



A Literature Review on *Urtica dioica*: An Ordinary Creature with Extraordinary Features

Sheetal Rani ^a, Deepika Bhatia ^{a*} and Yogeeta^a

^aUniversity Institute of Pharmaceutical Sciences, Chandigarh University, Gharaun, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i54A33735

Editor(s):

(1) Dr. Asmaa Fathi Moustafa Hamouda, Jazan University, Saudi Arabia.

Reviewers:

(1) A. Vijaya Anand, Bharathiar University, India.

(2) Ruqaya Mohammed Al-Ezzy, Al-Nahrain university, Iraq.

Complete Peer review History, details of the editor(s), Reviewers and additional Reviewers are available here:

<https://www.sdiarticle5.com/review-history/77567>

Review Article

Received 01 October 2021

Accepted 05 December 2021

Published 09 December 2021

ABSTRACT

Urtica dioica Linn is a popular medicinal plant that is native to Europe and is very commonly found in Temperate Asia, Western and Northern Africa, America and New Zealand. It is a traditional medicine used widely in various kind of treatment as was believed to be galactagogue – a substance that promotes lactation. It is well recognized in Ayurveda due to its multidimensional pharmacological and therapeutic effects as the compress of nettle help to revive Rheumatoid arthritis, Muscle pain, Sciatic and as Rasaan tonic as it constitutes various beneficial phytochemicals. It is popularly known for its stinging action. Its chemical compounds are highly irritating mainly histamine. Traditionally, the leaves and roots are used as a blood purifier, emmenagogue, nasal hemorrhage, eczema and diarrhea.

Keywords: *Urtica dioica*; nasal hemorrhage; eczema; diarrhea.

1. INTRODUCTION

Medicinal plants are well known due to their useful action whether therapeutic or other purposes like cosmetic or diagnosis. *Urtica dioica*

is as Kuksha, and Bichu or you can commonly call it Bichu Butti. It is broadly described and used in Ayurveda. It grows at a height up to 2-4 meters and it produces pointed leaves and flowers that are white to yellow and it belongs to

*Corresponding author: E-mail: Bhatia.deepika89@gmail.com;

the family Urticaceae [1]. It is well known for its edible leaves but these leaves when coming in contact as raw form they cause an irritation to the skin like itching and redness or a burning like sensation. The origin of its name is derived from the Latin verb "urere" which means burn and dioica means "two houses" so urere is because of the stinging action of the hairs and two houses because it either contains male or female flowers [2]. It is a herbaceous, perennial and flowering plant. As its pharmacological and therapeutic actions are well defined in Ayurveda it is a traditional plant known as Vriscali in the Sanskrit language. It does have yellow creeping rhizomes, toothed leaves and stems are covered with numerous the stinging part and trichomes also [3]. For a good pharmacological activity, a plant needs chemical constituents filled with therapeutic efficacy and nutrition. It possesses alkaloids, tannins, flavonoids and it is also a medicinal plant that consists of various secondary metabolites that have various pharmacological effects on the body. *U. dioica* is not very popular but is a very useful medicinal plant [4]. It is also known as chronic or acute or even degenerative can be prevented. This genus is a large group of the plants that comprises of almost 2,625 species in the Urticaceae family. By this plant a wide range of diseases or problems can be cured [2]. and [4].



Fig. 1. Leaves of *Urtica dioica*

It is just an ordinary plant which can be used for other purposes for example it is used in Yarn making and it is also used as a galactagogue for cow by rural people [1].

2. BOTANICAL DESCRIPTION

2.1 Taxonomy

- **Kingdom-** Plantae.
- **Subkingdom** – Tracheobionta.
- **Super division** – Spermatophyta.
- **Division** – Magnoliophyta.
- **Class** –Magnoliopsida.
- **Subclass** – Hamamelidae.
- **Order** –Urticales
- **Family** – Urticaceae
- **Genus** – *Urtica* L.
- **Species** –*Urtica dioica* L.

2.2 Habitat

Urtica dioica L. is a small, evergreen and perennial plant. It is native to cold regions of Europe and is abundantly available in Northern India and now it grows worldwide. It is abundantly found in cooler temperate regions of the world – Africa, Asia, America and Europe. It is widely distributed in Northern regions of Europe and many regions of Asia but less in Southern Europe and North America. It is widely distributed in the USA and Canada, where it is found in other states but not in Hawaii and also in Northernmost Mexico. In Pacific Northernmost it grows at abundance and especially in the regions where annual rainfall is high. The distribution of *U. dioica* is also found in Europe and Britain and also in Faroe Islands, Iceland, Sweden, Greenland and Bulgaria. It grows in Himachal Pradesh at an elevation of 3,000 meters. Additionally, these species are found in America, Nepal and other Asian countries [5]. It grows very well in soil rich in Nitrogen. It blooms in the month of June to September every year. This plant is green and erect and the leaves are in opposite manner, heart-shaped at its base, oblong or ovate. The color of its flowers can be reddish-brown to greenish-white. It occurs as racemes in the axils of the upper leaves, the plant possesses either male or female flower [6].

2.3 Morphological Characteristics

If we will talk about its appearance *Urtica dioica* is an erect, herbaceous plant. And it is widely known for its painful and unpleasant stinging hair on the surface of its leaves and stem. Its sex identification can be done by its appearance that as if the flowers are yellow or purple then it's the male parts and if it is green or white it's the female part of the plant [7].

2.4 Reproduction

Urtica dioica plants reproduce by very popular way of reproduction in plants that is Wind Dispersal of Seeds and creeping rhizomes (horizontal underground stems) and it grows in dense clumps often forming large colonies [7].

