



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(6): 1279-1285
© 2023 TPI

www.thepharmajournal.com

Received: 23-03-2023

Accepted: 26-04-2023

Mehreen Irshad

Department of Food Technology
and Nutrition, Lovely
Professional University,
Phagwara, Punjab, India

Wani Iram Firdous

Department of Food Technology
and Nutrition, Lovely
Professional University,
Phagwara, Punjab, India

Niharika Singh Parmar

Department of Food Technology
and Nutrition, Lovely
Professional University,
Phagwara, Punjab, India

Nutritional composition and health benefits of sweet basil: A Review

Mehreen Irshad, Wani Iram Firdous and Niharika Singh Parmar

Abstract

Africa, tropical Asia, South America, and Central America are home to the Lamiaceae plant *Ocimum basilicum*. It has an unmistakable sweet and hot smell and is habitually planted as a fixative or for natural balm creation. In addition to its use as a condiment, this plant has been linked to significant health benefits. It is used in traditional medicine to treat 5mbintestinal colic, diarrhea, vomiting, menstrual cramps, and improve kidney function. Some studies have shown that it can treat hyperlipidemia and has anti-inflammatory, antioxidant, vasodilator, neuroprotective, and hepatoprotective properties.

Basil seeds can be good for human health or bad for it. One of the most striking medical benefits of basil seeds is that they can improve stomach-related health, support weight loss efforts, improve skin appearance, strengthen hair, control glucose, cool the body, ease pressure, and build strong bones. Basil seeds' capacity to bring down circulatory strain, further develop vision, and reduce their hydrophilic nature is additionally because of the presence of hemicellulose and cellulose in them. They lower cholesterol, reduce inflammation, and avoid a number of related nutritional issues. They also contain a lot of fiber.

A popular culinary spice, sweet basil, otherwise called Genovese basil, is regularly used in Italian and Mediterranean cooking. It contains, among other minerals and vitamins, vitamin K, vitamin A, vitamin C, iron, and calcium. The fragrant sweet basil leaf is directly used as a flavoring ingredient in a number of food and beverage industries. Additionally, the pharmaceutical, aromatherapy, and cosmetics industries frequently employ it.

Keywords: Indian mustard, path coefficient analysis

Introduction

Ocimum basilicum is a Lamiaceae plant that fills in Africa, tropical Asia, South America, and Focal America. It is regularly planted as a fixative or for medicinal oil producing and has an extraordinary exceptional sweet and fiery fragrance. This plant has been linked to significant health benefits in addition to its condiment use. It is utilized in society medication to treat loose bowels, retching, feminine spasms, gastrointestinal colic, and to advance kidney capability. Its anti-inflammatory, antioxidant, vasodilator, neuroprotective, and hepatoprotective properties have been demonstrated in some studies to be useful in the treatment of hyperlipidemia (Barbalho *et al.*, 2012) [2]. Strong flavoring agents are made from the leaves and essential oil of flowering plants. Morocco, France, Egypt, Italy, and California are the essential exporters of *O. basilicum* to the European market (Kumar *et al.*, 2016). Due to its appealing aroma, basil oil is used in numerous dishes. It has additionally been used in meat items like wiener and different things. Cheese and other dairy-based products have included basil oil. It is frequently included in both alcoholic and non-alcoholic beverages. Basil oils are additionally normally utilized in desserts, confectionary, pastry kitchen items, vinegars, puddings, dressings, frozen yogurts, and salted vegetables alongside different flavors and spices (Li *et al.*, 2016). Because the plant contains a variety of essential oils that mix differently for different breeds, basil has distinct scents. Eugenol, the same chemical that can be found in natural cloves, is what gives sweet basil its distinctive clove flavor. Limonene, which gives natural lemon peel its scent, and citral, which provides this effect in various plants like lemon mint, are what give lemon basil and lime basil their citrus aroma. African blue basil has a strong camphor odor due to the increased camphor and camphene content. Licorice basil comprises of anethole, a sort of substance which adds to anise smell like licorice and is much of the time alluded to as anise basil (Kiani *et al.*, 2016) [3]

These herbs are known by many other names such as sweet basil seeds, sabja seeds, and tukmaria seeds.

Corresponding Author:

Mehreen Irshad

Department of Food Technology
and Nutrition, Lovely
Professional University,
Phagwara, Punjab, India

They are oval shaped, they have black colour, and swell up when soaked in water, producing a gelatinous mass. Basil herbs are high in dietary fiber. Only 5% of people in the United States meet their daily recommended intake of dietary fiber. One of fiber's many health benefits is that it helps relieve or prevent constipation, which is the most common stomach issue in the U.S. It does this by helping waste move through the body and contributes to a healthy gut microbiota.

According to a 2016 study, basil seeds may also have the potential to treat diabetes. When administered to diabetic rats, the aqueous extract of basil seeds reduced body weight and blood sugar levels. Although promising, further research utilizing the whole basil seed is necessary to fully comprehend any human effects. Flavonoids and phenolic compounds, which appear to have antioxidant properties, are found in basil seeds. Antioxidants are substances that the body can use to combat the body's unstable molecules, or free radicals, that can damage cells. Cardiovascular disease, neurodegenerative diseases, and some cancers have all been linked to oxidative stress caused by free radicals. There is evidence to suggest that basil seeds may be healthier for a person due to their higher antioxidant potential than other seeds.

