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Damini SharmaLovely Professional University,
Maheru, Punjab, India**Swarup Roy**Lovely Professional University,
Maheru, Punjab, India

Study on the nettle plant and its products

Damini Sharma and Swarup Roy

Abstract

Urtica dioica L. The word “nettle” is derived from the Anglo-saxon word “noed” which means “needle” while it’s Latin name “urtica” means “to burn”. Nettle plant is one of the most amazing medicinal plants with so many benefits. It is a perennial herb with a long history and it is used in many countries in the world. In recent years, there has been growing interest on therapies and the use of natural products. This plant transforming a common weed into a commercial plant with a wide range of applications. The objective of this paper is to know about the benefits and uses of nettle plant. As nettle plant is being used in most of the beauty products and health treatment, many researches done on the particular plant and products to know the science behind the benefits of the plant. The roots of the nettle plant is used to treat various diseases. Nettle plants and its all parts have various advantages and every part of the plant treat various kind of diseases. Fertilizers and insecticides can also be made from this plant which act as a natural one for plants and help them in growth and fight against insects. It is surveyed that the products are available in the market made up from the nettle plant. A thorough review is required to avoid repetition of future research on this plant. This review will also provide information on this plant which is useful article for researchers on this plant.

Keywords: Acne treatment, hair treatment, health care, nettle plant, nettle products, pharmacological properties

1. Introduction

Scientific name-*Urtica dioica* L, Stinging nettle is a wild plant that grows in all over the world in all seasons. Nettle grows in temperate areas. Nettle plant is a perineal herbaceous plant which belongs to the family Urticaceae. In Nepal, this nettle is known as Sisnu which is grown in moist areas where altitude is about 500-4500m. The height of the plant is 2m, the leaves of nettle plant are also covered with harsh hair on both sides of the leaves which produce hot sensation when touched. This is one such species that is found widely in Asia, Europe, and Northern America. Nettle fibres have three main advantages such as strong, lightweight and low environmental temperature. This is a herbaceous perennial flowering plant in the family Urticaceae. Nettle plant produce chemicals that produce a stinging sensation contact. The leaves of the plant are of heart shaped. This plant has a long history of use as a source of traditional medicine, food, tea and textile raw materials in ancient times. This synthesizes information related to food and pharmacological values along with their uses of nettle. Every part of the nettle plant (stem, roots, leaves and seed) can be used for the benefit of people and environment. It provides information related to nutrition, health benefits, phytochemistry and pharmacology. Nettle plant also maintains the soil fertility and nutrient recycling. This is estimated that there are around 250000 to 30000 known plant species on the earth and only 150 to 200 species are used as food by human. Various studies have reported that nettle plant is used as diuretic and to treat cold, cough, cuts and wounds. The leaves of nettle plant are rich in various bioactive compounds such as flavonoids, phenolic acids and amino acids. Stinging nettle used as a growth promoter for the fishes and also act as an immune stimulant for them. Nettle plant is consumed as a vegetable in Nepal because it contains calcium, iron, protein and phosphorous. Nettle plants prefer to grow in nitrogen rich soil and these plants are commonly found in those soils which are high in inorganic nitrates and heavy metals. Nettles are considered as weeds due to their fast growth but there are economic and ecological reasons for cultivating the nettle plant. Nettle plants promote the biodiversity of local flora and fauna, During the First World War, nettles were used to make textiles in Germany and Austria because of their tough fibres content. During the study of nettle it is found that higher amount of protein were found in the leaves than roots and stem. The concentration of chlorophyll increases in growing leaves and decreases during plant ageing. The fresh leaves of nettle plant contain high amount of Vitamin A, C, D, E, F, K and P as well as

