ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 17, Issue, 05, pp.33116-33137, May, 2025
DOI: https://doi.org/10.24941/ijcr.48983.05.2025

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

REVIEW ARTICLE

ORIGIN, TAXONOMY, BOTANICAL DESCRIPTION, GENETICS AND CYTOGENETICS, GENETIC DIVERSITY, BREEDING AND CULTIVATION OF MARJORAM

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ARTICLE INFO

Article History:
Received 09th February, 2025
Received in revised form
21st March, 2025
Accepted 19th April, 2025
Published online 30th May, 2025

Key words:

Origin, Taxonomy, Botanical Description, Genetics and Cytogenetics, Genetic Diversity, Breeding, Marjoram.

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ABSTRACT

Marjoram belongs to the family Lamiaceae, genus *Origanum* species *Origanum majorana***.** Marjoram is known by the following names: English: marjoram, French: marjolaine, German: majoran, Italian: maggiorana, Spanish: mejorana. Local names are Pot marjoram, sweet marjoram, knotted marjoram, wild marjoram (oregano), Marwa, ban tulsi, Marru, maruga, maruvanu and murru. Common names in different languages are in Oregano, Wild marjoram • Arabic: Sa'tar • Bengali: Jungli Marua • Dogri: Marua • Hindi: Ban Tulsi, Kedar Tulsi, Sathra, Mirzanjosh • Kannada: Maruga • Kashmiri: Marzan-Josh, Van Babbar • Konkani: Mijrikamv • Malayalam: Kaattumaruva • Nepali: Raam Tulasee, Sajiwan • Odia: Saptala, Sara • Pahari: Baasalo Ghaas, Jakhm Bootee • Punjabi: Mirzanjosha • Sanskrit: Maruvaka • Telugu: Mridumaruvamu • Urdu: Satar, Zatar. Oregano is a Greek word formed from the words "Oros" and Ganos. The literal meaning of "Oros" is mountain" and "Ganos" literally means "beauty". This means the joy of the mountain. The English word "oregano" is a borrowing of the Spanish *orégano*, which derives from the Latin *orīganum*, which itself comes from Classical Greek ὀρίγανον (*orī́ganon*). The ultimate origin is disputed; some claim it is a compound Greek term that consists of ὄρος (*óros*) meaning "mountain", and γάνος (*gános*) meaning "joy", thus, "joy of the mountain" while *The Oxford English Dictionary* states it is "probably a loanword [as] the plant comes from Africa". Marjoram is a very popular aromatic, perennial and herbaceous plant, especially in Mediterranean countries. It is considered to be a carminative expectorant and tonic. It contains exceptionally high levels of β-carotene, zeaxanthin, lutein, vitamin A and cryptoxanthin. Later three are powerful antioxidants and work as protective scavengers against oxygen-derived free radicals. The most widely studied properties of marjoram are its ability to improve the hemoglobin (Hb) of the body, mainly due to its high iron and folate content. Marjoram is a perennial herb. It's very cold-sensitive and grows best in warm climates. Marjoram is known for its sweet pine and citrus flavours. Some cultures use marjoram and oregano interchangeably. Marjoram is also known as sweet marjoram, knotted marjoram, or pot marjoram. The marjoram herb is indigenous to the Mediterranean. It also grows in Cyprus, Turkey, the Arabian Peninsula, and Western Asia. The Greeks and Romans associated marjoram with happiness. It was also used as a medicinal plant that was said to function as an antiseptic. During the Middle Ages, marjoram was one of the herbs and spices that made its way from the British Isles and was used extensively there. But marjoram wasn't popular in the United States until after World War II. These days it's an essential ingredient for both home cooks and restaurant chefs. Marijuana, scientifically known as Cannabis, is believed to have originated in Asia, specifically East Asia. Archaeological and genetic evidence suggest its domestication occurred during the early Neolithic period, around 12,000 years ago. The plant was initially used for various purposes, including fiber production, food, medicine, and recreational use.

Citation: K.R.M. Swamy. 2025. "Origin, Taxonomy, Botanical Description, Genetics and Cytogenetics, Genetic Diversity, Breeding and Cultivation of Marjoram". *International Journal of Current Research, 17, (05),* 33116-33137.