Basil seeds may also have promising antibacterial properties, according to preliminary research. *Pseudomonas aeruginosa*, a bacterium that is capable of causing pneumonia, was found to be most effective against the seeds in a study. The fatty acids in basil seeds may provide additional health benefits. They are especially high in alpha-linolenic corrosive (ALA). An essential fatty acid is ALA. The body can't make it, so individuals should get it from food sources. A healthy diet can benefit from including ALA and other fatty acids. Basil seeds may have potential antiulcer properties and anti-inflammatory effects on arthritis due to their ALA content, according to some studies. In any case, a large portion of the examination on the impacts of ALA is either in the beginning phases or creature studies (Opalchenova and Obreshova, 2003); (Hakkim Lukmanul *et al.*, 2009); (Runyoro *et al.*, 2010). Dietary fiber, vitamin K, iron, protein, phytochemicals, polyphenolic compounds, orientin, vicentin, and other potent antioxidants are some of the most important active ingredients in basil seeds. *Ocimum* species secondary metabolites exhibit exceptional biological activity, including bactericide, fungicide, repellent, anti-inflammatory, antioxidative, antidiarrheic, chemopreventive, and radioprotective properties (Hosseini-Parvar *et al.*, 2010)^[6].

According to Azuma and Sakamoto (2003), basil seeds have traditionally been used for therapeutic purposes to improve digestive health, control blood sugar levels, aid in weight loss efforts, cool the body, alleviate stress, lower blood pressure, improve vision, lower cholesterol, and reduce inflammation. Basil seeds are frequently used in beverages (sarbath) and ice desserts (falooda) in many parts of Asia for their aesthetic value and fiber content. Basil seeds have been used for some time in traditional medicine to treat colic, ulcers, dyspepsia, diarrhea, and inflammation. Due to the presence of a layer of polysaccharides, the outer pericarp of the *Ocimum basilicum* L. seed expands into a gelatinous mass when soaked in water. Most of the time, polysaccharides are used to gel, thicken, and stabilize food products like jellies, salad dressings, and desserts to make them more stable and have more texture. (Egata, Desta Fikadu, 2021)^[7]

Sweet basil (*Ocimum basilicum* L.) is a fragrant plant that is

utilized in a variety of industries as a raw material, a spice, a medicine, a food for honeybees, an ornamental plant, and a spice. The name basil, which belongs to the Lamiaceae family, comes from the Greek word *basileus*, which means "king." There are more than 150 different species of basil, but the following are the most commonly grown ones all over the world: *O. basilicum*, *O. gratissimum*, *O. xcitriodorum*, *O. americanum* L., *O. minimo* L., and *O. tenuiflorum* L. They are developed extraordinarily for their medicinal oil item in calm locales of the reality where ice is less huge issue and in tropical districts of the world. (Desta Fikadu Egata, 2021)^[7]

One of the world's cultivated aromatic plants is now basil. Basil is grown in both natural and greenhouse conditions. In order to produce basil year-round and increase yield, growing basil in a greenhouse is preferable to growing it in an open field. Moreover, tank-farming basil development enjoys upper hands over regular soil culture, for example, requiring less ground space to deliver a higher biomass yield with better quality properties. (Skrypnik and other, 2019)

As a traditional remedy, basil has been used to treat headaches, coughs, diarrhea, constipation, warts, worms, and kidney issues. Basil's medicinal properties are linked to the presence of a complex of diverse chemical structures of biologically active compounds in its leaves. Particularly, phenolic acids like rosmarinic, chicoric, caffeic, and caftaric, flavonols like quercetin and kaempferol, glycosides, and anthocyanins have been found to be abundant in basil leaves. Basil leaf concentrates' essential commitment to their cancer prevention agent properties comes from the phenolic intensifies recorded previously. Another important component of basil leaves and flowers is essential oil, which is highly valuable for this plan's use in food and medicine. (Skrypnik and other, 2019)

Health benefits of sweet basil herb

Basil seeds are frequently overlooked despite their high concentration of potent chemicals and active substances that can affect human health. Basil seeds contain dietary fiber, vitamin A, iron, protein, phytochemicals, and a few other active ingredients.

Basil seeds can be beneficial or harmful to human health. One of their most notable health benefits is the ability of basil seeds to improve digestive health, support weight loss efforts, improve skin appearance, strengthen hair, regulate blood sugar, cool the body, alleviate stress, and build strong bones. Basil seeds' ability to lower blood pressure, improve vision, and lessen their hydrophilic nature is also due to the presence of hemicellulose and cellulose in them. They prevent a number of related nutritional issues, are high in fiber, lower cholesterol, and reduce inflammation. (Cherian and other, 2019)^[5].