This plant is also used for external purposes that is skin problems, sciatica, hemorrhoid, gout and also for hair purposes [10]. A large prostate gland can be a big problem but its roots can be very beneficial in such case. Roots can also be used in other problems like gout, chickenpox and rashes. It is externally applied to bruises [11]. So, let us recall some points of its history. In the first century, Pedanius Dioscorides a Greek Physician and Galen reported that the leaves of *U. dioica* consist of the diuretic as well as laxative properties. Other traditional uses include asthma treatment, spleen illness and pleurisy [10]. It is also used as a weight loss aid [12]. Nowadays in Germany this plant is being sold for prostate problems and as a diuretic [13]. Since, it is being used for the treatment of rheumatism, gout, arthritis, eczema, UTIs, kidney stone, hay fever, anemia and early stages of prostate enlargement for hundreds of years. The condition of prostate enlargement is known as Benign Prostatic Hyperplasia [13]. As this was being used for rheumatism for a long period of time in recent clinical studies it showed that this plant

possesses possible anti-rheumatic properties [14]. According to that study it was reported by Riehemannet. *Et al.* that this plant possesses active chemical constituents that have the capability to inhibit Nuclear Factor Kappa Light Chain Enhancer of Activated B cells activation. Actually, this factor is a protein complex that controls DNA transcription and the production of cytokines [15]. Some other studies claim that as many as 80% of European Men with BPH were treated with the herbal remedy of this plant to control its symptoms including saw palmetto and roots.[16]. It was also mentioned that the roots can be very effective when used with other herbs and it was highlighted that better results can be found if given in combination with saw palmetto. It can be an effective treatment against BPH and treat urinary problems including a reduction in urinary flow, incomplete urine excretion; post urination dripping and also the constant urge to urinating.

Nettle also show different important pharmacological effects including Anti-inflammatory effects and hypoglycemic effects in preclinical studies. The hydro alcoholic extract of this plant at 100 and 200 mg/kg can show a significant anti-diabetic effect against those suffering from fructose-induced diabetic patients [17]. It can also show other pharmacological significances including anti-viral, to treat hay fever and is also be used as an expectorant [18].

Table 1. Ethnomedicinal Uses of *Urtica dioica* Linn and origin

Sr. No.	Part used	Uses	Region	References
1.	Leaves	As Anti-hemorrhagic agent.	Europe.	[7].
2.	Leaves	Galactagogue.	Himachal Pradesh, India.	[7].
3.	Dried Fruits.	Anti-Arthritis.	USA.	[8].
4.	Leaves.	Astringent.	Iceland.	[8].
5.	Leaves.	Blood Builder.	Europe.	[8].
6.	Aerial Plant.	Cleansing Tonic and Purifier.	Nepal.	[9].
7.	Leaves.	Crucial ingredient of traditional tea.	Mexico.	[9].
8.	Seeds.	Skin Problems.	Greenland.	[10].
9.	Roots.	Sciatica.	Nepal.	[10].
10.	Leaves.	Hemorrhoid.	Mexico.	[10].
11.	Whole Plant.	Gout.	India.	[10].
12.	Roots.	Hair Purposes.	India.	[10].
13.	Roots.	To treat large prostate gland.	Canada.	[11].
14.	Roots.	Gout and Rashes.	Nepal.	[11].
15.	Roots.	Chicken Pox.	Mexico.	[11].
16.	Roots.	Applied to bruises.	India.	[11].

3. PHYTOCHEMISTRY

3.1 Phytochemical Constituents

There are a lot of plants in this world known for their appearance, fragrance, beauty and medicinal uses. When it comes to medicinal uses the great focus is always its secondary metabolites which are going to be used as a medicine and to prepare a formulation for any medicinal purpose. So, phytochemical screening can be performed to understand the phytochemicals [1]. As, phytochemicals directly affects the Pharmacological properties it is important for a research to know about the phytochemical compositions of a medicinal plant [25]. The most common analytical techniques for analysis are Gas Chromatography-Mass Spectrometry, High Performance Liquid Chromatography and Other Chromatographic Techniques [27].

In the case of *U. dioica* it is also similar to other plants as its different parts have their own significance for their important chemical constituents [26]. But, this plant is more interesting than any other plant and the reason is of course its stinging action that is produced by its stinging hairs. So, the main cause of this stinging is the chemicals present in the leaves, stem or whole plant which causes irritation and burning to the skin. These chemicals are formic acid and histamine [1]. The leaves of the *Urtica* are popularly used as a herbal tea to treat and prevent various physiological abnormalities as mentioned above. It was reported that leaves constitute caffeic acid, high content of chlorophyll, chlorogenic acid and other pigments [26]. There are no reports published for the presence of alkaloids. Alguttin that is found in the rhizome is a series of long-chain amino acid linkage. [8]. The structure was also confirmed in the study as a member of the protein family as it

Table 2. Phytochemistry of different parts of *U. dioica*

Sr. No.	Part	Secondary metabolites	Examples	References
1.	Leaves. Roots. Seeds.	Flavonoids	Iso-rhamnetin. Kaempferol. Quercetin. Iso-quercetin. Astragaln.	[29],[33].
2.	Leaves. Roots.	Carotene	β - Carotene. Hydroxy beta carotene. Lutein epoxide.	[34]., [35].
3.	Leaves. Rhizomes.	Phenolic Compounds	Phenyl propane. Caffeic acid. Chlorogenic acid. Scopoline.	[28].
4.	Seeds. Leaves. Rhizome. Root.	Essential Oils	Ester. Ketone. Acetophenone. Ethyl ketone	[35].
5.	Seeds Leaves Rhizome Stinging Hairs	Other	Vitamin C Vitamin B Vitamin K Fatty acids Amino Acids (Agglutinin in rhizomes). Histamine. Formic Acids. Caffeic acid. Chlorogenic acid.	[1],[4].,
6.	Seeds Leaves	Minerals	Calcium. Iron. Magnesium Phosphorus Potassium Sodium Nitrogen traces.	[30],[31].