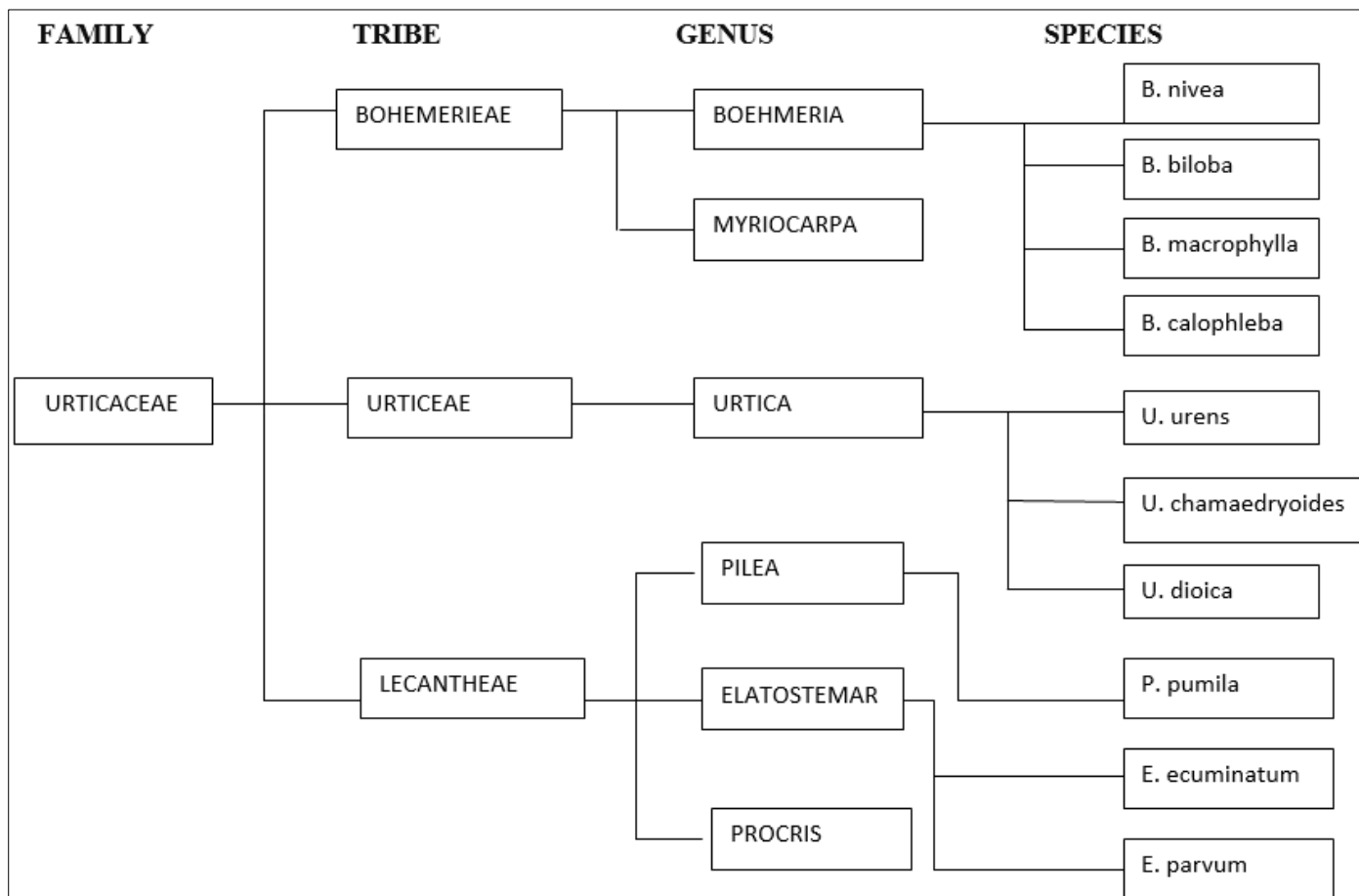
Corresponding Author:**Damini Sharma**Lovely Professional University,
Maheru, Punjab, India

Vitamin B complexes. Jiarui C and Friis, 2003 ^[1]

Classification of Natural fibers of Nettle plant

Natural fibers of nettle plant can be classified into six categories such as bast, leaf, seed, fruit, grasses and wood fibers. The feature of the *Urtica dioica* in the Plant Kingdom is that chloroplast present in that which convert light energy into chemical energy for the plant which is stored as a sugar

and used as a food for the plant. Plant cells contain cell walls which is made up of cellulose and used as support to the plant. The class of nettle plant is dicots because it shows characteristics such as net like veins, stinging nettle comes in the family Urticaceae which has about 2600 species of the plants and they have common features which include stinging hair, alternating leaves and watery sap.