Skin care: Basil seeds' antioxidants and flavonoids have the potential to improve skin health and encourage the growth of new cells. Various skin conditions like dermatitis and psoriasis can be treated by applying basi seeds that have been squashed into coconut oil to the impacted districts. Consuming basil seeds on a regular basis encourages the release of collagen, which is necessary for the production of new skin cells in the event that existing cells are damaged by daily wear and tear. Consequently, it is a potent anti-aging food that also helps to make skin more supple. (Cherian and other, 2019)^[5].

In a single-blind study 2 with male volunteers (n = 11), a

facial skin cream formulation with 3% concentrated ethanol extract of basil leaves and flowers was compared to the base formulation without basil. The two creams were applied to the subjects' isolated cheeks at night for a significant amount of time. Biophysical measurements were used to ascertain the level of smoothness, moisture content, and wrinkle prevalence on the skin. The definition with basil essentially expanded dampness content, diminished harshness, and smothered wrinkling when contrasted with the base cream. No adverse consequences were noticed. 26 dermatology outpatients in India were randomly assigned to the control group in a single-blind controlled study, and 25 were placed in the treatment group. 13 The control group received 500 mg of oral tetracycline as a standard acne treatment. The treatment group was instructed to manually crush fresh *O. basilicum* leaves, smear the juice on the acne lesions on their faces, and leave the covering on for the night before washing their faces the next morning with mild soap. Additionally, they received twice daily facial sulfur lotion. Each group received these treatments for an additional eight weeks.

The responses to treatment of the acne lesions—comedones, papules, pustules, and cysts—suggested that the basil treatment was just as effective as the standard acne medication. A progression of 16 *O. gratissimum*-containing plans ($n = 7$ for every definition) for the treatment of skin inflammation vulgaris among Nigerian college understudies was the subject of a randomized, fake treatment controlled clinical preliminary. One of four base blends and one of four doses of *O. gratissimum* essential oil were used to create 15 test samples. For four weeks, they were applied topically to the face twice daily. At about a month, the rejuvenating ointment arrangements, especially in higher dosages, were fundamentally more successful than a reference drug item (10% benzoyl peroxide moisturizer) in lessening the quantity of papules and pustules than the sore counts preceding the review. Although some higher doses irritated the skin, there were no reported side effects. (Singletary, 2018)^[8].

Utilization of blessed basil gives phenomenal healthy skin benefits. Treatments for adult and newborn skin frequently contain basil. Rustic Art Neem and Basil is one such cream that is entirely made of herbs, including aloe vera, neem, and basil. It is utilized by numerous mothers in my neighborhood to treat rashes on their children. It calms the skin and treats rashes. In one review, one gathering of members got a face cream with different parts in addition to 3% ethanolic basil separate, while the other gathering got a similar cream however without basil remove. The formulation with holy basil added had a much higher moisture content, was less rough, and wrinkled less. (Haynes and co., 2022)^[22].

Hair care: Due to its high iron content and antioxidant content, basil seeds can both encourage the growth of new hair and stop hair from falling out too soon. Inflammation and oxidative stress on the scalp, which frequently cause hair loss, are also prevented. These seeds are beneficial for getting beautiful, healthy hair because they are high in protein and vitamin K. (Cherian *et al.*, 2019)^[5].

Holy basil reduces dandruff. It may also cure hair loss. (Haynes *et al.*, 2022)^[22].

Low cholesterol: They assist in lowering levels of bad cholesterol, which lowers the risk of atherosclerosis and plaque buildup in the arteries and blood vessels. Additionally, this will lessen stress on the heart and lower the risk of heart attack and stroke. (Cherian *et al.*, 2019)^[5].

The positive effects of holy basil on human lipid profiles have been documented in seven clinical investigations. The following dosages were utilised in the tests for 8 to 12 weeks. (Cherian *et al.*, 2019)^[5].

For eight weeks, 250 mg tulasi leaf capsules from Himalaya Pharmaceuticals in India were taken twice daily before meals. For 8 weeks and 12 weeks, aqueous holy basil leaf (5 ml) was administered twice daily before meals.

3 grammes of whole plant powder every day for 12 weeks. (Haynes *et al.*, 2022)^[22].

Alpha-linolenic acid (ALA), which is derived from high levels of Omega 3 fatty acid content in the seeds, is reported to be abundant in sabia seeds. (Cherian *et al.*, 2019)^[5].

Cardiovascular health: Sweet basil has been shown to have potential benefits for cardiovascular health. For example, some studies have suggested that sweet basil may help to lower blood pressure and improve blood lipid levels, which can help to reduce the risk of heart disease (Michalski *et al.*, 2018)

It was investigated how this plant affected prostaglandins to reduce hypertension and prevent thrombosis. OBL and its extracts, in a dose- and time-dependent way, enhanced 6-keto-PGF1 and decreased PGE2 and TXB2 synthesis. This might mean that COX-2 is simultaneously inhibited and endothelial COX-1 is stimulated. In this regard, the butanol fraction appeared to be the most promising. (Miraj *et al.*, 2016)^[3].