INTRODUCTION

Marjoram belongs to the family Lamiaceae, genus *Origanum* species *Origanum majorana* (Maithani *et al*., 2023; Grieve, 2024; Wikipedia. 2024; Wikipedia, 2024a; Wikipedia, 2024b; Britannica, 2025; WC, 2025). Marjoram is known by the following names: English: marjoram, French: marjolaine, German: majoran, Italian: maggiorana, Spanish: mejorana (Potty and Krishna Kumar, 2012). Local names are Pot marjoram, sweet marjoram, knotted marjoram, wild marjoram (oregano), Marwa, ban tulsi, Marru, maruga, maruvanu and murru (Hisrory, 2014; Dhiman and Bhasin, 2022; Britannica, 2025**).** Common names in different languages are in Oregano, Wild marjoram • Arabic: Sa'tar • Bengali: Jungli Marua • Dogri: Marua • Hindi: Ban Tulsi, Kedar Tulsi,

Sathra, Mirzanjosh • Kannada: Maruga • Kashmiri: Marzan-Josh, Van Babbar • Konkani: Mijrikamv • Malayalam: Kaattumaruva • Nepali: Raam Tulasee, Sajiwan • Odia: Saptala, Sara • Pahari: Baasalo Ghaas, Jakhm Bootee • Punjabi: Mirzanjosha • Sanskrit: Maruvaka • Telugu: Mridumaruvamu • Urdu: Satar, Zatar (Tripathy *et al*., 2017; Jafari Khorsand *et al*., 2022). Oregano is a Greek word formed from the words "Oros" and Ganos. The literal meaning of "Oros" is mountain" and "Ganos" literally means "beauty". This means the joy of the mountain (Verma, 2021). The English word "oregano" is a borrowing of the Spanish *orégano*, which derives from the Latin *orīganum*, which itself comes from Classical Greek ὀρίγανον (*orī́ganon*). The ultimate origin is disputed; some claim it is a compound Greek term that consists of ὄρος (*óros*) meaning "mountain", and γάνος (*gános*) meaning "joy", thus, "joy of the mountain" while *The Oxford English Dictionary* states it is "probably a loanword [as] the plant comes from Africa" (Wikipedia, 2024a). Marjoram was called *amaracum* in Latin, which in turn was taken from Greek *amarakos* [ἀμαράκος]. The origin of the Greek name is not known, but maybe it came from further East, cf. Sanskrit *maruva* marjoram. Marjoram's reputation as aphrodisiac in Roman literature is probably due to the similarity of *amaracum* to Latin *amor* love, which is linguistically not related. The forms in most modern European languages derive from *amaracum* and were additionally influenced by Latin *maior* greater via folk etymology. Examples include Lithuanian *mairūnas*, Norwegian *merian*, French *marjolaine*, Serbo-Croatian *mažuran*, Italian *maggiorana*, Romanian *măghiran*, Greek *matzourana* and even Hebrew *mayoran.* Marjoram is, similar to tarragon (botanically not related), a spice which on one hand needs a warm climate to develop its specific aroma, but on the other hand loses some fragrance when dried. Despite these deficiencies, it is a well-established culinary herb in Central Europe. Dried marjoram is extremely important in industrial food processing and is much used, together with thyme, in spice mixtures for the production of sausages; in Germany, where a great variety of sausages is produced, it is thus called *Wurstkraut* sausage herb. Furthermore, application of marjoram to boiled or fried liver is somewhat classical. Marjoram may be effectively combined with bay leaves; furthermore, it goes well with small amounts of black pepper or juniper. Combinations of the last type are well suited to ragoûts, particularly venison. Yet marjoram also has its place in vegetable dishes; it is mostly recommended for rather heavy vegetables like legumes or cabbage. Fried potatoes spiced with liberal amounts of marjoram are delicious. Fresh marjoram, on the other side, is more popular in South European cooking styles. Because of its lesser fragrance in cold climate, its usage in other regions may end in serious disappointment. Fresh marjoram may add new accents to the French *fines herbes* and is frequently suggested for delicate fish dishes; it should be added shortly before serving. Only in less subtly flavoured dishes (like Italian tomato sauces spiced with garlic), fresh marjoram may be substituted by fresh oregano. Although this usage is not mentioned in cookbooks, fresh marjoram is well suited for the French *bouquet garni* (Gernot, 2024).

