring warmth to joints and extremities in a management known as urtication⁶. This plant has a great potential medicinal uses but is undervalued till now⁷.

Traditionally, in herbal medicine stinging nettle is used as diuretic agent for treatment of rheumatism and arthritis. Stinging nettle is used as supportive therapy to relieve seasonal allergy symptoms, in reducing difficulties in urination associated with early stages of benign prostatic hyperplasia in control of sugar level in diabetes^{8,9}. The seeds and leaves of *U. dioica* has been used from a long time in middle east, as traditional medicines for a variety of complaints such as eczema, abscess, wound pile, liver insufficiency, rheumatic pain, dermatophytic infections and cancer^{10,11}.

Vernacular and Local Names:

Common name: Stinging Nettle

Assamese: Chorat

Hindi: Bichchhu kali, Kandadli

Sanskrit: Vrscikali, Vrishchhiyaa - shaaka

Unani: Anjuraa, (Kumaon)

Folk language: Shisuun

Local Name: Bichchhu buti

Distribution: *Urtica* is found ubiquitously in the world as a weed plant chiefly in barren wastelands with characteristics attribute of unpleasant stinging hair on stems and leaves^{5,12}. *Urtica* was originally found in the cooler regions of northern Europe, Asia and the western United States. Now stinging nettles can be found in many areas of the United States, Canada, Europe, Asia, Africa and South America¹³. In India, It is found in the Himalayas from Kashmir to Kumaon at altitudes of 2,100 - 3,200 m. The plant has reported its presence in Kashmir, Srinagar, Shimla, Rajasthan, and Kerala¹⁴. The stinging nettle flourishes in temperate climates where it can receive plentiful sunlight. The plants are commonly found along rivers, lakes and streams.

Botanical Description:¹⁵



FIG. 1: A COMPLETE NETTLE PLANT IN ITS HABITAT AT DAL LAKE, PALAMPUR

Roots: extensive underground network of hard winter rhizomes, fibrous roots produced along with rhizomes.

Stem: Unbranched, and grow from 60 - 150 cm high covered with bristly stinging hairs slender and approximately square in cross section.

Leaves: Opposite, toothed, pointed stipules (small leaf-like appendages) occur at the base of the leaf, but senesce early. Leaf stalks are 1/4 to 2/3 the length of the leaf,

Flowers: Tiny, greenish-white flowers monoecious or dioecious in axillary cymose clusters, hanging panicles.

Dioecious: perigone has 4 tepals, 4 stamens and 1 ovary with brush like stigma.

Monoecious: Male flower consist of only stamens, perianth of 4 segments. Stamens curve inward in bud stage and grow back at end of flowering for anthers to fling out the pollen.

Fruit: Stinging nettle produces a small, dry, oval-shaped, 1 seeded fruit (achene) that is yellow to grayish-tan. Fruits are clustered along drooping flower spikes,

Seeds: Erect, Albumen scanty, Cotyledons rounded.

II. Phytochemistry: The major chemical constituents of *Urtica dioica* are flavonoids, tannins, volatile compounds and fatty acids, polysaccharides, isolectins, sterols, terpenes, protein, Vitamins and minerals^{16, 17, 18}.

GC-MS analysis shows the presence of 43 compounds. Fatty-acid esters (C14:0, C16:0, C18:1, C18:2, C18:3, C19:2, etc.), 9-oxononanoic, hydroxycinnamic, and vanillic acids, free fatty acids, and vanillin, eugenol, apiol, squalene, etc. made up most of the 36 identified compounds. In addition to the aforementioned compounds, pyrazine and pyrazole derivatives were detected for the first time in studied samples of HMT. These included 4-ethyl-4,5-dihydro-5-propyl-1H-pyrazol-1-carboxaldehyde isomers (I) and derivatives of hexahydropyrrolo-[1,2-a]pyrazin-1,4-dione (II) with -3-alkyl and -3-phenylmethyl substituents in addition to 5,10-diethoxy-2,3,7,8-tetrahydro-1H,6H-dipyrrolo[1,2-a;1',2'-d]pyrazine (III)¹⁹.

Amino acid analysis shows dominating presence of aspartic acid, asparagines, glutamic acid, alanine, and threonine in homeopathic matrix tincture of *Urtica dioica*. Histidine was also identified in the tincture, indicating that the amino acid is in bound form¹⁹. Arginine, isoleucine and leucine dominated among the free amino acids²⁰.

An unusual lectin has been isolated from *Urtica dioica* L. rhizomes. It is a small (8.5 kDa) monomeric protein with high contents of glycine, cysteine and tryptophan²¹. Aspartic acid and Alanine amino acids were isolated from the root extract¹⁹. Polar extracts of the stinging nettle (*Urtica dioica* L.) roots were screened to have lignans (+)-neoolivil, (-)-secoisolariciresinol, dehydrodiconiferyl alcohol, isolariciresinol, pinoresinol, and 3,4-divanillyltetrahydrofuran. These compounds were isolated from *Urtica* roots²². Root extract of *Urtica fissa* isolated 8 known steroidal compounds β -sitosterol, daucosterol, palamitic acid, stigmasterol, α -spinasterol, potassium nitrate, cholestrine-5, 22-enyl-3 β -alcohol, stigmasterol-3- β -D-glucopyranoside and phenols found in small traces only²³.

About nine types of carotenoids were isolated from the phytochemical analysis of leaves of *U. dioica* at

different maturity stages which are, lutein, lutein isomers, β -carotene and β -carotene isomers were the major carotenoids found at every level of maturity²⁴. Neoxanthin, violaxanthin and lycopene were also found as important contributors in specific leaf maturity stages. Leaves were analysed to have Chlorophyll A and Chlorophyll B²⁵. *Urtica dioica* leaves have revealed the presence of free (1.238%) and bound (4.87%) amino acids²⁶. The presence of c- and o-glycosides and proteins, ceramides, Vitamins, minerals, lignans, caffeic acid derivative compounds, and high content of phenolic acids including benzoic acids, cinnamic acids, flavonoid, coumarins, phytosterols^{27, 28}. The leaves are rich in Vitamins B, C, K and minerals such as calcium, iron, magnesium, phosphorus, potassium and sodium²⁹. The carotenoid such as β -carotene, hydroxy- β -carotene, lutoxanthin, lutein epoxide and violaxanthin are reported³⁰.