Control blood pressure: These seeds contain sufficient potassium to have a direct effect on blood pressure. Because potassium is a vasodilator, it can release the tension in the arteries and blood vessels, which lessens stress on the cardiovascular system and has a hypotensive impact. (Cherian *et al.*, 2019)^[5].

In renovascular hypertensive rats, the potential antihypertensive benefits of OBL extract were investigated. Further research is necessary since the effects of OBL on blood pressure, cardiac hypertrophy, and ET are consistent with an impact on the ET-converting enzyme. (Miraj *et al.*, 2016)^[3].

There have only been three studies published so far that demonstrate holy basil's potential to decrease blood pressure. Fresh holy basil leaf juice was used in all three investigations for a period of 12 to 4 weeks. 15 fresh leaves of the holy basil plant were used to make the juice, which contained 75% basil. Before meals, it was drunk twice a day. In all three investigations, there was a notable drop in blood pressure. (Haynes *et al.*, 2022)^[22].

Boost bone health: Iron, potassium, copper, calcium, manganese, and magnesium are just a few of the many minerals found in basil seeds that improve bone mineral density. This will keep you feeling young and strong and reduce your risk of getting osteoporosis. (Cherian *et al.*, 2019)^[5].

According to a study, consuming 10 drops of holy basil tincture three times per day for twelve weeks will lower uric acid levels and alleviate gouty arthritis. (Haynes *et al.*, 2022)^[22].

Control blood sugar level: Basil seeds contain dietary fibres which are able to control blood sugar level. They are considered to be good for type II diabetics as it is known to keep a check on blood sugar levels. They slow down the metabolism of the body and thus control the conversion of carbohydrates into glucose. A glass of water with basil seeds in the morning can improve insulin sensitivity throughout the

whole day. (Cherian *et al.*, 2019)^[5].

Improve vision dental health: Basil seeds contain a significant amount of vitamin A, they are advised for those with failing vision or high levels of oxidative stress.

In the retina, vitamin A functions as a potent antioxidant that inhibits the growth of cataracts and delays the onset of macular degeneration. (Cherian *et al.*, 2019)^[5].

Due to their anti-fungal, antibacterial, antiviral, and antimicrobial properties, basil seeds assist to prevent plaque, cavities, bad breath, and mouth ulcers. To freshen your breath, chew on some basil seeds. (Cherian *et al.*, 2019)^[5].

Relieve pain: Basil seeds are known to lessen the severity of episodes in disorders like arthritis, gout, headaches, and irritable bowel syndrome as well as to relieve pain. Anti-inflammatory qualities of basil seeds help to reduce pain, swelling, and inflammation. It has been used for centuries in Ayurveda to prevent blood vessel plaque buildup. (Cherian *et al.*, 2019)^[5].

Spider bites and scorpion stings can be treated using a paste made from holy basil seeds. Other studies have also suggested using holy basil paste made from the leaves or roots. (Haynes *et al.*, 2022)^[22].

Relieve stress: Using basil seeds might improve your mood and lessen depressive episodes. (Cherian *et al.*, 2019)^[5].

Several studies have also shown that using holy basil leaves for about four weeks improves cognitive function. (Haynes *et al.*, 2022)^[22].

Reduces body heat: Basil seeds are used to prepare drinks in several Asian regions, together with water, sugar, honey, and other ingredients. It is an excellent beverage for cooling off during the sweltering heat. One of the best ways to chill the body is using basil seeds. They are recognized for lowering body heat. To boost the drinks' cooling effects, basil seeds are added. (Cherian *et al.*, 2019)^[5].

Cures cough and flu: Basil seeds have an antispasmodic property, which means that they soothe tension in the spasmodic muscles and relax them. This way they help in controlling whooping cough. They strengthen the immunity of the body. Flavonoids like vicenin, orietin, and beta carotene fortify the body's defense (Cherian *et al.*, 2019)^[5].

Basil is a key ingredient in several Ayurvedic expectorants and cough syrups. Holy basil leaves, cloves, and table salt are combined to make an influenza remedy that works quickly. For respite from the cold, eat the leaves. A sore throat can be soothed by drinking water that has been cooked with holy basil leaves. (Haynes *et al.*, 2022)^[22].

Respiratory health: Sweet basil has been traditionally used to support respiratory health, and some studies have suggested that it may have potential benefits in this area. For example, sweet basil has been shown to have bronchodilator effects, which can help to reduce symptoms of asthma and other respiratory conditions. (Michalski *et al.*, 2018)

In a research of asthma patients, it was discovered that three daily doses of 500 mg of holy basil dried leaves relieved asthma symptoms in three days. It is advantageous for the proper operation of the respiratory system since it aids in the mobilization of mucus caused by bronchitis and asthma. (Haynes *et al.*, 2022)^[22].

Digestive health: Sweet basil has traditionally been used to support digestive health, and some studies have suggested that it may have potential benefits in this area. For example, sweet basil has been shown to have anti-ulcer properties and may help to reduce symptoms of irritable bowel syndrome

(IBS). (Michalski *et al.*, 2018)

Basil seeds are well known for helping the body naturally detoxify, acting as a stomach cleanser and aiding in the removal of toxins from the stomach. They contain volatile oils that aid in digestion and relieve gas from the gastrointestinal tract. Additionally, it has soothing and calming effects on the stomach. (Cherian *et al.*, 2019)^[5].