Kailee Homolika ,2011

Advantages of Stinging Nettle

- May treat arthritis and lower back pain, while also help to stay warm.
- Its scientific name comes from Latin word uro, which means “to burn”, because its leaves can cause a temporary burning sensation upon direct contact.
- Inflammation is your body’s way of healing itself and fighting infections.
- In human studies applying a stinging nettle cream appears to relieve inflammatory conditions.
- Stinging nettle cream reduces arthritis pain.
- A few studies suggested that stinging nettle may help treat BPH (Benign prostatic hyperplasia).
- It treat urination problems, without side effects.
- It may help reduce prostate size.
- It is used to treat high blood pressure.
- It may stimulate nitric oxide production, which acts as a vasodilator. Vasodilators relax the muscles of your blood vessels, helping them widen. Hildebert Wagne and Sigrun Chrubasik, 2007

Health Benefits Of Nettle	
Reduce stress and tension	Used as an antioxidant
Helps against allergies	Improves health of pregnant women
Used during dental surgeries	Used as tea
Relieves menopausal symptoms	Reduces blood sugar
Treat arthritis and anaemia	Increases hair growth

Lichius and Muth, 1997

Traditional Uses

Urtica dioica L. Nettles are one of the most commonly used medicinal plants in the world, due to their health enhancing qualities. Because of their high content of nutritive substances, nettles are also used as a folk veterinary medicine. There are many dietary supplements based on *Urtica* spp. which is now available in the market. Their popularity can be explained by their non-toxic chemical composition, relatively low cost and wide availability. The most recognized health benefit of using stinging nettles is activity against Benign Prostatic Hyperplasia (BPH), also known as an enlarged prostate, as well as urinary tract infections. Clinical studies

suggested that *Urtica* spp. contain various compounds that affect the hormones which is responsible for BPH. In addition, nettle root extract shows activity against prostate cancer cells. In therapy, nettles are usually used in combination with saw palmetto (*Serenoa repens*). They are also used as a home remedy for bladder infections. Nettles can help alleviate the symptoms of osteoarthritis and joint pain, typically in the case of hands, knees, hips and spine. Nettles can work in combination with nonsteroidal anti-inflammatory drugs (NSAIDs), allowing patients to decrease their use of NSAIDs. The prolonged use of NSAIDs can increase the risk of heart attack or stroke. However, histamine has been already used to treat strong allergy symptoms. Histamine production causes unwanted allergic reactions, associated with unpleasant nasal congestion, sneezing or itching. Stinging nettles affect numerous receptors and enzymes involved in allergic reactions. In addition, because of their anti-histamine and anti-inflammatory properties, stinging nettles can be used as a natural component in eczema medications. Infusions of the plant can be used for nasal and menstrual hemorrhage, diabetes, anemia, asthma, hair loss and to promote lactation. Herb extract of *Urtica* plants is useful for bladder disorders, reduces postoperative blood loss and prevents hemorrhagic and purulent inflammation following adenectomy. Thus, nettles could serve as good adjuvant to other oral hypoglycemic agents and seem promising for the development of phytomedicines for diabetes mellitus. In addition, as organic nitrogenous compounds, amino acids from nettles are building blocks in the process of protein biosynthesis. *Said, 2015*

Nettle Products: Cooking, drying and crushing of stinging nettle will remove the stinging of nettle.

- Nettle Cream
- Nettle Tea
- Nettle Tea As A Fertilizer
- Nettle Soup
- Nettle Chocolate
- Nettle Cheese
- Nettle Pesticides
- Nettle Bread
- Nettle vegetable

Stinging nettle cream

Nettle cream is one of the processed products which are derived from nettle plant. Spiky hair of nettle plant is like a hollow needle which is filled with formic acid, so whenever you direct touch the plant and feels irritation on your body there is a nettle herb cream which treat this allergy. Nettle has a natural ability to reduce the inflammation and it helps to reduce the redness in dry skin. This is anti- bacterial also which kills the microorganisms. This is effective against acne and act as a natural skincare product. Nettle cream is high in potassium, calcium and magnesium. Nettle cream extracted from leaves and root tinctures. Nettle cream is good for osteoarthritis which is the most common joint disease. Stinging nettle relieves the pain. Osteoarthritis is the most conventional disease and one of the oldest chronic diseases in humans. The American College of Rheumatology recommended an approach to control the pain of osteoarthritis when other surgeries and therapies failed. A previous study proved value of fresh nettle leaf applied directly to aching joints compared to a control application of a dead nettle plant.

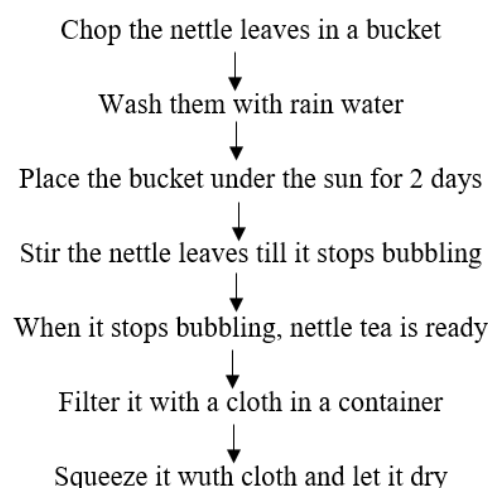
Keith Rayburn, 2009.