Other important constituents found are essential amino acids, glucokinnins and a very high content of chlorophyll^{31, 32}. The derivatives of shikimic acid like phenylpropanes, caffeic acid and various esters of this acid such as chlorogenic acid and caffeoyl malic acid have been identified^{30, 15, 33}. *U. dioica* leaves revealed the presence of scopoletin, gentisic acid, proto-catechuic acid, quinic acid, esculetin, quercetin and rutin. The presence of phenolics, 5-O-caffeoyl-quinic acid (chlorogenic acid), quercetin 3-O-rhamnosylglucoside (rutin) 3-O-glucoside (isoquercitrin) and diacanol (new phenol derivative) in the aqueous methanolic extract of inflorescence of the *Urtica dioica* species had been reported^{27, 34}.

Young leaves of *Urtica cannabina* were screened to have essential micro elements and fatty acids³⁵. Amino acid been screened in *Urtica urens* were Aspartic acid, Threonine, Serine and Alanine¹⁹. Ethanol extract of leaves of *Urtica augustifolia* had screened phytochemically for presence of steroidal saponins³⁷.

The compounds responsible for the burning sensation properties of leaf trichomes are acetylcholine, histamine, 5-hydroxytryptamine (serotonin), leukotrienes and formic acid^{29, 38, 39}. The main components of essential oil of *U. dioica* seeds are carvacrol (38.2%), carvone (9.0%), naphthalene (8.9%), (E)-anethol (4.7%),

hexahydrofarnesyl acetone (3.0%), (E)-geranyl acetone (2.9%), (E)- β -ionone (2.8%) and phytol (2.7%)¹⁷. The flavonoids are mainly kaempferol, isorhamnetin, quercetin, isoquercitrin, astragalol, rutin and their 3-rutinosides and 3-glycosides^{40,42}.

Lignans from the roots of *U. dioica* and their metabolites which bind to human sex hormone binding globulin (SHBG) has been worked by Franciskovic et al., 2017²². Telo et al., 2017⁴³ have observed crystal structure of *U. dioica* agglutinin (UDA), a superantigen presented by MHC molecules of class I and class II.

The stem extract of *Urtica cannabina* had screened to have essential micro elements and fatty acids (palmitic acid, stearic acid, oleic acid, lenoleic acid, linolenic acid) and other unsaturated fatty acids^{35,36}. Phytochemical analysis of inflorescence extracts of *Urtica dioica* has screened with highest amount of phenolics which as in root extracts are found to be in small traces only²⁷.

Fruits of *Urtica cannabina* has isolated to mega stigmanes that is + blumenol and (+)-dehydrovomifoliol and five flavonoid glycosides that are isoquercitrin, astragalol, afzelil, quercitril, isovitexin⁴⁴.

Fatty acid analysis had screened presence of Linoleic acid (44.29%) and Oleic acid (34.93%) in the seed oil of *Urtica dioica* and from the seed oils of *Urtica pilulifera* screened the presence of Linoleic acid (62.99%), Oleic acid (21.99%), Linolenic acid (0.55%), Stearic acid (4.79%), Palmitic acid (9.74%). Amino acid analysis had screened Aspartic acid, threonine and serine from the seed oil of *Urtica dioica*^{19,26,45}.

Asparagine, Isoleucine, Leucine, Arginine are the dominant amino acids which are screened from whole plant of *Urtica dioica*. Steroidal analysis of *Urtica cannabina* isolated three compounds identified as β -sitosterol, scutellarein-7-o-a-L-rhamnoside and bicenin-2^{19,26}.

III. Pharmacology:

Anti-diabetic: The hydroalcoholic extract of *U. dioica* leaves prevents from severity of diabetes by preventing severe increase in blood glucose concentration and also regenerates β -cells, if used before induction of hyperglycemia⁴⁶. *U. dioica*

leaves results in reduction in the level of blood glucose and glycated haemoglobin during streptozotocin (STZ)-induced diabetes⁴⁷. Hydro-alcoholic extract of *U. dioica* leaves shows reduction in dexamethasone induced diabetes and its associated complications such as depressive like behavior and cognitive dysfunction, hyperglycemia, plasma corticosterone and oxidative stress⁴⁸.

The aqueous extract of plant 250 mg/kg has shown a significant glucose lowering effect against alloxan induced diabetes in rats³². The fructose induced insulin resistance in male rats has been shown to decrease serum glucose level on administration of hydro-alcoholic leaf extract⁴⁹. *Urtica dioica* has been tested for the alpha amylase inhibition activity and 60% inhibition is seen in 2 mg/ml aqueous extract of plant⁵⁰. Farzami et al., 2003⁵¹ have reported the enhancement in the induction of insulin secretion by a component of *U. dioica* leaves extract in perfused Islets of Langerhans and its *in vivo* effects in normal and streptozotocin diabetic rats.

The cold methanolic extract of leaves of *Urtica dioica* and *Urtica pilulifera* (250 mg/kg) has also shown significant antihyperglycemic effect in alloxan induced diabetes^{52,53,54}.

Anti-inflammatory: *U. dioica* has been reported to increase total antioxidant capacity and reduce inflammatory stress⁴⁷. The two most prevalent active chemical agents found in the Stinging Nettle are formic acid (methanoic acid) and histamine (1H-Imidazole-4-ethanamine; 2- (4- Imidazolyl ethylamine; 4- (2- Aminoethyl)- 1H- imidazole) which function as an anti-inflammatory agent⁷.

Seed oil extract of *U. dioica* had a weak anti-inflammatory effect in rats, had no analgesic effects in mice and is non-toxic⁵⁴. At the dosage concentration of 200 and 400 mg/kg, the Methanolic extract of plant has been shown to inhibit the abdominal twitches induced by acetic acid and paw edema induced by carrageenan⁵⁵.