Antioxidant activity: In a study, it was investigated how the production of polyphenolic compounds in three cultivars of the culinary herb basil (*Ocimum basilicum* L.) is influenced by the availability of nutrients, particularly nitrogen fertilisation. Additionally, it was shown that antioxidant activity, rosmarinic and caffeic acid concentrations, and total phenolic levels varied significantly depending on the basil cultivar. (Sadegh Kiani *et al.*, 2016)^[3]

Sweet basil contains a variety of antioxidant compounds, including phenolic acids, flavonoids, and carotenoids. These compounds have been shown to have strong antioxidant activity, which can help to protect cells from damage caused by free radicals. (Bravo *et al.*, 2021).

Five distinct extracts of *Ocimum basilicum* L. and *Origanum vulgare* L. were examined for their antioxidant capacity.

The amounts of phenolics and flavonoids in the examined *O. vulgare* and *O. basilicum* extracts contributed to the variation in their antioxidant activity. (Sadegh Kiani *et al.*, 2016)^[3]

Anti-inflammatory properties: Some studies have suggested that sweet basil has anti-inflammatory properties, which may help to reduce inflammation throughout the body. This could be beneficial for individuals with conditions such as arthritis, asthma, and other inflammatory diseases. (Gajendiran *et al.*, 2016)^[9].

Basil essential oil has anti-inflammatory and antibacterial effects. To the affected area, apply a paste made from holy basil leaves. (Haynes *et al.*, 2022)^[22].

Antimicrobial properties: Sweet basil has been shown to possess antimicrobial properties, which may help to fight off harmful bacteria and other pathogens. This could be particularly beneficial for individuals with infections or other conditions caused by bacterial overgrowth. (Gajendiran *et al.*, 2016)^[9].

It was investigated how this plant affected prostaglandins to reduce hypertension and prevent thrombosis. OBL and its extracts, in a dose- and time-dependent way, enhanced 6-keto-PGF1 and decreased PGE2 and TXB2 synthesis. This might mean that COX-2 is simultaneously inhibited and endothelial COX-1 is stimulated. In this regard, the butanol fraction appeared to be the most promising. (Miraj *et al.*, 2016)^[3] basilicum methanol extract had strong antibacterial action, rupturing the membrane of *V. cholera*, killing the bacterium. (Sanchez *et al.* (2010)

Numerous *Ocimum* species, including *O. basilicum*, have essential oils that have antibacterial (against Gram-positive and Gram-negative bacteria like *Bacillus subtilis*, *Staphylococcus aureus*, *Streptococcus mutans*, and *Enterococcus faecalis*), as well as antifungal (*Epidermophyton floccosum*, *Microsporum gypseum*, and *Sporothrix schenckii*). (Rao *et al.*, 2011)

Due to the presence of flavonoids, alkaloids, phenols, saponins, triterpenoids, glycosides, tannins, and other chemicals in the basil plant's ethanol extract, the basil leaf extract can also demonstrate antiplasmodial activity. (Inbaneson *et al.*, 2012).

Antimicrobial properties of coatings made from the mucilage

of basil seeds are a result of the coating's ability to defend against oxygen and food-contaminating substances. To improve the quality and shelf life of meat products, this coating may be combined with an essential oil, such as Shizari thyme essential oil, to augment its antibacterial effects. (Bravo *et al.*, 2021).

Basil essential oil has anti-inflammatory and antibacterial effects. To the affected area, apply a paste made from holy basil leaves. (Haynes *et al.*, 2022)

Nutritional composition

A well-liked culinary herb, sweet basil, also known as Genovese basil, is frequently utilized in Italian and Mediterranean cuisine. Vitamin K, vitamin A, vitamin C, iron, and calcium are just a few of the minerals and vitamins found in it. The nutritional value of 100 grams of sweet basil is as follows:

- Calories: 23
- Carbohydrates: 2.7 g
- Protein: 3.2 g
- Fat: 0.6 g
- Fiber: 1.6 g
- Vitamin K: 414% of the Daily Value (DV)
- Vitamin A: 175% of the DV
- Vitamin C: 30% of the DV
- Calcium: 18% of the DV
- Iron: 21% of the DV