Marjoram is a herb that is a member of the mint family and is closely related to oregano. It is native to the Mediterranean region and has a sweet and slightly bitter flavor, often used in Mediterranean and Middle Eastern cuisine. Marjoram has small, gray-green leaves that are oval-shaped and grow on a bushy plant. The leaves can be used fresh or dried and have a fragrant aroma that is similar to oregano. It is also commonly used in herbal medicine for its medicinal properties, such as its ability to soothe digestive issues, relieve anxiety, and promote relaxation (Area2farms, 2024). Wild marjoram **(***O. vulgare***)** is a perennial herb native to Europe and West Asia and is commonly found in dry places and as hedge banks in England. It has been naturalized in the USA and is also known as oregano (Potty and Krishna Kumar, 2012). Marjoram is a plant close to oregano in morphological classification that varies in a milder flavour (Škrovánková *et al.,* 2012). Marjoram plant and their extracts possess relatively strong antioxidant activity. It is due to several antioxidants such as highly labile carnosic acid, carnosol, followed by RA, CA, and flavonoids, luteolin-7-O-glucoside, apigenin-7-O-glucoside (Škrovánková *et al.*, 2012). Marjoram contains a high amount of ursolic acid too. Another antioxidant found in marjoram is ursolic acid, a pentacyclic triterpenoid compound. The antioxidant activity of marjoram is significantly higher using polar solvent (ethanol) for the extraction than extracts prepared by **n**-hexane or supercritical CO_2 (Škrovánková *et al.,* 2012). Other observed differences in the antioxidant properties and amounts of phenolic compounds of marjoram were assessed to be caused by the geographic differences and therefore different climate features (*e.g*., higher numbers of sunny days) (Škrovánková *et al.,* 2012). The antioxidant activity of marjoram essential oil is mainly attributed to the major contents of terpinen-4-ol, γ-terpinene, and α-terpineol. Marjoram essential oil also possesses radical scavenging activity (Škrovánková *et al.,* 2012). The genus *Origanum* L. belongs to the family Lamiaceae and comprises 42 species and 18 hybrids widely distributed in Eurasia and North Africa (Amar and El Wahab, 2013). This genus includes numerous species, subspecies, varieties, and hybrids that can be distinguished individually, but extensive variation still exists (Amar and El Wahab, 2013). *Origanum* species are usually subshrubs or woody perennial herbs that reach heights of up to 80 cm and have ovate leaves and white or purple flowers. Many of the studies confirmed the medicinal effects of oregano for human health (Amar and El Wahab, 2013). The genus *Origanum* contains two important aromatic plants with different sensorial qualities, marjoram (*Origanum majorana* L.) and oregano (*Origanum* sp.,) but also species from other genera with similar sensorial qualities are called 'oregano' (Amar and El Wahab, 2013). The *Origanum* genus, which are rich in essential oils, have been used for thousands of years as spices for food production and as local medicines in traditional medicine (Amar and El Wahab, 2013). Recently *Organium vulgare* has antitumor activity against breast cancer cell lines in *vitro* and in *vivo* (Amar and El Wahab, 2013). The taxonomy of *Origanum* was found to be rather complex and nearly all of the sections are afflicted with some kind of taxonomic uncertainties (Amar and El Wahab, 2013). Systematic and phylogenetic studies on medicinal and aromatic plants were usually based on morphological characters (Amar and El Wahab, 2013). However, in the last decades, continuous advances in molecular biology have offered a set of new tools useful for investigating the relationships among these taxa and to characterize the peculiar chemical composition of related cultivars (Amar and El Wahab, 2013). Presently, the advent of molecular markers overcame most of the problems associated with using morphological markers in which major phenotype-altering genes were used as genetic markers (Amar and El Wahab, 2013). Among PCR-based methods, inter-simple sequence repeats (ISSRs) has been found to be an efficient, low cost, simple operation, high stability and abundance of genomic information (Amar and El Wahab, 2013). ISSR technique is a PCR-based method which uses microsatellites as primers in a single reaction targeting multiple genomic loci mainly to amplify ISSR sequences of different sizes (Amar and El Wahab, 2013). ISSR is reliable technique for the identification of species or varieties, population authentication and population genetic structure (Amar and El Wahab, 2013). The SRAPs is a