Stinging Nettle Tea

This is an herbal tea which is made up from the leaves of the nettle plant known as *Urtica dioica*. Nettle tea is made by boiling the leaves in hot water. Tea is packed with vitamins, minerals such as Vitamin A, C, B3 and B5 It is originated in China, where it is used medicinally. Nettle tea is a part of an ancient medicine for treating a range of diseases which includes hay fever, bone related issues, and other allergies. It has a long medicinal history. It is used to treat UTI (urinary tract infections), insect bites as well as skin conditions like acne. Nettle is available in various forms in market including tablets, ointments and creams but the best way to consume it. Nettle roots can be used as liquid or powdered extracts, as well as in special decoctions. Nettles are also used in herbal liquors. In the British Isles, *Urtica* plants are used in an alcoholic beverage, which is similar to ginger beer and brewed in the same way. Nettle and oat extracts are the subject of a U.S. Patent describing the use of plant powders as additives in beverages or fruit juice to provide nutritional drinks.

- It helps to balance the excess sodium in the body.
- It is excellent for boosting immunity and metabolism.
- This tea cleanses our blood, body which flushes out toxins and maintain a clear skin.
- It is used to purify the blood.
- Its taste is quite similar to green tea.
- Treats menstrual cramps.
- Stinging nettle is the member of mint family which is known for its hair which produces a formic acid which cause allergy who touches the plant. But this formic acid removed when dried. Nettle tea is made from dry leaves. It increases energy and mental ability.

Preparation Of Nettle Tea-

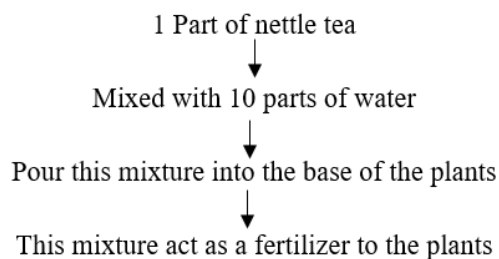


Di Virgilio N, 2009

Nettle tea as a fertilizer

To use as a fertilizer, 1 part of nettle tea with 10 parts of water i.e (1:10) mix this mixture and pour it in the base of the plants where roots can absorb it more easily. This fertilizer works best on plants that have a high demand for nourishment such as fruit trees and bushes, roses, annuals and perennial flowering plants. It works for tomatoes, leeks, brassicas, cucumbers and courgettes. However, it is not meant for brans

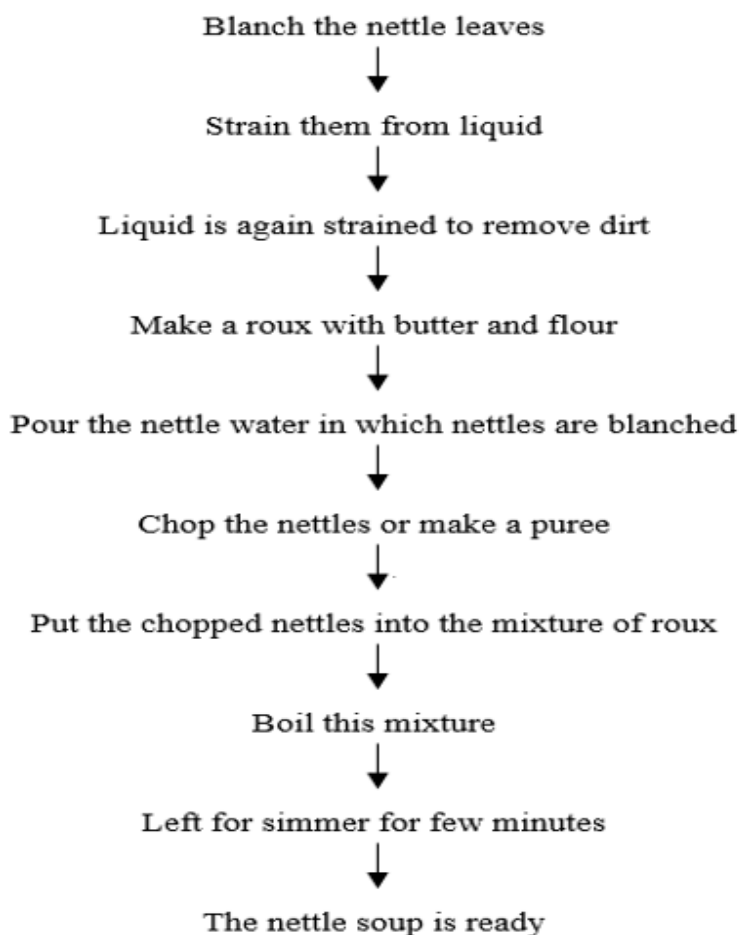
, peas , onions , potatoes and root vegetables . Apply nettle tea to your plants every 3 weeks in the growing season.