1. It is also rich in antioxidants and contains essential oils such as eugenol, citral, and limonene that have anti-inflammatory and antibacterial properties (Bravo *et al.*, 2021).
2. Macronutrient content: Sweet basil is low in calories but high in essential nutrients. 100 grams of fresh basil leaves contain approximately 22 calories, 2.65 g of carbohydrates, 3.15 g of protein, and 0.64 g of fat. (Bravo *et al.*, 2021).
3. Vitamins: Sweet basil is a rich source of vitamins, particularly vitamin A, vitamin C, and vitamin K. 100 grams of fresh basil leaves contain approximately 5275 IU of vitamin A, 18 mg of vitamin C, and 414.8 µg of vitamin K. Vitamin A is important for maintaining healthy vision, while vitamin C is an antioxidant that helps to protect cells from damage. Vitamin K is essential for blood clotting and bone health. (Bravo *et al.*, 2021).
4. Minerals: Sweet basil is also a good source of minerals, including calcium, iron, and magnesium. 100 grams of fresh basil leaves contain approximately 177 mg of calcium, 3.17 mg of iron, and 64 mg of magnesium. These minerals are important for maintaining healthy bones, muscles, and overall bodily functions. (Bravo *et al.*, 2021).
5. Antioxidant content: Sweet basil contains a variety of antioxidant compounds, including phenolic acids, flavonoids, and carotenoids. These compounds help to protect cells from damage caused by free radicals, which are unstable molecules that can contribute to chronic diseases such as cancer and heart disease. (Bravo *et al.*, 2021).

Basil essential oil has anti-inflammatory and antibacterial effects. To the affected area, apply a paste made from holy basil leaves. (Haynes *et al.*, 2022)

In a study, it was investigated how the production of

polyphenolic compounds in three cultivars of the culinary herb basil (*Ocimum basilicum* L.) is influenced by the availability of nutrients, particularly nitrogen fertilisation. Additionally, it was shown that antioxidant activity, rosmarinic and caffeic acid concentrations, and total phenolic levels varied significantly depending on the basil cultivar. (Sadegh Kiani *et al.*, 2016)^[3]

6. Anti-inflammatory properties: Some studies have suggested that sweet basil has anti-inflammatory properties, which may help to reduce inflammation throughout the body. This could be beneficial for individuals with conditions such as arthritis or other inflammatory diseases. (Gajendiran *et al.*, 2016)^[9]. Basil essential oil has anti-inflammatory and antibacterial effects. To the affected area, apply a paste made from holy basil leaves. (Haynes *et al.*, 2022)^[22].
7. Antimicrobial properties: Sweet basil has been shown to possess antimicrobial properties, which may help to fight off harmful bacteria and other pathogens. This could be particularly beneficial for individuals with infections or other conditions caused by bacterial overgrowth. (Gajendiran *et al.*, 2016)^[9]. basilicum methanol extract had strong antibacterial action, rupturing the membrane of *V. cholera*, killing the bacterium. (Sanchez *et al.* (2010)

Numerous *Ocimum* species, including *O. basilicum*, have essential oils that have antibacterial (against Gram-positive and Gram-negative bacteria like *Bacillus subtilis*, *Staphylococcus aureus*, *Streptococcus mutans*, and *Enterococcus faecalis*), as well as antifungal (*Epidermophyton floccosum*, *Microsporum gypseum*, and *Sporothrix schenckii*). (Rao *et al.*, 2011)

Due to the presence of flavonoids, alkaloids, phenols, saponins, triterpenoids, glycosides, tannins, and other chemicals in the basil plant's ethanol extract, the basil leaf extract can also demonstrate antiplasmodial activity. (Inbaneson *et al.*, 2012).

Antimicrobial properties of coatings made from the mucilage of basil seeds are a result of the coating's ability to defend against oxygen and food-contaminating substances. To improve the quality and shelf life of meat products, this coating may be combined with an essential oil, such as Shizari thyme essential oil, to augment its antibacterial effects. (Bravo *et al.*, 2021)

The nutritional value of sweet basil, including its macronutrient content, vitamin and mineral content, antioxidant content, and potential health benefits. Overall, sweet basil is a nutritious herb that can be a valuable addition to a healthy diet (Gajendiran *et al.*, 2016)^[9].

Uses in food preparation.

Sweet basil (*Ocimum basilicum*) is an aromatic herb that can be used in the form of a medicine, spice, ornamental plant, and raw material in various organizations. Sweet basil is the most significant among species of basil which is widely grown due to its great economic worth and demand. The aromatic leaf of sweet basil is directly utilized as an ingredient for flavoring in several food and beverage sectors. It is also commonly used in the pharmaceutical, aromatherapy, and cosmetic industries (Egata, 2021)^[7].

Value added products Bakery products

The cookie's quality was found to be improved by the basil herb that was added.

The sample that had basil and orange peel added had a lot of phenolics, but the cookies that had basil and carom seeds added had more chlorophyll. Sowmya and other, (2022)

The addition of herbs had a significant pharmacological impact on individuals' health. The discoveries showed that adding basil powder at levels of 3% and 5% helpfully affected the bread's appearance from an external perspective, and that the treatment at 3% had a more noteworthy chewiness impact. (Pavlova and Nakov, 2019) [10].

The effectiveness of replacing fat with hot water-derived basil seed mucilage (BSM) was examined. BSM was substituted for butter in sponge cake, resulting in a 75% decrease in total fat content. Subsequently, BSM was believed to be liked to use as a fat option in food varieties, which can improve the worth and medical advantages of handled food sources. (Song and co., 2017) [13].