Table 3. Parameters of phytochemicals [36]

Sr. No.	Part Used	Parameter	Content
1.	Harvested Up-growth	Moisture (%)	7.04±0.77
2.	Leaves	Crude Protein (%)	33.77±0.35
3.	Leaves	Crude Fiber (%)	9.08±0.14
4.	Leaves	Crude Fat (%)	3.55±0.06
5.	Leaves	Total Ash (%)	16.21±0.54
6.	Seeds	Carbohydrates (%)	37±0.72
7.	Leaves	Calcium (%)	168.77±1.47
8.	Leaves	Iron (%)	227±0.21
9.	Leaves	Tannins (%)	0.93±0.01
10.	Leaves	Polyphenols (%)	3496±0.56
11.	Leaves	Carotenoids (%)	307.24±0.13

does have two herein like domains that are present in each subunit [7].

3.2 Phytochemical Analysis

• GC-MS Analysis

In GC-MS analysis it was found that it contains derivatives of cinnamic acid, homovanilyl alcohol, coumarins and some phenolic compounds were found using trimethylsilyl ester. These phenolic compounds yielded 34 compounds and structure interpretation was done by Mass Fragmentation and then was compared with commercially available preparations.[11].

Other compounds found in GC-MS analysis are homovanilyl alcohol, vanillic acid, vanillin, (+) isolaricinresinol, (-) secolaricinresinol. By using methyl iodide, methylated derivatives of phenols and flavonoids from *U. dioica* with other plants were prepared by methyl iodide and analysis was done. In GC-MS analysis of *U. dioica* with methanolic leaf extract the presence of homo vanillic acid (3.0ng/mg), vanillic acid (2.5ng/mg) and Ferulic acid (574ng/mg) was found [27].

• HPLC Analysis

On preparative HPLC analysis using Sephadex column aqueous extract of *U. dioica* leaves yielded two fractions. One was found to contain the proteins (glycoproteins) & carbohydrates. In the study of Blumenthal et al. an experiment was attempted to study the link between proteins and carbohydrates by hydrolysis with NaOH and NaBH₄ and it was found that both are connected via serine and O-galactosidic linkages and methylation was also done with the help of which it was reported that glycoproteins were branched but unfortunately in this methylation the study on

the second fraction was reported to be unsuccessful [32].

In HPLC studies it was also reported that roots showed the presence of trans-neo-olivil, a lignans glycoside [29].

3.3 Other Traditional Methods

Traditional methods of extraction include steam distillation and Soxhlet percolation with organic solvents [33]. These methods have a lot of problems in them like degradation, loss of active compounds which were biologically active and time-consuming etc [35].

3.4 Phytochemical Composition of *Urtica dioica*

There are a lot of factors that can affect the chemical composition of nettle plants like variety, climate, genotype, and vegetative stage, and soil, time of harvesting, processing, storage and treatment. This plant is a rich source of nutrients.

A comprehensive study has reported that harvested up growth contain approximately 90% of moisture, 3.7% proteins, 2.1% ash, 0.6% fats, 6.4% dietary fibers and carbohydrates up to 7%. While, powder of nettle leaves contains on average 30% proteins, 40% non-nitrogen compounds, 4% fats and 15% of ash.

4. PHARMACOLOGICAL ACTION

Extract from *Urtica dioica* has a broad-spectrum pharmacological activity. It does have highly acting antioxidants this plant source is a rich antioxidant plant which has good activity as an antioxidant can prevent various free radicals induced problems in the body. It also acts as a

good insect repellent and good galactagogue. Acute urticaria and angioedema give well response to Histamine 1 Receptor.

- **Different Pharmacological Actions to Cure or Prevent Physiological Damages or Abnormalities**

As it consists of various bioactive compounds like Alkaloids, Flavonoids, Tannins, Fatty acids, Tannins, Volatile Oils, Polysaccharides, Iso Lectin, Sterols, Terpenes, Proteins, Vitamins and Minerals. Its root extract is used to treat Proplastic hyperplasia. Its seeds are cultivated in rows that are one inches apart in spring. The size of its seeds is almost 1.3 by 1.0mm. Its hydro-alcoholic extract is used in oxidative stress-induced Type 2 Diabetes Mellitus as a treatment. It also has therapeutic effects on Arthritis, in Inflammation and in Hypoglycemia [36].

- **Antioxidant Action**

Antioxidants are those agents which help in the scavenging of free radicals and hence help in the prevention of the deleterious effect of free radicals. Free radicals cause damage to the various parts of the body and hence can damage various systems of the body and disturb body homeostasis. This plant extract possesses antioxidant properties [36].

- **Anti-diabetic Action**

In the study of Korani *et al.* it was found that 250mg/kg hydro-alcoholic extract of the leaves of *U. dioica* was used to prevent the severity of diabetes in STZ induced diabetes in rats and it showed a reduction in complications like behavioral changes and cognitive dysfunction and oxidative stress. This plant also possess anti-diabetic mainly leaves possess this action. Leaf extract can help to decrease serum glucose levels. Its extract shows a significant increase in insulin secretion and hence decreases blood sugar level. In another study, it has been shown that the cold methanolic leaf extract (250mg/kg) can show anti-hyperglycemic action in Alloxan-induced diabetes [37].