On infusion of *Urtica dioica* leaf supplements N-Methyl-D-aspartate (NMDA) injection has been reported to show brain lesion and subsequent inflammation in wistar rats significantly reducing the nuclear factor kappa B (NF-kB) binding activity to DNA showing a significant anti-

inflammatory effect⁵⁶ and this activity is also found prevalent in the ethanolic extract of *Urtica fissa*. The extract of *Urtica dioica* have been screened to have anti-inflammatory activity due to inhibition of pro-inflammatory transcription factor NF- κ B due to presence of high phenolic contents and this activity is found in ethanolic extract of *U. urens* due to presence of Chlorogenic acid⁵⁷.

Anticancerous: Aqueous extract of *U. dioica* leaves were evaluated with anti-cancer activity in LNCaP treated prostrate carcinoma cell line⁵⁸. The extract shows significant reduction in LNCaP cell viability in a dose dependent manner, thus shows cytotoxic effect using MTT Assay⁵⁷. The extract has been used as complementary and alternative therapies during and after the chemotherapeutic treatment of cancer patients⁵⁹.

Leaf extract of *U. pilulifera* has been analyzed for its use in cancer treatment as it increase protein concentration and reduces the lipids in lipidemic liver and remodels the phospholipids compositions showing its potential to be used in treatment of cancer diseases. Aerial part of *Urtica pilulifera* extract shows highest cytotoxicity against breast infection, about 85% of the cells were found dead at the concentration of 500 μ g/ml due to presence of phenolic compounds (phenolic compounds are known to inhibit mutagenesis in humans)⁶⁰.

The aqueous extract of plant has been investigated for cytotoxic activity against MCF-7, MDA-231 breast cancer cell lines by using the XTT cell cytotoxicity assay. On MCF-7 cells; IC₅₀ value at 48th hr was 34 μ g/ml increasing the concentration of aqueous extract to 29.2 μ g/ml has been observed to decrease MDA-231 cell viability to 43%⁶¹.

The aqueous extract of the *Urtica dioica* roots has been analyzed *in vitro* for the cytotoxic effect and its anticancerous activity against acute myelogenous leukemia cell line⁶².

Methanolic extract of root of *U. pilulifera* has been screened to have antitumor activity due to presence of flavanoids and phenolic acids⁵³.

Antioxidant: The hydro-alcoholic extract of *U. dioica* showed positive *in-vitro* antioxidant activity. Ferulic acid is detected as a potential antioxidant present in the species using HPTLC²⁰. It has

antioxidant, antimicrobial, antiulcer and analgesic properties⁶³. Its extract shows *in vitro* inhibition of several key inflammatory events that cause the symptoms of seasonal allergies⁶⁴.

Antiarthritic Activity: Methanolic extract of the root of *Urtica dioica* has been used as a remedy for rheumatoid arthritis due to suppression of cytokine production⁶⁵.

Methanolic leaf extract of *U. pilulifera* had analyzed for antiarthritic activity as it inhabits the CFA induced paw swelling, skin lesions and articular deformity by suppressing inflammatory nuclear factor NF- κ B in rats^{52, 53, 60}.

Hepatoprotective Activity: Hepatoprotection or anti-hepatotoxicity is the ability to prevent damage to the liver, prevent the liver affections prophylactically and maintains balance in liver enzymes⁶⁶. The leaves extract of plant shows maximum hepatoprotective activity at dose of 400 mg/kg concluded by the decreased level of serum alanine transaminase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), total bilirubin level and malonyldehyde (MDA) and also by the increase in level of superoxide dismutase (SOD) level^{67, 68}. The seed extract of *Urtica dioica* has also shown hepato-protective activity against ischemia-reperfusion induced hepatotoxicity and it exhibited hepatoprotective effect by increasing the activity of paraoxonase, aryl-esterase and liver tissue catalase activity⁶⁹. The plant extract has shown significant hepatoprotective effect in isolated rat hepatocytes (*in vitro*) and in rabbits (*in vivo*) reduces the chances of hepatocellular degeneration and necrotic changes in CCl₄ induced hepatotoxicity^{70, 71, 72}.

Anti-hyperlipidemic Activity: The plant exhibit potential antihyperlipidemic activity as it lowers the concentrations of lipids and lipoproteins in blood. The dose of 150 mg/kg of the aqueous extract when supplemented for 30 days to rats feeding on normal or high fat diet, improved the blood lipid profile. The extract resulted to decrease in total cholesterol, and decreases the ratios of low density/high density cholesterol (LDL/HDL) ratios by lowering the content of LDL and plasma total apo-protein B⁷³.

The dose of 100 and 300 mg/kg of the ethanolic extract of the plant has shown significant reduction in the level of total cholesterol and LDL level in hypercholesterolemic rats ^{74, 75}.

Diuretic Activity: The aqueous extract of whole plant has been reported with the diuretic and natriuretic effects in rabbits ⁷⁶. The aqueous extract of aerial part of the plant was administered at low dose (4 mg/kg/h) and high dose (24 mg/kg/h) which shows diuresis effect by increase diuresis (11 and 84% respectively) and natriuresis (28 and 143% respectively). Hence, the plant has shown to have potential diuretic effect ⁷⁷. The diuretic effect is also found in *U. circularis* was approximately 101% and 65% respectively with 100 mg/kg ⁷⁸.

Antimicrobial Activity: Hexane extract of *U. dioica* is analyzed to have antimicrobial activity against a multi drug resistant bacteria - *Mycobacterium semegmatis*. It is also assessed for having potential anti-microbial activity against all the tested bacterial strains and its minimum inhibitory concentration (MIC) value was 125, 15.62, 31.25, 250, 31.25, 125 and 7.81 µg/ml against *Enterococcus faecalis*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Shigella flexneri* and *Salmonella typhi*, respectively ^{79, 80}. Aqueous extract from the leaves of *U. dioica* showed antibacterial activity against bacterias like *Bacillus cereus*, *Staphylococcus aureus*, *Staphylococcus epidermis*, *E. coli* and various other gram positive and gram negative bacteria ^{63, 45, 81}.