To functionalize bread by presenting bioactive characteristics and as normal parts with conservation potential, rosmarinic corrosive and catechin-rich concentrates from basil and strawberry tree organic products individually were added to lounge bread tests. Loaf breads containing potassium sorbate and ascorbic acid had lower antioxidant activity than breads containing natural extracts, particularly basil. In general, the findings demonstrated that natural extracts could be used in place of synthetic preservatives in the production of novel bread without sacrificing nutritional properties (Takwa *et al.*, 2018) [21].

Beverages

The inclusion of the dried sweet basil leaves improved the processed beverage's ability to scavenge free radicals as the overall carotenoid and antioxidant activity levels were boosted in the functional beverage (Abidoeye *et al.*, 2022) [20].

It was observed that basil seed might be supplemented in various food products to prepare nutritious, enriched, and wholesome meals. Basil seed was incorporated in a drink and out of all the samples, 0.3% basil seeds concentration was found to be the most acceptable (Munir *et al.*, 2017) [18].

Doguer *et al.* (2021) highlighted anticarcinogenic and apoptotic effects of the novel beverage developed from sirkencubin syrup (SC), a traditional beverage from Turkish cuisine, by incorporating purple basil. SC supplemented with purple basil had notable increases in some aroma compounds and a significant decrease in the overall amount of ketones.

Snacks

Patriani *et al.* (2021) [14] looked at how adding different amounts of sweet basil leaves (*Ocimum basilicum*) affected the way chicken meatballs looked and tasted. It was determined that the physical and organoleptic properties of chicken meatballs could be significantly enhanced and maintained for 24 hours with the addition of 4 percent sweet basil leaves.

Nadeem and others (2022) [1] discovered that essential oil's high antioxidant activity was linked to the presence of bioactive components. The shade of the pieces was worked on by the expansion of 0.3% natural ointment in contrast with the control. With an increase in the essential oil dose level in the supplemented nuggets, the thiobarbituric acid reactive substance (TBARS) assay contents significantly decreased in

the *Ocimum basilicum* essential oil supplementation results. Overall, the findings suggested that nuggets could safely incorporate *O. basilicum* as a supplement.

Akshatha *et al.* (2019) [11] detailed that the improvement of basil seeds enhanced laddu contained more protein content (23.62 g), fiber (8 g) and iron (10.6 mg) as opposed to jam and soup. The soup with basil seed had more ash (16.89 percent), iron (10.9 mg), and fiber (10.6 g).

Gaio and co. (2015) [15] examined the antibacterial properties of basil essential oil in Italian-type sausage and in vitro. Up until the 14th day of storage, the essential oil reduced the number of *Staphylococcus aureus*, but it did not affect fermentative lactic or *Micrococcaceae* bacteria.

Chaleshtori and others In vitro, antioxidant activity, antibacterial effects, and phytochemical components of basil essential oil (*Ocimum basilicum*) were examined. In addition, the beef burger product's lipid oxidation and essential oil's antibacterial properties were evaluated. There were no significant differences observed when various quantities of essential oils were added to raw beef burgers to reduce lipid oxidation. Subsequently, the medicinal oil could be used as an antibacterial specialist and to upgrade the flavor in meat items like hamburger burger.

Milk-based products

It was mentioned that the flavoring of basil could be a great substitute for flavored yoghurts. According to Gurkan and Hayaloglu (2017) [17], sensory evaluation of the samples revealed that the basil-flavored yoghurts had a distinct flavor and appearance in comparison to the other yoghurts.

Organoleptic, physicochemical, and microbiological parameters were all determined by J David (2015) [16]. Using concentrations of 1%, 2%, 3%, and 4% of aqueous basil extract, herbal shrikhand was prepared. The physico-synthetic examination results showed that T4 has greatest cell reinforcement movement, debris content, sharpness, protein, dampness while the control test (T0) had most extreme fat substance, pH, and all out solids.

Conclusion

Ocimum basilicum is a Lamiaceae plant that fills in Africa, tropical Asia, South America, and Focal America. It is regularly planted as a fixing or for medicinal oil producing and has an extraordinary exceptional sweet and fiery fragrance. This plant has been linked to significant health benefits in addition to its condiment use. In traditional medicine, it is used to improve kidney function and treat diarrhea, vomiting, menstrual cramps, and 5mbintestinal colic. It has been demonstrated in some studies to have anti-inflammatory, antioxidant, vasodilator, neuroprotective, and hepatoprotective properties, as well as the ability to treat hyperlipidemia.

Basil seeds can be beneficial or harmful to human health. One of their most notable health benefits is the ability of basil seeds to improve digestive health, support weight loss efforts, improve skin appearance, strengthen hair, regulate blood sugar, cool the body, alleviate stress, and build strong bones. Basil seeds' ability to lower blood pressure, improve vision, and lessen their hydrophilic nature is also due to the presence of hemicellulose and cellulose in them. They avoid a number of related nutritional issues, have a high fiber content, reduce inflammation, and lower cholesterol.