- **Hepato-protective Action**

In the study of Joshi B. *et. al.*, the 150mg/kg extract of leaves of the plant show significant hepato-protection in isolated liver cells of rats (in vitro) lower down the chances of degeneration of hepatic cells and necrosis in CCl₄ induced

hepatotoxicity. The ability of an agent or drug or a molecular entity to shoe action against liver damage are referred as hepato-protective. Again, leaves help to cure these kinds of damages tap liver. Leaf extract of *U. dioica* shows a very good hepato-protective action by decreasing levels of ALT (Alanine transaminase), AST (Aspartate phosphatase), ALP (Alkaline phosphatase) and MDA (Malon di-aldehyde). Another part of the plant that are seeds also show hepato-protection with ischemia–reperfusion and help to protect liver by increasing the activity of enzymes like aryl esterase and liver tissue catalase activity. [38].

- **Anti-inflammatory Activity**

In the study of Patel S. *et al.* it was reported that extract of Mt-OH extract seed oil of *Urtica dioica* at a dosage of 200mg/kg inhibit the twitches in the abdomen induced by acetic acid and 400mg/kg inhibit inflammation in paw edema induced by carrageenan and a positive result was found. It also possesses anti-inflammatory action. In a study it has been found that Mt-OH extract can show activity to inhibit acetic acid-induced model on rats. Actually, this can be caused due to the anti-inflammatory effect of the plant by inhibition of NF-kB activation. Actually, the hair in the leaves and stem of the plant consist of different kinds of chemicals that can lead to pain relief and show action against inflammation. Due to its action against inflammation, it can be used in Arthritis. Secondary metabolites are mainly responsible for anti-inflammatory action is Glycosides [39].

- **Antimicrobial Activity**

In a study by Modarresi A. *et al.* it was reported that the ethyl acetate extract was tested on 28 bacteria that were three yeast strains and seven fungal isolates and exhibited the highest inhibition of pathogenic bacteria that are *Bacillus cereus*, MRSA & *Vibrio para-haemolyticus*. MIC for para-haemolyticus was reported to be 0.13mg/ml. It was also reported that only 47.06% of extract inhibited Gram-negative that was 8/17 and 63.63% only inhibited Gram-positive bacteria that is 7/10. As microbial infections are rising day by day so intake of this valuable herb can be very useful to fight against these microbial infections. The leaf extract of nettle can be very useful against both Gram-positive as well as Gram-negative bacteria. The bacteria that can be inhibited with the help of this herb are – *Staphylococcus aureus*, *E. coli*, *Klebsiella* spp.

Salmonella spp. and Pseudomonas spp. But the action can vary with bacteria [40].

- **Antiviral Activity**

In the study of *et al.* they used *U. dioica* in combination with *Sambucus nigra* L. and used FIV (Feline Immunodeficiency Virus) as a model and found that at some concentration it showed anti-viral activity against FIV as assayed by forming of syncytia using CrFK. As this plant can deal with so many physiological problems it has been found that it can also deal with viral infections. In some studies, it has been noticed that it can work against FIV, a virus that has been widely spread in domestic cats which can be similar to a very popular and lethal virus HIV (Human Immunodeficiency Virus) [41].

- **Diuretic Activity**

In a study by Dizaye K. *et al.* it was found that aqueous extract of the whole plant was administered at a dose of 4 mg/kg showed diuresis in rabbits and significant diuretic property was found. As *U. dioica* is a herbal plant so it can act as a natural diuretic due to some beneficial constituents. It has been found that it is a loop diuretic and then it can cause hypokalemia by the excess output of Potassium in urine. This plant has been reported for its remarkable diuretic action. A wide range of

phytochemicals such as Alkaloids, Tannins and Phenols which possess the diuretic action are present in *U. dioica*. [42].

- **Immunomodulatory Action**

In the study of Beatriz S. *et al.* they malnourished Wistar rats for 21 days and then they were treated with extract of the leaves *U. dioica* at a dose of 0.2g/ml and was found to give a significant immuno-modulatory action.

Immuno-modulatory action of this plant is due to flavonoids. Mainly in those who were suffering from a deficiency and chronic granulomatous disease. For the management of HIV infection an oral immune-modulator has been reported that consists of flavonoids extracted from *U. dioica*. When it is used as an immune-modulator it can produce several allergic substances that can cause edema and also inflammation [43].

- **Anti-cancer Activity**

In the study by Kopytko Y *et. al* the extract of the aerial parts of the plant was used and it exhibited the highest cytotoxicity against breast infection and it was found that 85% of cells were dead at 500µg/ml and due to the phenolic content present and was observed to inhibit mutagenesis in humans.

Table 4. Phytochemicals and Pharmacological Action of *Urtica dioica*

Sr. No.	Part of the plant	Phytochemical constituents	Pharmacological Activities	References
1.	Seeds Leaf Herb Root	Fatty acids-Palmitic acid, Stearic acid, Oleic acid Linoleic acid	Hypoglycemic Agent Antioxidant Anti-tumor	[45].
2.	Leaves Stem	HT 5-HT Ach Protein Aspartic acid Serine Threonine Tryptophan Tyr	Hepato protective Wound healing Hypoglycemic Agent Anti-oxidant Cardio-protective. Nephro-protective.	[46].
3.	Aerial Parts	Phenols- Cholinergic phaselic. Salicyliccaffeic acids Proto-catechetic aldehyde Flavonoids-	Anti-rheumatoid arthritis, Anti-inflammatory Agent Analgesic.	[47].