simple and efficient marker system that can be adapted for a variety of purposes including germplasm identification, map construction, genetic diversity and gene tagging in various crops, such as potato, rice, lettuce, cotton, most crops, tree species, ornamental and medicinal plants (Amar and El Wahab, 2013). Rather, the result of SRAP markers was a moderate number of co-dominant markers. Unfortunately no molecular marker technique is ideal for every situation. Each marker has advantage and disadvantage, thus combining different marker system were greatly better for diversity study in medicinal and aromatic plants (Amar and El Wahab, 2013). It is believed that marjoram originally came from the Mediterranean region and Anatoila (Asia Minor) and has been used since ancient times (Hisrory, 2014). The ancient Greeks used this as a natural treatment for many ailments. They believed it helped heal from poison, convulsions and edema. They called this herb *joy mountain* and crowned young couples with it during wedding ceremonies (Hisrory, 2014). It was once believed that marjoram helped to nurture love. This herb was added to food to promote civility and love (Hisrory, 2014). Women carried this herb around in bags and it was placed around homes for the sweet fragrance (Hisrory, 2014). It was also used in "love spells." A young woman would place marjoram under her pillow at night believing that the herb would help reveal her future husband while she was dreaming (Hisrory, 2014). Marjoram eventually made its way to England where they used it in beer and tobacco. It was used as an ingredient in snuff to add a bit of minty flavor. Marjoram was also frequently used in beer for taste and to act as a preservative (Hisrory, 2014). Many people believed that if marjoram grew on your grave you would have happiness in heaven. Today, many still consider it to be good luck and happiness to have marjoram growing by your grave (Hisrory, 2014).

Origanum majorana L. commonly known as sweet marjoram has been used for variety of diseases in traditional and folklore medicines, including gastrointestinal, ocular, nasopharyngeal, respiratory, cardiac, rheumatologic, and neurological disorders **(**Bina and Rahimi, 2016**).** Essential oil containing monoterpene hydrocarbons and oxygenated monoterpenes as well as phenolic compounds are chemical constituents isolated and detected in *O majorana* **(**Bina and Rahimi, 2016**).** Wide range of pharmacological activities including antioxidant, hepatoprotective, cardioprotective, anti-platelet, gastroprotective, antibacterial and antifungal, antiprotozoal, antiatherosclerosis, anti-inflammatory, antimetastatic, antitumor, antiulcer, and anticholinesterase inhibitory activities have been reported from this plant in modern medicine **(**Bina and Rahimi, 2016**).** *Origanum majorana* L. from the family Lamiaceae (syn. *Majorana hortensis* Moench) is commonly known as sweet marjoram **(**Bina and Rahimi, 2016**).** This herb is native to Mediterranean region and cultivated in many countries of Asia, North Africa, and Europe, for example, Spain, Hungary, Portugal, Germany, Egypt, Poland, and France **(**Bina and Rahimi, 2016**).** *Origanum majorana* grows up to 30 to 60 cm. It is a perennial bushy plant. It has oblique rhizome, hairy shrub like stalks, opposite dark green oval leaves and white or red flowers in clustered bracts. The leaves are whole, larger ones being fragmented, oblate to broadly elliptical **(**Bina and Rahimi, 2016**).**