The seed oil extract of *Urtica pilulifera* also screened to have anti-bacterial property against *E. coli*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Staphylococcus aureus*, *Bacillus subtilis* and *Enterococcus faecalis* ⁴⁵ and the same extract from

Urtica cannabina showed effective antibacterial property against *E. coli* and *Staphylococcus aureus* ⁸².

Antifungal Activity: Extract of nettle leaves at different concentrations showed antifungal activity against *R. solani*, *Fusarium oxysporium*, *F. solani*, *Alternaria alternata*. The antifungal activity against is such that the growth of *A. alternata* was completely inhibited at 0.9% concentration. The extract produced great reduction in mycelial growth with this fungus at (0.3, 0.5 and 0.7) % with (30.5, 39.4 and 58.1) % percentage reduction ⁸³. Seed oil extract of *U. pilulifera* shows anti-fungal activity against *Candida albicans* and *Candida parapsilosis*. The reason of this activity is presence of Ketaconazole and Fluconazole ⁴⁵.

Antiviral Activity: Antiviral activity is exhibited by the root of *U. dioica* against HIV-1, HIV-2, CMV, RSV, and flu virus ⁸⁴.

N-acetyl glucosamine specific lectin from *U. dioica* is screened for having a strong anti- HIV activity, as it have high binding affinity towards HUT-8 cells, CD4+ and Molt/4 cells, the cells which are the binding sites for HIV-1 and HIV-2 virus ^{66, 85}.

Nematicidal Activity: The root exudates of *U. dioica*, when interplanted with tomato and bean shows reduction in the population of plant nematodes. The chemical compound produced by root in surrounding soil includes formic acid, that is highly toxic for nematodes and cause Nematicidal activity against *Pratylenchus*, *Aphelenchoides* and *Helicotylenchus* ⁸⁶.

Anthelmintic Activity: The methanolic extract of leaves of *U. dioica* exhibited anthelmintic activity against earth worms (*Pheretima posthuma*) with a dose dependent increase in anthelmintic activity of the extract at dose 25, 50, and 100 mg/ml ⁶⁷.

TABLE 1: PHYTOCHEMICALS AND PHARMACOLOGICAL ACTIVITY FOUND IN DIFFERENT SPECIES OF GENUS URTICA

Name of species	Plant Part	Phytochemicals constituents	Pharmacological activity
<i>Urtica pilulifera</i>	Seeds	Fatty acids- Palmitic, Stearic, Oleic, Linoleic acid ⁴⁵	Hypoglycemic, Antioxidant ¹²
	Leaf		Anti-arthritis ⁵²
	Herb		Anti-tumor ⁵³
	Root		Antioxidant ⁵³
<i>Urtica parviflora</i>	Leaf	Histamine, Serotonine, Acetyl-choline, Protein-Aspartic acid, serine, threonine, tryptophan, tyrosine ⁸⁷	Hepatoprotective, Wound healing, Hypoglycemic, Antioxidant, Cardioprotective, Nephroprotective ⁸⁷
<i>Urtica artichocaulis</i>	Aerial parts	Phenols- Chlorogenic phaselic Salicylic caffeic	Antirheumatoid arthritis, Anti-

		acids, Proto-catecheuic aldehyde Flavonoids-rutin, Quercitin, Luteolin ⁸⁸	inflammatory, Analgesic ⁸⁸
<i>Urtica fissa</i>	Aerial parts		Anti-hyperplasic ⁸⁹
	Roots	Steroidal compounds- β -sitosterol, daucosterol, palamitic acid, stigmasterol, α -spinasterol, potassium nitrate, cholestrine-5, 22-enyl-3 β -alcohol, stigmasterol-3-o- β -D-glucopyranoside ⁸⁹	
<i>Urtica laetivirens</i>	Herb		Anti-proliferative, Anti-apoptotic, Anti-arthritis ⁹⁰
<i>Urtica urens</i>	Aerial part	Amino acid-Aspartic acid, Threonine, Serine and Alanine ¹⁹ Chlorogenic acid ⁵⁷	Anti-inflammatory ⁵⁷ , Anxiolytic ⁹¹
<i>Urtica cannabina</i>	Dried fruit	Megastigm-anes-(+)-blumenol A,(+)-Dehydrovoifolial, Flavonoid glycosides-Isovitexin, Astragalin, Afzelin, Quercitin, Iso-Quercitin ⁴⁴	
<i>Urtica dioica</i>	Herbs	Phenols- Caffeoyl-malic acid, caffeic acid, Chlorogenic acid, tannins, amines, steroids ⁹² Amino acid- Aspartic acid, Threonine, Serine, Alanine ⁹² Phenols-Pinoresinol, Neolivil ⁹² Unusual lectins.	Hepato-protective, Antioxidant ⁶³ Antirheumatoid arthritis ⁶⁵
	Root	lignans - (+)-neolivil, (-)-secoisolaricresinol, dehydrodiconiferyl alcohol, isolaricresinol, pinoresinol, and 3, 4-divanillyl-tetrahydro-furan ²²	Antiprostatic hyperplasic ⁵⁴
	Leaf	Carotenoids - lutein, lutein isomers, β -carotene and β -carotene isomers, Amino acid- Valine, Threonine, Methionine, Isoleucine, leucine, Lysine, Phenylala-nine, Histidine and arginine ⁵⁴ c- and o-glycosides and proteins, ceramides, Vitamins, minerals, lignans, caffeic acid derivative, phenolic acids benzoic acids, cinnamic acids, flavonoid, coumarins, phytosterols ^{27, 28} . Vitamins B, C, K minerals such as calcium, iron, magnesium, phosphorus, potassium and sodium ²⁹ . carotenoid such as β -carotene, hydroxyl- β -carotene, lucoxanthin, lutein- epoxide and violaxanthin ³⁰	Anti-diabetic, Anti-inflammatory, Anti-apoptotic, Cytotoxic, Anti-cancerous ⁵⁷
	Seed	Fatty acid-Palmitic, stearic, Oleic, Linoleic and Eicosenoic acid, Amino acid Aspartic acid, threonine, serine Essential oils- Carvacrol, carvone, naphthelene, Phytol ¹⁹	Anti-diabetic, Anti-inflammatory ⁴⁷
	Stinging hairs	formic acid, histamine, serotonin ⁹³ , Acetylcholine, Leukotriene ³⁹	
	Inflorescence		Analgesic, Antiviral ^{84, 85}