Di Virgilio N, 2009

Nettle soup is a traditional soup which is prepared from stinging nettle plant. This also acts as a herbal therapy for various types of diseases. Nettle soup is eaten mostly during spring and early summer season. Nettle soup is made from young nettle buds of the nettle plant. Nowadays, nettle soup is mostly eaten in Iran, Ireland and Eastern Europe with their different recipes. Earlier in history nettle soup was eaten to treat joint pain, arthritis, diabetes, acne and hay fever. One of the easy way to consume nettle in a medicinal way is either through soup or tea.

Nettle soup

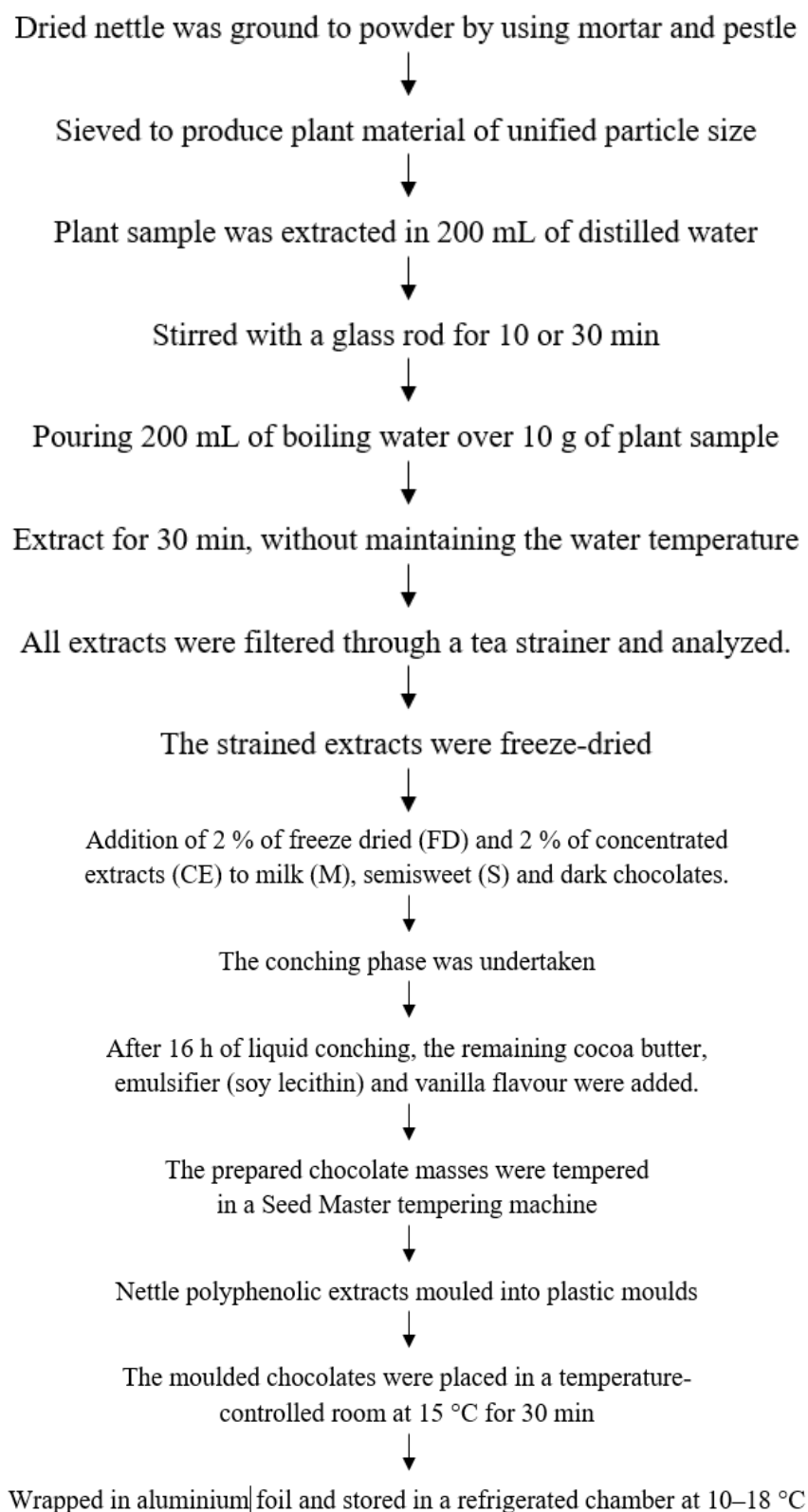


Fiegl and Amanda, 2011

Nettle chocolate

The addition of two different forms of polyphenolic extract from nettle was evaluated. The strained extracts were freeze-dried (FD) or concentrated (C) by evaporation to thickness of syrup (containing 21.13% of dry matter, determined by dry matter determination in an oven at 105 °C until constant weight). The addition of 2% of freeze dried (FD) and 2% of concentrated extracts (CE) to milk (M), semisweet (S) and dark chocolates (D), containing 30, 38 and 72% of cocoa parts, respectively, was evaluated. All three types of chocolates were refined in two phases: preliminary grinding on two-roll press (Carle & Montanari, Italy) and grinding on five-roll press (Carle & Montanari, Italy). The conching phase was undertaken for a total of 24 h (dry conching for 4 h and liquid conching for 20 h) in a Carle & Montanari conch (Italy). After 16 h of liquid conching, the remaining cocoa

butter, emulsifier (soy lecithin) and vanilla flavour were added. The prepared chocolate masses were tempered in a SeedMaster tempering machine (Bühler, Switzerland). 2 kg portions of all chocolates were then excluded, and the above mentioned quantities (2% of FD, 2% of CE) of nettle polyphenolic extracts were added in laboratory conditions, followed by moulding into plastic moulds. The moulded chocolates were placed in a temperature-controlled room at 15 °C for 30 min before de-moulding and the finished bars were wrapped in aluminium foil and stored in a refrigerated chamber at 10–18 °C until analysed. In order to examine the stability of polyphenols in the enriched chocolates, polyphenolic content and antioxidant capacity were determined each fourth month during 1 year (shelf life of chocolates). Belščak-Cvitanović, 2012.