Sr. No.	Part of the plant	Phytochemical constituents	Pharmacological Activities	References
		Rutin, Quercetin, Luteolin		
4.	Aerial Parts Roots	Steroidal compounds- β-sitosterol, Daucosterol Palamitic acid, Stigmasterol, A- spinasterol KNO ₃ , Cholestrine-5 22-enyl-3β-alcohol Stigmasterol-3-o-β-D- glucopyranoside.	Anti-hyperplasic.	[48]. and [49].
5.	Aerial Parts	Amino acids- Aspartic acid, Threonine, Serine, Alanine, Chlorogenic acid.	Anti-proliferative, Anti- apoptotic, Anti-arthritis, Anti-inflammatory, Anxiolytics.	[50]. and [51].
6.	Dried Fruit	Megastigm-anes (+)- blumenol A, (+)- Dehydrovoifolial, Flavonoid glycosides- Isovitexin, Astragalin, Afzelin, Quercetin, Iso- Quercetin.	Anti-arthritis, Anti- inflammatory, Anxiolytics.	[52]. and [53].
7.	Herb Root Stalks Leaves	Phenols-Coffey-malic acid, Caffeic acid, Chlorogenic acid, Tannins, Amines, Steroids, Amino acids- Aspartic acid, Threonine, Serine & Alanine Phenols-Pinoresinol, Neolivil, Unusual lectins.	Hepato-protective. Anti-oxidants Anti-rheumatoid arthritis.	[54]. and [55].
8.	Root	β-carotene and its isomers Amino acids- Valine, Threonine, Methionine, Isoleucine, Lysine Phenylala-nine, Histidine, Arginine and Glycosides.	Anti-prostatic hyperplasic.	[56]. and [57].
9.	Leaves	Carotenoids-lutein Lutein isomers. Glycosides Proteins Ceramides Vitamins-B, C & K. Minerals Lignans Phenolic acid Benzoic acid Cinnamic acid Flavonoids Coumarins	Anti-diabetic, Anti- inflammatory, Anti- apoptotic, Cytotoxic, Anti-cancerous.	[58].

Sr. No.	Part of the plant	Phytochemical constituents	Pharmacological Activities	References
		Phytosterols Minerals- Ca, Fe, Mg, P, K & Na. Carotenoids, Hydroxyl- β - carotene, Lucoxanthin, Lutein-epoxide, Violaxanthin.		
10.	Seeds	Fatty acids- Palmitic acid, Stearic acid Oleic and Linoleic acid Eicosanoid acid Essential oils- Carvacol, Carvone, Naphthalene HT, 5-HT, Formic acid. Ach, Leukotriene.	Ant-diabetic, Anti- inflammatory	[59].
11.	Stinging Hairs	Formic acid HT 5-HT Serotonin. Ach. Leukotriene.	Analgesic. Anti-viral.	[60].

In today's world cancer has been one of the greatest lethal diseases and as his herb consist of the antioxidant property so it can be effective against free radical-induced Cancer. Several studies have been found that has demonstrated that *U. dioica* possess Anticancer activity particularly it works against colon, gastric, lungs, prostate and breast cancer [44].

5. STINGING ACTION OF NETTLE




As mentioned earlier in this review Nettle is well known for its stinging action, it causes inflammation on the skin mostly hands come in





contact with *U. dioica* that can cause a burning sensation. This mechanism is known as Contact Urtica [61]. This contact of skin with leaves or stem or even whole body of the plant can lead to irritation, itching and pain by few biochemical presents in it. These active chemicals which produce this unpleasant sensation are – Histamine, Serotonin and Acetylcholine [62]. The solution to get rid of that pain is – Anti itching drugs as creams, these creams consist of Antihistaminic agents, Hydrocortisone that provides relief [63]. Cannabis leaves are also used to provide relief only by rubbing it on the affected region [64].






Fig. 2. Cannabis For relief from the stinging of Nettle and UrticaUrens with Anti-histaminic Property [65]. and [66]

Table 5. Different Formulations of U. dioica with uses and manufactures

Sr. No.	Formulations	Uses	Manufacturer	Pictures	References
1.	Prostate Blend SP-16 Vegetarian Capsule.	Dietary Supplement	SOLARAY		[67].
2.	Dry Nettle Tea Leaves	Antioxidant	Sorich Organics		-
3.	Organic Nettle Leaf.	Antihypertensive Joint pain treatment	The Indian Chai.		

Sr. No.	Formulations	Uses	Manufacturer	Pictures	References
4.	Plant-Based Di-hydrotestosterone Blocker.	Anti-inflammatory action Hair fall reduction	OZIVA		
5.	Plant-Based Super-food, Nettle Leaves.	Allergy Relief. As Diuretic. Relives Body Pain. Anti-oxidants. Reduce inflammation. Aids sugar control.	SORICH		
6.	Trexgenics Stinging Nettle Veg Capsule	Promotes hair growth and helps to reduce hair fall. Acts as a powerful DHT blocker. Improves prostate health.	Trexgenics		
7.	<i>Urtica dioica</i> MT	Used for catarrh, leucorrhoea, bronchial hemorrhage blood-splitting, uterine hemorrhage, nephritis, hematuria and menorrhagia.	Dr. William Schwabe India.		