CONCLUSION: The bioactive compounds isolated from the *Urtica* plant have been reported to show various medicinal, antiproliferative, and antimicrobial activities. So, the bioactive compounds isolated from the plant will help in designing new drugs and other pharmaceutical compounds to fight against widespread diseases like cancer, arthritis, Skin diseases, etc. Phytochemical studies on the plant revealed presence of various chemical compounds like phytosterols, saponins, flavonoids, tannins, proteins and amino-acids that showed beneficial potential of the plant to get commercially cultivated and get used for the natural drugs and medicine. Presence

of Vitamins, phenolic compounds, macro and micro-elements, tannin, flavonoids, sterols, fatty acids, carotenoids, chlorophylls, accorded the plant to get utilized in different ways. The bioactive compounds isolated from the plant will help in designing new drugs and other pharmaceutical compounds to fight against widespread diseases like cancer, arthritis, Skin diseases, etc.

ACKNOWLEDGMENT: We express our sincere thanks to Dr. R. A. Sharma, Associate professor, Department of botany, University of Rajasthan, Jaipur for providing the facilities.

CONFLICT OF INTEREST: Nil**REFERENCES:**

- Saini S, Kaur H, Verma B and Ripudaman, Singh SK: *Kigellia africana* (Lin) Benth – An Overview. *Natural Product Radiance* 2009; 8: 190-197.
- Ekor M: The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. *Frontiers in Pharmacology* 2014; 4: 177-79
- Kubde MS, Khadabadi SS, Farooqui IA and Deore SL: Report and Opinion 2010; 2(12): 24-31.
- Kavalali GM: *Urtica*: Therapeutic and nutritional aspects of Stinging nettles, Medicinal and Aromatic plants-industrial profiles 2003; 37: 1-6.
- Upton R and Dayu RH: Stinging nettles leaf (*Urtica dioica* L.): Extraordinary vegetable medicine, *Journal of herbal medicine* 2014; 3(1): 9-38.
- Pashazadeh M, Rahbani M and Zakhireh S: Effect of nettle oil *Urtica dioica* consumption on levels of blood glucose and lipids in Alloxan- Induced diabetic rats, *Bull Env. Pharmacol. Life Sci.* 2014; 2(10): 84-89.
- Bisht S, Bhandari S and Bisht NS: *Urtica dioica* L.: An undervalued, economically important plant, *Agricultural Science Research Journals* 2012; 2(5): 250-252.
- Mehri A, Ranjbar SH, Larjani B and Abdollahi M: A Systematic Review of Efficacy and Safety of *U. dioica* in the Treatment of Diabetes, *International Journal of Pharmacology* 2011; 7(2): 161-170.
- Nahata A and Dixit VK: Ameliorative effects of stinging nettle (*Urtica dioica*) on testosterone-induced prostatic hyperplasia in rats, *Andrologia* 2012; 44(1): 396-409.
- Khare CP: *Indian Medicinal Plants an Illustrated Dictionary*. New York: Springer Science Business Media LLC 2007; 5: 686-7.
- Virgilio ND, Papazoglou EG, Zofija J, Lonardo SD, Praczyk M and Wielgusz K: The potential of stinging nettle (*Urtica dioica* L.) as a crop with multiple uses. *Industrial crops and products* 2015; 68: 42-49.
- Kavalali G: Hypoglycemic activity of *Urtica pilulifera* in streptozotocin-diabetic rats. *J. Ethnopharmacol* 2003; 84: 241-5.
- Homolka K: *Urtica dioica*-Where nettles can be found, http://bioweb.uwlax.edu/bio203/2011/homolka_kail/habita t.htm, 2011.
- Pullalah T and Naidu KC: Antidiabetic Plants in India and Herbal Based Antidiabetic Research 2003; 310.
- Fleming T and Streit B: PDR for Herbal Medicines, Tec and Doc publisher 2000; 2: 729-31.
- Krystofova O, Adam V, Babula P, Zehnalek J, Beklova M and Havel L: Effects of various doses of selenite on stinging nettle (*Urtica dioica* L.). *Int J Environ Health Res Public Health* 2010; 7: 3804-3815.
- Gul S, Demirci B, Başer KH, Akpulat HA and Aksu P: Chemical composition and *in vitro* cytotoxic, genotoxic effects of essential oil from *Urtica dioica* L., *Bull Environ Contam Toxicol* 2012; 88: 666-71.