A well-liked culinary herb, sweet basil, also known as

Genovese basil, is frequently utilized in Italian and Mediterranean cuisine. Vitamin K, vitamin A, vitamin C, iron, and calcium are just a few of the minerals and vitamins found in it. Several sectors of the food and beverage industry directly utilize the fragrant leaf of sweet basil as a flavoring ingredient. Additionally, it is frequently utilized in the cosmetic, aromatherapy, and pharmaceutical industries.

References

- Nadeem HR, Akhtar S, Ismail T, Qamar M, Sestili P, Saeed W, *et al.* Antioxidant Effect of *Ocimum basilicum* Essential Oil and Its Effect on Cooking Qualities of Supplemented Chicken Nuggets are as Antioxidants. 2022;11(10):1882.
- Barbalho SM, Machado FMVF, Rodrigues JDS, Silva THPD, Goulart RDA. Sweet basil (*Ocimum basilicum*): Much more than a condiment. CELLMED. 2012;2(1):3-1.
- Miraj S, Kiani S. Study of pharmacological effect of *Ocimum basilicum*: A review. Der Pharmacia Lettre. 2016;8(9):276-80.
- Naji-Tabasi S, Razavi SMA. Functional properties and functions of basil seed gum are as: An overview. Food Hydrocolloids. 2017;73:313-325.
- Cherian R. Health benefits of basil seeds. Int. J. Sci. Res. Sci. Eng. Technol, 2019, 511-515.
- Hosseini-Parvar SH, Matia-Merino L, Goh KK, Razavi SM, Mortazavi SA. Steady shear flow behavior of gum extracted from *Ocimum basilicum* L. seed: Effect of concentration and temperature. Journal of food engineering. 2010 Dec 1;101(3):236-43.
- Egata DF. Benefit and use of sweet basil (*Ocimum basilicum* L.) in Ethiopia: a review. J. Nutr. Food Proces. 2021;4(5):57-9.
- Singletery KW. Basil: A brief summary of potential health benefits. Nutrition Today. 2018 Mar 1;53(2):92-7.
- Gajendiran A, Thangaraman V, Thangamani S, Ravi D, Abraham J. Antimicrobial, antioxidant and anticancer screening of *Ocimum basilicum* seeds. Bull. Pharm. Res. 2016;6(3):114-9.
- Pavlova-Student T, Nakov AG. The effect of adding basil whole plant powder (*Ocimum basilicum* l.) Some properties of bread 9. Научни трудове.
- Akshatha DS, Naik RS, Chethana B, Brundha A. A study on nutritional, functional and anti-nutritional properties of basil seed integrated products suggest; c2019.
- Yikmiş S, Özpancar N, Bozkir Ç, Çöl BG. Functional sirkencubin syrup with purple basil; bioactive properties, organoleptic acceptability, and possible effects on blood pressure. Food Science and Technology. 2020 May 8;40:550-7.
- Song KY, Joung KY, Shin SY, Kim YS. Effects of Basil (*Ocimum basilicum* L.) Seed mucilage substituted for fat source in sponge cake: physicochemical, structural, and retrogradation properties. Italian Journal of Food Science. 2017 Sep 5;29(4).
- Patriani P, Hellyward J, Hafid H, Apsari NL. Application of sweet basil (*Ocimum basilicum*) on physical and organoleptic qualities of chicken meatballs. InIOP Conference Series: Earth and Environmental Science 2021 Jun 1 (Vol. 782, No. 2, p. 022083). IOP Publishing.
- Gaio I, Saggiolato AG, Treichel H, Cichoski AJ, Astolfi V, Cardoso RI, *et al.* Antibacterial activity of basil essential oil (*Ocimum basilicum* L.) in Italian-type sausage. Journal für Verbraucherschutz und Lebensmittelsicherheit. 2015 Dec;10:323-9.
- David J. Preparation of herbal shrikhand prepared with basil (*Ocimum basilicum*) extract. The Pharma Innovation. 2015 Oct 1;4(8, Part B):81.
- Gurkan HACER, Hayaloglu AA. Volatiles and sensory properties of yogurt manufactured by incorporating basil (*Ocimum basilicum* L.). International journal of food properties. 2017;20(sup1):S779-S789.
- Munir M, Qayyum A, Raza S, Siddiqui NR, Mumtaz A, Safdar N, *et al.* Nutritional assessment of basil seed and its utilization in advancement of value added beverage. Pakistan Journal of Agricultural Research. 2017;30(3):266-271.
- Preedy VR. (Ed.). Essential oils in food preservation, flavor and safety. Academic press; c2015.
- Abidoye AO, Ojedokun FO, Fasogbon BM, Bamidele OP. Effects of sweet basil leaves (*Ocimum basilicum* L) addition on the chemical, antioxidant, and storage stability of roselle calyces (*Hibiscus sabdariffa*) drink. Food Chemistry. 2022 Mar 1;371:131170.
- Takwa S, Caleja C, Barreira JC, Soković M, Achour L, Barros L, Ferreira IC. Arbutus unedo L. and *Ocimum basilicum* L. as sources of natural preservatives for food industry: A case study using loaf bread. LWT. 2018 Feb 1;88:47-55.
- Haynes S. 16 Evidence-Based Health Benefits of Holy Basil or Tulasi; c2022.