Sr. No.	Formulations	Uses	Manufacturer	Pictures	References
8.	Bizpression Nettle Extract	The recommended usage level of extract should not exceed 2% when you add it to skincare and cosmetic formulas. It is formulated only for external purpose.	Bizpression.		
9.	Jaivik Nettle Patti	As antihypertensive. Promotes weight loss. Boost our immune system. Reduce the symptoms of PMS.	Niyama®		
10.	Devinez Stinging Nettle Essential Oil	Makes our hair shiny. Can be used as leave in conditioner. Sooths our feet.	DEVINEZ		

6. CONCLUSION

So, from above-mentioned information in this review article, it has been found that *Urtica dioica* do have both therapeutic as well as dietary potential. It has also been found out that this medicinal herb is mentioned in Traditional Indian Pharmacopeia Ayurveda. As it contains a huge number of phytochemicals that do have pharmacological potential and is very effective against so many physiological problems. Different pharmaceutical formulations are being used in different dosage forms depending upon the conventional route of administration.

DISCLAIMER

The products used for this research are commonly and predominantly use the products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by the personal efforts of the authors.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Akg ul A, et al. Spies Science and Technology Association Food Technology, Publ;No:15, Ankara, Turkey; 1993. DOI:10.4236/fns.2012.31010
2. Baytop T, et al. Therapy with Plant in Turkey. Istanbul University, Faculty of Pharmacy (Second press). Nobel Medicine Bookstores, Istanbul, Turkey; 1989. DOI:10.4236/acs.2014.44050
3. Wetherilt H, et al. Isirgan Out Yaprak Ve Tohumlarının Besleyici  ozellikleriveAntit  um  ore Etkileri. PhD Thesis, (Turkish). Hacettepe University. Graduate Institute of Health Science, Ankara, Turkey; 1989.
4. Does MP, et al. Characterization of Urticadioica agglutinin Iso lectins and the encoding gene family. Plant Mol Biol. 1999;39(2):335-47. DOI:10.1023/a:1006134932290.
5. Le Moal M.A. et al. Urticadioica agglutinin, a new mitogen for murine T lymphocytes:unaltered interleukin-1 production but late interleukin 2-mediated proliferation. Cell Immunol. 1988; 115(1):24-35. DOI:10.1016/0008-8749(88)90159-1.
6. Wagner H. et al. Biologically active compounds from the aqueous extract of Urticadioica. Plant Med. 1989;55(5):452-4. DOI:10.1055/s-2006-962062.
7. Stinging Nettle – Urticadioica - Montana Plant Life.
8. Bombardelli E, et al. *Urticadioica* L. Fitoterapia. 1997;68:387-402.
9. Ji H.F. et al. Natural products and drug discovery;Can thousands of years of ancient medical knowledge lead us to new and powerful drug combinations in the fight against cancer and dementia? Rep. 2009;10(3):194-200. DOI:10.1038/embor.2009.12
10. Riehemannet K. et al. Plant extracts from stinging nettle (Urticadioica), an antirheumatic remedy, inhibit the pro-inflammatory transcription factor NF-kB. FEBS Lett. Jan;1999;442(1):89-94. DOI:10.1016/s0014-5793(98)01622-6.
11. Randall C, et al. Randomized controlled trial of nettle sting for treatment of base-of-thumb pain. J R Soc Med;2000;93(6):305-9. DOI:10.1177/014107680009300607.
12. Ahangarpour A, et al. Antidiabetic effect of hydro-alcoholic Urticadioica leaf extract in male rats with fructose-induced insulin resistance. Iran J Med Sci. 2012;37(3):181-6. DOI:10.30466/vrf.2018.33079. Epub 2018 Dec 15.
13. AlShuwayeb MH et al. Molecular and chemical therapeutic features of Urtica species. Eur Sci J 2013;9(24):253-61. DOI:https://doi.org/10.19044/esj.2013.v9n24p%25p
14. Meral I. et al. Effects of *Nigella sativa* L. and *Urticadioica* L. on selected mineral status and hematological values in CCl₄ - treated rats. Biol Trace Elem Res.