- Kumari J, Baunthiyal M and Singh A: Characterization of silver nanoparticles synthesized using *Urtica dioica* Linn. leaves and their synergistic effects with antibiotics, *Journal of radiation research and applied sciences* 2016; 9(3): 217-227.
- Lapinskaya ES, Kopyt'ko F-Ya, Timokhina AE, krapivkin AB, Levandovskii GS, Dargaeva DT and Sokol'skaya AT: Amino acids and cyclic dipeptides in stinging nettle (*U. dioica* and *U. urens*) homeopathic matrix tincture. *Pharmaceutical Chemistry Journal* 2008; 42(11): 49-52.
- Yunuskhodzhaeva NA, Abdullabekova VN, Ibragimova KS and Mezhlumyan LG: Amino- Acid Composition of *Urtica dioica* leaves and *Polygonum hydropiper* and *P. aviculare* herbs, *Chemistry of Natural Compounds* 2014; 50(5): 970-971.
- Itakura Y, Tsuruta SN, Kominami J, Tateno H and Hirabayashi J: Sugar- Binding profiles of Chitin-Binding lectins from the Hevein family: A comprehensive study. *International Journal of Molecular Sciences* 2017; 18(6): 1160.
- Franciskovic M, Perez RG, Orcic D, Medina FSD, Augustin OM, Simin N and Dukic NM: Chemical composition and immune-modulatory effects of *Urtica dioica* L. (stinging nettle) extracts, *Phytotherapy research* 2017; 31(8): 1183-1191.
- Zhang J, Lu H, Li J and Lu X: Study on chemical composition from the root of *Urtica fissa*, *Journal of Guangdong Pharmaceutical College* 2011.
- Guil-Guerrero J, Reboloso-Fucnts M and TonjaIsasa M: Fatty acids and carotenoids from stinging nettel (*Urtica dioica* L.). *Journal of Food Composition and Analysis* 2003; 16(2): 111-119.
- Hojnik M, Skerget M and Knez Z: Isolation of Chlorophylls from stinging nettle (*Urtica dioica* L.), Separation and purification Technology 2007; 57(1): 37-46.
- Orcic D, Franciskovic M, Bekvalac K, Svircev E, Beara I, Lesjak M and Mimica-Dukic N: Quantitative determination of plant phenolics in *Urtica dioica* extracts by high-performance liquid chromatography coupled with tandem mass spectrometric detection. *Food Chemistry* 2014; 143: 48-53.
- Yunuskhodzhaeva N, Abdullabekova AVN, Ibragimova KS and Mezhlumyan LG: Amino- Acid Composition of *Urtica dioica* leaves and *Polygonum hydropiper* and *P. aviculare* herbs. *Chemistry of Natural Compounds* 2014.
- Farag M, Weigend M, Lubert F, Brokamp G and Weissjohann L: Phytochemical, phylogenetic, and anti-inflammatory evaluation of 43 *Urtica* accessions (stinging nettle) based on UPLC-Q-TOF-MS metabolomic profiles, *Phytochemistry* 2013; 96: 170-183.
- Bhatia H, Manhas RK, Kumar K and Magotra R: Traditional knowledge on poisonous plants of Udhampur district of Jammu and Kashmir, India, *Journal of ethnopharmacology* 2014; 152(1): 207-216.
- Grevsen K, Frette XC and Christensen LP: Concentration and composition of flavonol glycosides and phenolic acids in aerial plants of stinging nettles (*Urtica dioica* L.) are affected by nitrogen fertilization and by harvest time, *Eur J Horti Sci* 2008; 73: 20-7.
- Harput US, Saracoglu I and Ogihara Y: Stimulation of lymphocyte proliferation and inhibition of nitric oxide production by aqueous *Urtica dioica* extract, *Phytother Res* 2015; 19: 346-8.
- Adhikari BM, Bajracharya A and Shrestha AK: Comparison of nutritional properties of stinging nettle (*Urtica dioica*) flour with wheat and barley flours, *Food science and nutrition* 2016; 4(1): 119-124.
- Zhang H, Li N, Li K and Li P: Protective effect of *Urtica dioica* methanol extract against experimentally induced urinary calculi in rats, *Molecular medicinal reports* 2014; 10: 3157-3162.
- Ullah R, Hussain I and Ahmad S: Diocanol; one new phenol derivative isolated and characterized from *Urtica dioica*, *Arabian Journal of Chemistry* 2017; 10(1): 1284-1286.