Belščak-Cvitanović, 2012

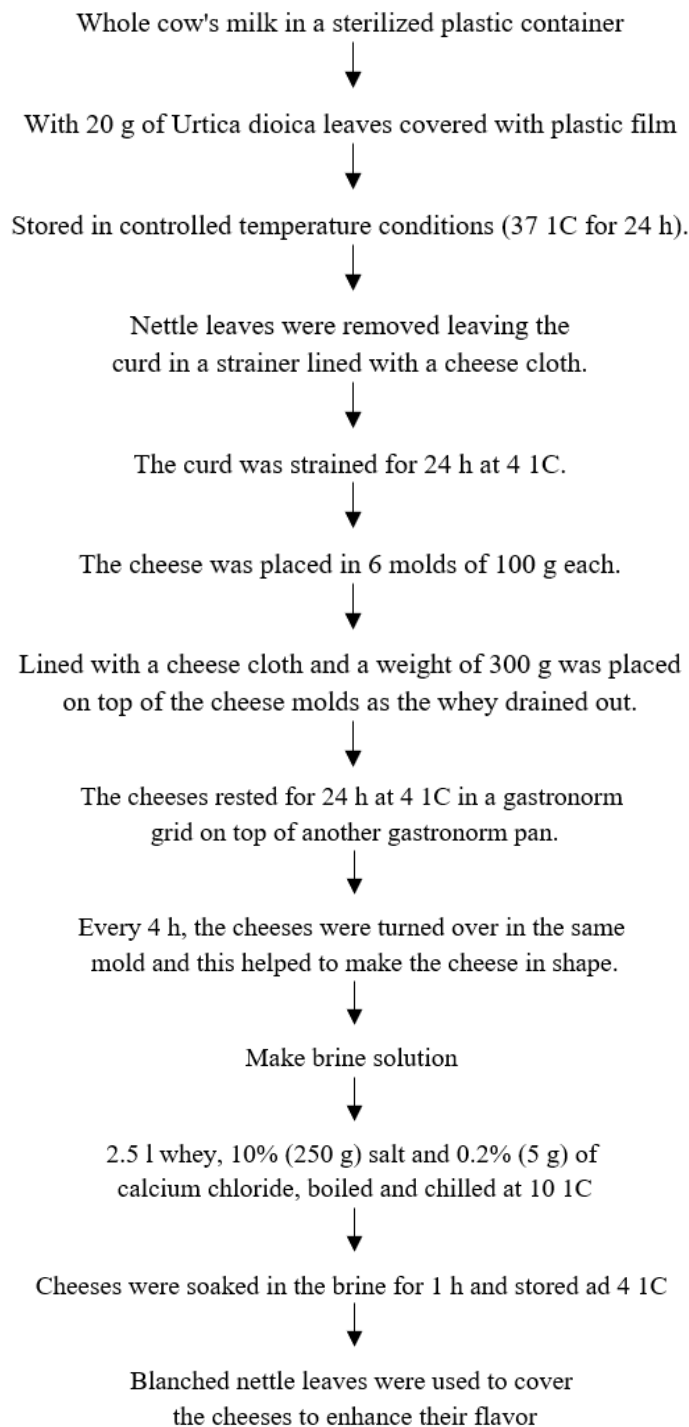
Nettle cheese

Nettle cheese also act as a food and fiber source for fabrics. It is very important in the development of “Mamia”, which is a very traditional Basque dessert made with the sheep's milk curd and ‘Rennet’ that is usually served with honey or sugar. In this elaboration, nettle is used as a strainer to clean the impurities of the milk mainly because of its abundance as well as the content of the stinging hairs that are used as a fine mesh which adds a characteristic flavor. Milk possesses a unique

protein structure called casein that enables coagulation which allows the maintenance of milk as a food source in the form of cheese. Casein is not coagulated by heat, but precipitates when milk is acidified to a pH 4.6 (isoelectric point) making a curd or separating the solids (curds) from liquids (whey) In conventional cheese making, rennin (chymosin) in the form of rennet (a proteolytic enzyme that coagulates milk) is used to coagulate milk. In our experimentation, the chemical content found in nettles is used to acidify the milk and lower its pH in

order to make the curd. Using nettle as a vegetable “rennet” to make milk curds or fresh cheeses, is accepted by consumers which improves their organoleptic capabilities, is also useful

for new culinary preparations and helps increase the value of a product using edible wild herbs.



Karling, 2011

Nettle Pesticides

Plant pesticides have been used for food preservation for hundreds of years. Nettles serve as a home for bugs' natural predators. Planting nettles resulted in a higher number of aphid predator species. Nettle extract can be used as an insecticide, fungicide, and acaricide under Basic Substance laws. As an insecticide, nettle extract can be used to control codling moths, mites. This fungicide can be used to prevent pythium root rot, powdery mildew, early blight, late blight, septoria blight, alternaria leaf spot, and grey mould.