- 2003;96(1-3):263-70.
DOI:10.1385/BTER:96:1-3:263.
15. Turkdogan MK, et al. The role of *Urticadioica* and *Nigella sativa* in the prevention of carbon tetrachloride-induced hepatotoxicity in rats. *Phytother Res.* 2003;17(8):942-6.
DOI:10.1002/ptr.1266
 16. Kanter M, et al., Effects of *Nigella sativa* L. and *Urticadioica* L. on lipid peroxidation, antioxidant enzyme systems and some liver enzymes in CCl₄ -treated rats. *J Vet Med A Physiol Pathol Clin Med.* 2003; 50(7):383.
 17. Ozen T, et al. Modulatory effect of *Urticadioica* L. (Urticaceae) leaf extract on biotransformation enzyme systems, antioxidant enzymes, lactate dehydrogenase and lipid peroxidation in mice. *Phytomedicine.* 2003;10(5):405-15.
DOI:10.1078/0944-7113-00275
 18. Legssyer A. et al. Cardiovascular effects of *Urticadioica* L. in isolated rat heart and aorta. *Phytother Res.* 2002;16(6):503-7.
DOI:10.1002/ptr.1087.
 19. Gülçin I. et al.. Antioxidant, antimicrobial, antiulcer and analgesic activities of nettle (*Urticadioica* L.). *J Ethnopharmacol*;2004;90(2-3):205-15.
DOI:10.1016/j.jep.2003.09.028.
 20. Testai L. et al. Cardiovascular effects of *Urticadioica* L. (Urticaceae) roots extracts: in vitro and in vivo pharmacological studies. *J Ethnopharmacol.* 2002; 81(1):105-9.
DOI:10.1016/s0378-8741(02)00055-7.
 21. Galelli A, et al. *Urticadioica* agglutinin. A superantigenlectin from stinging nettle rhizome. *J Immunol*;1993;151(4):1821-31.
 22. Blumenthal M. et al. Expanded commission E monographs. Newton MA: Intergrative Medicine Communications. 2000:367-75.
 23. Bradley P, et al. *British Herbal Compendium.* Dorset and England-British Herbal Medicine Association;1992;1:166–67.
 24. Chrubasik S, et al. Evidence for anti-rheumatic effectiveness of Herbal *Urticaedioicae* in acute arthritis: A pilot study. *Phytomedicine.* 1997;4(2):105-8.
DOI:10.1016/S0944-7113(97)80052-9.
 25. Ernst E. et al. Phyto–anti-inflammatories. A systematic review of randomized, placebo-controlled, double-blind trials. *Rheum Dis Clin North Am.* 2000;26(1):13-27.
DOI:10.1016/s0889-857x(05)70117-4.
 26. Fischer C. et al. Nettles-an aid to the treatment of allergic rhinitis. *Eur Herbal Med.* 1997;3(2):34-5.
DOI:10.1111/all.13406. Epub 2018 Mar 22.
 27. Farag MA, et al. Phytochemical, phylogenetic, and anti-inflammatory evaluation of 43 *Urtica* accessions (stinging nettle) based on UPLC-Q-TOF-MS metabolomic profiles. *Phytochemistry.* 2013;96:170-83.
DOI:10.1016/j.phytochem.2013.09.016. Epub 2013 Oct 26.
 28. Klingelhoef S, et al. Anti-rheumatic effect of IDS 23, a stinging nettle leaf extract, on in vitro expression of T helper cytokines. *J Rheumatol.* 1999;26(12):2517-22.
 29. Sovo H, et al. Near-critical extraction of pigments and oleoresin from stinging nettle leaves. *J Supercrit Fluids.* 2004;30(2):213-24. DOI:10.1016/J.SUPFLU.2003.09.014
 30. Institute of Fermentation Technology and Microbiology, Faculty of Biotechnology and Food Science, Lodz, University of Technology, 171/173 Wolczanska, 90-924 Lodz, Poland; dorota.kregiel@p.lodz.pl (D.K.); ewelina.pawlikowska@edu.p.lodz.pl (E.P.)
 31. Gulcin I, et al. Antioxidant, antimicrobial, antiulcer and analgesic activities of nettle (*Urticadioica* L.), *Journal of Ethnopharmacology* 2004;90(2):205-215.
DOI:10.1016/j.jep.2003.09.028.
 32. Ahangarpour A, et al. Antidiabetic effect of hydro-alcoholic *Urticadioica* leaf extract in male rats with fructose-induced insulin resistance, *Iran J Med Sci.* 2012;37:181-61.
 33. Katakı MS, et al. Antioxidant, hepatoprotective and anthelmintic activities of methanol extract of *Urticadioica* L. Leaves, *Pharm Crops* 2012;3:38-46
DOI:10.2174/2210290601203010038
 34. Tekin M, et al. Investigation of acute toxicity, anti-inflammatory, and analgesic effect of *Urticadioica* L., *Pharmacology online* 2009;1:1210-1215.
DOI:10.3109/13880209.2012.715172. Epub 2012 Oct 5.
 35. Katakı MS, et al. Antioxidant, hepatoprotective and anthelmintic activities of methanol extract of *Urticadioica* L. Leaves, *Pharm Crops* 2012;3:38-46.
DOI:10.2174/2210290601203010038.
 36. Nasiri M, et al. Studies on the nematicidal activity of stinging nettle (*Urticadioica* L.) on plant parasitic nematodes, *Archives of*