35. Shi A, He P, Rong A and Zhang J: Nutritional Components in the young leaves and stems of *Urtica cannabina* L. from inner Magnolia, Food Research and Development 2007; 05: 46.
36. Gubin KV and Hanina MA: Study of Chemical Composition of *Urtica cannabina* L. From Western Siberia, Chemistry of plant raw material 2009; 2: 89-92
37. Zhang H, Guo X, Han Y and Dong N: Extraction and identification of saponins from *Urtica augustifolia* leaves, Chinese Journal of Food Science 2008; 1.
38. Shilpi J, Khushbu S, Parashar A and Diksha G: A drug: *Urtica dioica*, Journal of Drug Discovery and Therapeutics 2017; 5(2): 17-22.
39. Kumar A, Bisht AS, Joshi S and Juyal D: Pharmacognosical and phytochemical study of a plant *Urtica parviflora* Roxb.- A review, Journal of Pharmacognosy and phytochemistry 2017; 6(3): 42-45.
40. Ji TF, Liu CH, Wang AG, Yang JB, Su YL, Yuan L et al.: Studies on the chemical constituents of *Urtica dioica* L. grown in Tibet Autonomous Region, Zhong Yao Cai 2007; 30: 662-4.
41. Ellnain-Wojtaszek M, Bylka W and Kowalewski Z: Flavonoids compounds in *Urtica dioica* L. Herba Pol 1986; 32: 131-7.
42. Bucar F, Britzmann B, Streit B and Weigend M: LC-PDA-MS-profiles of phenolic compounds in extracts aerial parts of *Urtica* species, Planta Med 2016; 72: 152.
43. Telo S, Halifeoglu I and Ozercan IH: Effect of stinging nettle (*Urtica dioica* L.) on antioxidant enzyme activities in rat model of mammary gland cancer, Iranian Journal of Pharmaceutical research 2017; 16: 164-170.
44. Aishan H, Baba M, Iwasaki N, Kuang H and Okuyama T: The constituents of *Urtica cannabina* used in uighar medicine, Pharmacological biology 2010; 48(5): 577-83.
45. Kan Y, Orhan I, Koca U, Özcelik B, Aslan S and Kartal M: Fatty Acid Profile and Antimicrobial Effect of the Seed Oils of *Urtica dioica* and *U. pilulifera*, Turkish Journal of Pharmaceutical Sciences 2009; 6(1): 21-30.
46. Korani B, Mirzapour A, Moghadamnia AA, Khafri S, Neamati N and Parsian H: The effect of *Urtica dioica* hydro-alcoholic extract on glycemic Inex and AMP-Activated protein Kinase levels in Diabetic Patients: A randomized single- Blind Clinical trial, Iran Red Crescent Med Journal 2016; 19(3).
47. Patel S, Parashar A and Udayabanu M: *Urtica dioica* leaves modulates muscarinic cholinergic system in the hippocampus of streptozotocin-induced diabetic mice, Metabolic Brain Disorders 2014; 30(3): 803-811.
48. Patel S and Udayabanu M: *Urtica dioica* extract attenuates depressive like behavior and associative memory dysfunction in dexamethasone induced diabetic mice, Metabolic Brain Disorders 2014; 29(1): 121-130.
49. Ahangarpour A, Mohammadian M and Dianat M: Antidiabetic effect of hydroalcoholic *Urtica dioica* leaf extract in male rats with fructose-induced insulin resistance, Iran J Med Sci. 2012; 37: 181-6.
50. Testai Silvio L, Vincenzo C, Giulia C, Paola N, Enrica M and Ivano N: Cardiovascular effects of *Urtica dioica* L. (Urticaceae) Root Extract in Vitro and in Vivo Pharmacological Studies, Journal of Ethano Pharmacology 2002; 81(1): 105-109.
51. Mukundi MJ, Mwaniki EN, Piero NM, Kelvin JK, Yusuf AA, John MK, Alex NK, Daniel AS, Peter GK and Alice MN: Potential Anti-diabetic effects and safety of aqueous extract of *Urtica dioica* collected from Narok Country, Kenya, Pharmaceutica Analytica Acta 2017; 8(5): 1-8.
52. Abudoleh S, Disi A, Qunaibi E and Aburjai T: Anti-Arthritic Activity of the Methanolic Leaf Extract of *Urtica pilulifera* L. on Albino Rats, American Journal of Pharmacology and Toxicology 2011; 6(1): 27-32.
53. Kader M, Mahmoud A, Motawa H, Wahba H and Ebrahim A: Antitumor Activity of *Urtica pilulifera* on Ehrlich Ascites Carcinoma in Mice, Asian Journal of Biochemistry 2007; 2(6): 375-385.
54. Tekin M, Ozbek H and Him A: Investigation of Acute Toxicity, Anti-inflammatory, and Analgesic Effect of *Urtica dioica* L., Pharmacology online 2009; 1: 1210-1215.
55. Hajhashemi V and Klooshani V: Antinociceptive and anti-inflammatory effects of *Urtica dioica* leaf extract in animal models, Avicenna J Phytomed 2013; 3: 193-200.
56. Johnson T, Sohn J, Inma W, Bieldes L and Raybun K: Liphophilic Stinging Nettle Extracts Possess Potent Antiinflammatory Activity, are not Cytotoxic and May be Superior to Traditional Tinctures for Treating Inflammatory Disorders. Phytomed 2013; 20(2): 143-147.
57. Levy A, Sivanesan D, Murugan R, Jornadal J, Quinonez Y, Jaffe M and Ratheina Velu A: *Urtica dioica* Induces Cytotoxicity in Human Prostate Carcinoma LNCaP Cells: Involvement of Oxidative Stress, Mitochondrial Depolarization and Apoptosis, Tropical Journal of Pharmaceutical Research 2014; 711-717.
58. Kopyt'ko YF, Lapinskaya ES and Sokol'skaya TA: Application, Chemical Composition, and Standardization of Nettle Raw Materials and related Drugs, Pharmaceutical Chemistry Journal 2011; 45(10): 32-41.
59. Kocasli S and Demircan Z: Herbal product use by cancer patients in both the pre and post surgery periods and during chemotherapy, African Journal Tradit. Complement Altern.Med. 2017; 14(2): 325-333.
60. Husein AI, Shtayeh MSA, Jondi WJ, Zatar NA, Ibrahim M, Reidah A and Jamous RM: *In-vitro* antioxidant and antitumor activities of six selected plants used in traditional Arabic Palestinian herbal medicine, Pharmaceutical biology 2014; 52(10): 1249-1255.
61. Guler ER: Investigation of chemo-prevent properties of *Urtica dioica* L., in MCF7 and MDA 231 breast cancer cell lines, New J Med 2013; 30: 50-53.
62. Keshavarz S, Ardekani MRS, Safavi M, Chahardouli B and Nadali F: *In-vitro* cytotoxic effect of *Urtica dioica* extracts on acute myelogenous leukemia cell line (Kg-1), Archives of medical laboratory sciences 2016; 2(1): 12-18.
63. Gulcin I, Kufrevioglu O, Oktay M and Buyuko-kuroglu M: Antioxidant, antimicrobial, antiulcer and analgesic activities of nettle (*Urtica dioica* L.), Journal of Ethnopharmacology 2004; 90(2): 205-215.
64. Roschek Jr B, Fink RC, McMichael M and Alberte RS: Nettle extract (*Urtica dioica*) affects key receptors and enzymes associated with allergic rhinitis, Phytother Res. 2009; 23(7): 920-926.
65. Liao JC, Wei ZX, Ma ZP, Zhao C, Cai DC: Evaluation of a root extract gel from *Urtica dioica* (Urticaceae) as analgesic and anti-inflammatory therapy in rheumatoid arthritis in mice, Tropical journal of Pharmaceutical research 2016; 15(4): 781-785.
66. Joshi B, Mukhija M and Kalia A: Pharmacognostical review of *Urtica dioica* L., International Journal of Green Pharmacy 2014; 8(4): 201-209.
67. Katakai MS, Murugamani V, Rajkumari A, Mehra PS, Awasthi D and Yadav RS: Antioxidant, hepatoprotective and anthelmintic activities of methanol extract of *Urtica dioica* L. Leaves, Pharm Crops 2012; 3: 38-46.