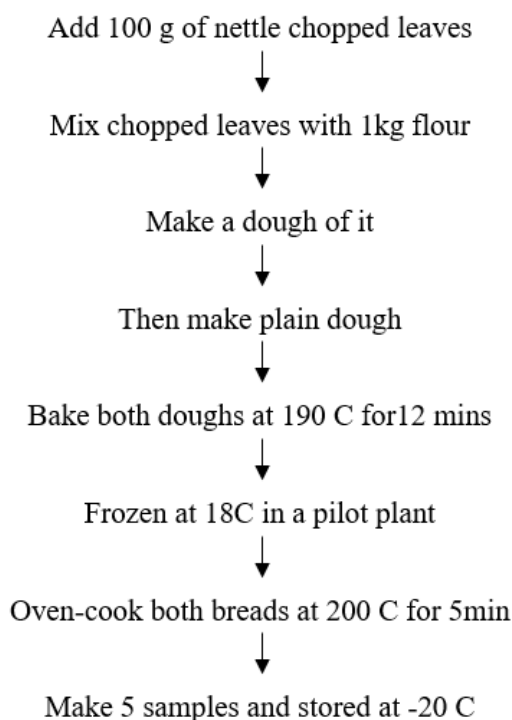
Sharp, 2021

Nettle Bread

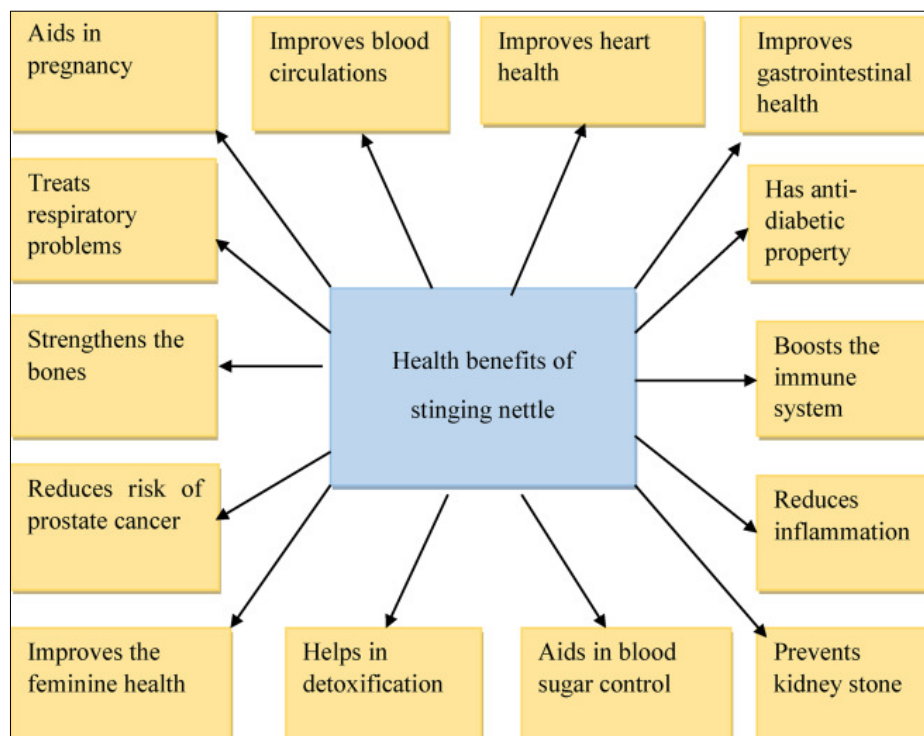
The addition of nettles to bread raised the concentration of nutrients such as fiber, calcium, copper, and iron substantially). Nettle leaf powder/flour is added to bread and pasta as a high-protein supplement in starchy diets. Nettle leaves are high in protein, fiber, minerals, and other bioactive compounds, making them an ideal addition to bread and pastries. Adding 5% nettle dried leaves to bread resulted in a

substantial rise in ash content (1.83% vs. 1.06% for the control) but only a small increase in protein content (11.65% for the sample with 5% share of nettle leaves vs. 11.14% for the control). Nettle powder has a crude fiber content of 9.08%. Nettle bread was particularly rich in antioxidants

.Compared to regular breakfast cereals, nettle powder contains few calories. Nettle powder is considered a low glycemic index food. Whole grains alone can provide much-needed fiber.



Balestra, F, Cocci, E, Pinnavaia *et al.*,2011



Chrubasik, 2007

Nettle as a vegetable

Stinging nettle is consumed as a leafy vegetable by Nepal’s marginalized and underprivileged ethnic tribes. Stinging nettle contains calcium, iron, protein, phosphorus, and

vitamins A and C. Diabetics, heart sufferers, and people with high blood pressure can all benefit from it. Sishnu ko saag is a common wild vegetable that grows as a weed on wastelands, walls, and hedges throughout Nepal’s mid-western hills. The