- Phytopathology and Plant Protection 2014;47(5):591-599
DOI:https://doi.org/10.1080/03235408.2013.816080].
37. Balzarini J, et al. 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.
DOI:10.1074/jbc.M508801200.
 38. Tahri A, et al. Acute diuretic, Natriuretic and Hypotensive Effects of Continues Perfusions of Aqueous Extract of Urticadioica in the Rat, Journal of Ethnopharmacology 2000;73(1):95-100.
DOI:10.1016/s0378-8741(00)00270-1.
 39. Levy A, et al. Urticadioica induces cytotoxicity in human prostate carcinoma LNCaP Cells: Involvement of oxidative stress, mitochondrial depolarization and apoptosis. Tropical Journal of Pharmaceutical Research. 2014;711-717.
DOI:10.4314/tjpr.v13i5.9
 40. Kan Y, et al. Fatty Acid Profile and Antimicrobial Effect of the Seed Oils of Urticadioica and U. pilulifera, Turkish Journal of Pharmaceutical Sciences 2009;6(1):21-30.
 41. Kavalali G et al. Hypoglycemic activity of Urticapilulifera in streptozotocin-diabetic rats. J. Ethnopharmacol. 2003;84:241-5.
DOI:10.1016/s0378-8741(02)00315-x.
 42. Abudoleh S, et al. AntiArthritic Activity of the Methanolic Leaf Extract of Urticapilulifera L. on Albino Rats, American Journal of Pharmacology and Toxicology 2011;6(1):27-32.
DOI:10.4103/0974-8490.118828.
 43. Kader M, et al. A: Antitumor activity of urticapilulifera on ehrlich ascites carcinoma in Mice, Asian Journal of Biochemistry. 2007;2(6):375-385.
DOI:10.3923/ajb.2007.375.385
 44. Tekin M, et al. Investigation of acute toxicity, anti-inflammatory, and analgesic effect of Urticadioica L., Pharmacology online 2009;1:1210- 1215.
DOI:10.3109/13880209.2012.715172.
 45. Kumar S, et al. Pharmacognostical and pharmacological studies on Urticaparviflora Roxb.- A review, International Journal of Universal Pharmacy and Biosciences 2014;3(4):179-184.
 46. Wang M, et al. Antirheumatoid arthritis activities and chemical compositions of phenolic compounds-rich fraction from Urticaatrichocaulis, An endemic plant to China, Hindawi publishing corporation Evidence based complementary and alternative medicines. 2012;10.
DOI:https://doi.org/10.1155/2012/818230.
 47. Xiaocheng C, et al. Inhibition of Spontaneous canine Benign Prostatic Hyperplaia by an Urticafissa polysaccharide fraction, PlantaMedica 2015;81:10-14.
DOI:10.1055/s-0034-1383364. Epub 2014 Dec 4.
 48. Levy A et al. Urticadioica induces cytotoxicity in human prostate carcinoma LNCaP cells: Involvement of oxidative stress, mitochondrial depolarization and apoptosis. Tropical Journal of Pharmaceutical Research. 2014;711-717
 49. Akbay P, et al. In vitro immunomodulatory activity of flavonoid glycosides from Urticadioica, Phytother Res. 2003;17:34-7.
DOI:10.1002/ptr.1068.
 50. Gulcin I, et al. Antioxidant, antimicrobial, antiulcer and analgesic activities of nettle (*Urticadioica* L.), Journal of Ethnopharmacology. 2004;90(2):205-215.
 51. Liao JC, et al. Evaluation of a root extract gel from Urticadioica (Urticaceae) as analgesic and anti-inflammatory therapy in rheumatoid arthritis in mice, Tropical jourNal of Pharmaceutical Research. 2016;15(4):781-785.
DOI:10.1016/j.jep.2003.09.028.
 52. Franciskovic M, et al. Chemical composition and immune-modulatory effects of *Urticadioica* L. (stinging nettle) extracts, Phytotherapy research. 2017; 31(8):1183-1191.
DOI:10.1002/ptr.5836. Epub 2017 May 24.
 53. Tekin M, et al. Investigation of Acute Toxicity, Anti-inflammatory, and Analgesic Effect of Urticadioica L., Pharmacology online 2009;1:1210- 1215.
DOI:10.3109/13880209.2012.715172. Epub 2012 Oct 5.
 54. Yunuskhodzhaeva N, et al. Amino- Acid Composition of Urticadioica leaves and Polygonumhydropiper and P. aviculare herbs. Chemistry of Natural Compounds 2014.
DOI:10. 1007/s10600-014-1137-z.
 55. Farag M, et al. Phytochemical, phylogenetic, and antiinflammatory evaluation of 43 Urtica accessions (stinging nettle) based on UPLC–Q-TOF-MS metabolomic profiles, Phytochemistry 2013;96:170-183.

- DOI:10.1016/j.phytochem.2013.09.016. Epub 2013 Oct 26.
56. Bhatia H, et al. Traditional knowledge on poisonous plants of Udhampur district of Jammu and Kashmir, India, Journal of Ethnopharmacology. 2014;152(1):207-216.
DOI:10.1016/j.jep.2013.12.058. Epub 2014 Jan 8.
 57. Grevsen K, et al. Concentration and composition of flavonol glycosides and phenolic acids in aerial plants of stinging nettles (*Urticadioica* L.) are affected by nitrogen fertilization and by harvest time, Eur J HortSci 2008;73: 20-7.
 58. Lapinskaya ES, et. al.:Amino acids and cyclic dipeptides in stinging nettle (*U. dioica* and *U. urens*) homeopathic matrix tincture. Pharmaceutical Chemistry Journal 2008;42(11):49-52.
 59. Patel S, et al. *Urticadioica* leaves modulates muscarinic cholinergic system in the hippocampus of streptozotocin-induced diabetic mice, Metabolic Brain Disorders 2014;30(3):803-811.
DOI:10.1007/s11011-014-9646-9. Epub 2014 Dec 17.
 60. Asgarpanah J et al. Phytochemistry and Pharmacological properties of *Urticadioica* L., Journal of medicinal plants research 2012;6(46):5714-5719.
 61. Kumar A, et al. Pharmacognosical and pphytochemical study of a plan *Urticaparviflora* Roxb.- A review, Journal of Pharmacognosyaandphytochemistry 2017;6(3):42-45.
 62. Jan KN et al. Stinging nettle (*Urticadioica* L.): a reservoir of nutrition and bioactive components with great functional potential, Journal of food measurement and Characterization, 2017;11(2):423-433.
DOI:http://dx.doi.org/10.1007%2Fs11694-016-9410-4.
 63. Balzarini J, et. al.: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. Balzarini J, et. al.: 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.
 64. Oliver F, et al. Contacturticaria due to the common stinging nettle (*Urticadioica*) histological, ultrastructure and pharmacological studies. ClinExpDermatol;1991;16:1-7.
DOI:10.1111/j.1365-2230.1991.tb00282.x.
 65. Taskila K, Saarinen JV, Harvima It, Harvima RJ. Histamine and LTC4 in stinging nettle-induced urticaria. Allergy. 2000;55:680-681.
DOI:10.1034/j.1398-9995.2000.00635.x.
 66. Randall C, et al. Nettle sting of *Urticadioica* for joint pain – an exploratory study of this complementary therapy. Complement Ther Med. 1999;7:126-131.
DOI:10.1016/s0965-2299(99)80119-8.
Available:www.drug.com

© 2021 Rani et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/77567>