68. Sidana J, Deswal G, Nain P and Arora K: Liver toxicity and hepatoprotective herbs, *Int J Pharm Sci Rev Res* 2011; 9: 121-61.
69. Kandis H, Karapolat S, Yildirim U, Saritas A, Gezer S and Memisogullari R: Effects of *Urtica dioica* on hepatic ischemia-reperfusion injury in rats, *Clin (Sao Paulo)* 2010; 65: 1357-61.
70. Zarshenas MM, Farrokhi R, Mahshad A and Kiafar RM: A panoramic view of chronic liver diseases and natural remedies reported in Traditional Persian medicine, *urrent pharmaceutical design* 2016; 22(3): 350-364.
71. Ahmed K, Mueen K and Subramani P: *Urtica dioica* L. (Urticaceae): A stinging nettle, *Systematic reviews in pharmacy* 2014; 5(1): 6-8
72. Joshi BC, Prakash A and Kalia AN: Hepatoprotective potential of antioxidant potent fraction from *Urtica dioica* Linn. (Whole plant) in CCl₄ challenged rats, *Toxicological reports* 2015; 2: 1101-1110.
73. Daher CF, Baroody KG and Baroody GM: Effect of *Urtica dioica* extract intake upon blood lipid profile in the rats, *Fitoterapia* 2006; 77: 183-8.
74. Nassiri-Asl M, Zamansoltani F, Abbasi E, Daneshi MM and Zangivand AA: Effects of *Urtica dioica* extract on lipid profile in hypercholesterolemic rats, *Zhong Xi Yi Jie He Xue Bao* 2009; 428-33.
75. Saad B, Zaid H, Shanak S and kadan S: Antidiabetic medicinal plants, antidiabetes and anti-obesity medicinal plants and phytochemicals, *Springer International publication* 2017; 147-174.
76. Dizaye K, Alberzingi B and Sulaiman S: Renal and vascular studies of aqueous extract of *Urtica dioica* in rats and rabbits, *Iraq Journal of Veterinary Science* 2013; 27, 25, 31.
77. Tahri A, Yamani S, Legssyer A, Aziz M and Bnouham M: Acute diuretic, Natriuretic and Hypotensive Effects of Continues Perfusions of Aqueous Extract of *Urtica dioica* in the Rat, *Journal of Ethnopharmacology* 2000; 73(1): 95-100.
78. Basso AR, Marrassini C, Anesini C and Gorzalczany S: Acute hypotensive, diuretic and antioxidant activities induced by *Urtica circularis*, *European journal of Medicinal Plants* 2016; 14(2): 1-9.
79. Dar SA, Yousuf AR, Ganai FA, Sharma P, Kumar N and Singh R: Bioessay guided isolation and identification of anti-inflammatory and antimicrobial compounds from *Urtica dioica* L. (Urticaceae) leaves, *African Journal of Biotechnology* 2012; 11(65): 12910-12920.
80. Singh R, Hussain S, Verma R and Sharma P: Anti-Mycobacterial Screening of Five India Medicinal Plants and Partial purification of Active Extracts of *Cassia sophera* and *Urtica dioica* L., *Asian Pacific Journal of Tropical medicine* 2012; 6(5): 366-371.
81. Motamedi H, Seyyednejad S, Bakhtiari A and Vafaei M: Introducing *Urtica dioica*, A Native Plant of Khuzestan, As an Antibacterial Medicinal Plant, *Jundishapur Journal of Natural Pharmaceutical Products* 2014; 9(4): 15904.
82. Cheng Z, Li G and Qi L: Studies on Antimicrobial component and Activity of Seeds of *Urtica cannabina*, *Biotechnology* 2005; 05.
83. Hadizadeh I, Peivastegan B and Kolahi M: Antifungal activity of nettle (*Urtica dioica* L.), colocynth (*Citrullus colocynthis* L. Schrad), oleander (*Nerium oleander* L.) and konar (*Ziziphus spina-christi* L.) extracts on plants pathogenic fungi, *Pak. J. Biological Sciences* 2009; 12(1): 58-63.
84. Jan KN and Zarafshan K: Stinging nettle (*Urtica dioica* L.): a reservoir of nutrition and bioactive components with great functional potential, *Journal of food measurement and Characterization*, 2017; 11(2): 423-433.
85. Balzarini J, Laethem V, Hatse S, Froeyen M, Peumans W and Damme V: conserved glycosylation sites in HIV GP120: A new therapeutic concept to hit the achilles heel of HIV, *Journal of Biological Chemistry* 2005; 280: 41005-14.
86. Nasiri M, Azizi K, Hamzehzarghani H and Ghaderi R: Studies on the nematocidal activity of stinging nettle (*Urtica dioica*) on plant parasitic nematodes, *Archives of Phytopathology and Plant Protection* 2014; 47(5): 591-599.
87. Kumar S, Ahmad S and Harikumar SL: Pharmacognostical and Pharmacological studies on *Urtica parviflora* Roxb.- A review, *International Journal of Universal Pharmacy and Biosciences* 2014; 3(4): 179-184.
88. Wang M, Li K, Nie Y, Wei Y and Li X: Antirheumatoid arthritis activities and chemical compositions of phenolic compounds-rich fraction from *Urtica atrichocaulis*, An endemic plant to China, *Hindawi publishing corporation-Evidence based complementary and alternative medicines* 2012; 10.
89. Xiaocheng C, Shan H, Yuxing L, Lizhen Y, Linmao D, Shoujun Y and Qinglin Z: Inhibition of Spontaneous canine Benign Prostatic Hyperplasia by an *Urtica fissa* polysaccharide fraction, *Planta Medica* 2015; 81: 10-14.
90. Qian P, Yong YD, Ying SL, Bao-min F and Yong-qi W: Effect of *Urtica laetivirens* from different areas on cell proliferation and apoptosis in human rheumatoid arthritis synovial cells, *Lischizen medicine and Materia Medica* 2013; 02
91. Doukkali Z, Taghzouti K, Boudida E, Nadjmouddini M, Cherrah Y and Alaoui K: Evaluation of anxiolytic activity of methanol extract of *Urtica urens* in a mice model. *Behavioural and brain functions* 2015; 11: 19-24
92. Akbay P, Basaran AA, Undeger U and Basaran N: *In vitro* immunomodulatory activity of flavonoid glycosides from *Urtica dioica*, *Phytother Res* 2003; 17: 34-7.
93. Asgarpanah J and Mohajerani R: Phytochemistry and Pharmacological properties of *Urtica dioica* L., *Journal of medicinal plants research* 2012; 6(46): 5714-5719.

How to cite this article:

Rajput P, Chaudhary M and Sharma RA: Phytochemical and pharmacological importance of genus *Urtica* - A review. *Int J Pharm Sci Res* 2018; 9(4): 1387-96. doi: 10.13040/IJPSR.0975-8232.9(4).1387-96.

All © 2018 are reserved by International Journal of Pharmaceutical Sciences and Research. This Journal licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

This article can be downloaded to **ANDROID OS** based mobile. Scan QR Code using Code/Bar Scanner from your mobile. (Scanners are available on Google Playstore)