tender young leaves and shoots are cooked much like any other leafy vegetable. Because of its medicinal properties; it is a highly valued plant in Nepalese society. When harvesting nettle greens, just the sensitive highest shoots and top green leaves are selected or gathered. The lowest half of the bushes' matures and older leaves have no flavor. It's a popular dish on Nepal's five-star hotel menus. It is also regarded as one of the healthiest foods on the planet. Outside of the country, it's used as a soup, vegetable, tea, juice, and medicinal. Shonte and De Kock, 2017.

Conclusion

The stinging nettle plant can be found almost anywhere on Earth. Nettles can be eaten as a vegetable, juice, tea, or a flavoring in a variety of dishes. Stinging nettles have several health benefits. The nettle has antioxidant, antibacterial, and pro-health effects in all of its parts. Stinging nettle has significantly higher tannin content, total polyphenol content, antioxidant activity, carotenoids, and calorific value. The bioactivities of these functional components may be important in the prevention of arthritis, rheumatism, and cancer. The use of *U. dioica* L. in the diet, either as a single herb or in combination with other herbs, can boost growth and boost immune in fish, poultry and animals, making them more resistant to bacterial infection. The medical industry would greatly benefit from using nettle plants as a raw material source. These plants can be used to make fertilizer and pesticides. The conservation of this plant is important and more research is needed in the future.

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