This plant is widely used as a garnish and is used for different medicinal purposes in traditional and folklore medicine of different countries (Bina and Rahimi, 2016). Various compounds have been identified in sweet marjoram. Also, different pharmacological activities have been attributed to this plant (Bina and Rahimi, 2016). Sweet marjoram is a medicinal plant with various proven pharmacological properties, including antioxidant, antibacterial, hepatoprotective, cardioprotective, antiulcer, anticoagulant, anti-inflammatory, antiproliferative, and antifungal activities (Bina and Rahimi, 2016). The flowering stems are the medicinal parts. Their constituents include 1% to 2% of an essential oil with a containing terpinenes and terpinols, plus tannins, bitter compounds, carotenes, and vitamin C. These substances give sweet marjoram stomachic, carminative, antispasmodic, and weak sedative properties (Bina and Rahimi, 2016). In herbalism, it is used mainly for various gastrointestinal disorders and to aid digestion. Novel investigations showed increase in acid and pepsin secretions by this plant (Bina and Rahimi, 2016). Also sweet marjoram showed antiulcer activity and mucus protecting effects in gastrointestinal tract (Bina and Rahimi, 2016). Ethnomedicinal use of *O majorana* on vaginitis and polycystic ovarian disease can be related to restoration of hormonal balance and reduction of DHEA-S by this plant (Bina and Rahimi, 2016). Efficacious uses of *O majorana* in cardiac disease and dysrhythmia were proved which may be related to its antiplatelet and cardioprotective activities through inhibition of production of nitric oxide and lipid peroxidation in heart tissues (Bina and Rahimi, 2016). Useful effect on head cool, sniffle, ear pain, and respiratory disorders may be related to its antimicrobial effect (Bina and Rahimi, 2016). Monoterpene hydrocarbons (such as α-pinene, β-pinene, camphene, and γ-terpinene), oxygenated monoterpenes particularly terpinene-4-ol, *cis*-sabinene hydrate and terpineol, phenolic compounds particularly flavonoids (such as apigenin, hesperetin, quercetin, kaempferol), and phenolic glycosides (such as arbutin) are the active components isolated and detected in *O majorana* (Bina and Rahimi, 2016). Various bioactive compounds have been isolated and identified in *O majorana*, whereas many active compounds responsible for ethnomedicinal uses or proved pharmacological activities have not been completely evaluated (Bina and Rahimi, 2016). Marjoram is a very popular aromatic, perennial and herbaceous plant, especially in Mediterranean countries (Vishwakarma *et al*., 2022). It is considered to be a carminative expectorant and tonic. It contains exceptionally high levels of β-carotene, zeaxanthin, lutein, vitamin A and cryptoxanthin (Vishwakarma *et al*., 2022). Later three are powerful antioxidants and work as protective scavengers against oxygen-derived free radicals (Vishwakarma *et al*., 2022). The most widely studied properties of marjoram are its ability to improve the hemoglobin (Hb) of the body, mainly due to its high iron and folate content (Vishwakarma *et al.,* 2022). Oregano is a rich source of biologically active components such as phenolic compounds (Jafari Khorsand *et al.,* 2022). Seven pot grown *O. vulgare* accessions belonging to three subspecies (subsp. *virens*, subsp. *vulgare* and subsp. *gracile*) were investigated for their content in sixteen bioactive phenolic compounds as well as their antioxidant capacities (DPPH$^{\bullet}$ and FRAP tests), total phenolic content (TPC) and total flavonoid content (TFC) in order to identify the most suitable ones on an industrial level (Jafari Khorsand *et al.,* 2022). HPLC analyses showed that rosmarinic acid (659.6–1646.9 mg/100 g DW) was by far the most abundant constituent, followed by luteolin (46.5–345.4 mg/100 g DW), chicoric acid (36.3–212.5 mg/100 g DW), coumarin (65.7–193.9 mg/100 g DW) and quercetin (10.6–106.1 mg/100 g DW), with variability in concentration depending on the accession and subspecies (Jafari Khorsand *et al.,* 2022). The highest level of rosmarinic acid and TPC was obtained from Ardabil accession (subsp. *virens*). There was a significant and positive correlation between rosmarinic acid and antioxidant activity (r = 0.46) (Jafari Khorsand *et al.,* 2022).

TFC significantly correlated to TPC (r = 0.57) as well as to chicoric acid (r = 0.73). Cluster (CA) and principal component (PCA) analyses classified the investigated accessions in three different groups (Jafari Khorsand *et al*., 2022). Such natural variabilities in phenolics provide the possibility of using elite plants for nutraceutical and pharmaceutical industries and domestication of highly antioxidative accessions of oregano (Jafari Khorsand *et al.,* 2022). *Origanum majorana*, also known as Marjoram, sweet basil, and wild oregano, is a perennial herb grown for its flavor and aroma all over the world (Dhiman and Bhasin, 2022). This herb has been used to treat a variety of diseases since ancient times, and it was kept inside homes to repel insects (Dhiman and Bhasin, 2022). The essential oils of this herb are stored in oil glands behind the plant cell wall and must be extracted with care to avoid altering the chemical composition (Dhiman and Bhasin, 2022). There are several extraction procedures for extracting essential oils from various parts of marjoram, but only a few are used like distillation and supercritical fluid extraction. This plant is high in bioactive chemicals and can be used as a natural preservative and to treat a variety of illnesses by including in food products, health supplements, nutraceuticals and skin care products because it has few negative effects (Dhiman and Bhasin, 2022). Essential oils, which contain important bioactive chemicals in concentrated form, are now employed to make medications and flavoring agents (Dhiman and Bhasin, 2022). Furthermore, marjoram has various chemical components with pharmacological benefits, including antibacterial, antioxidant, antidiabetic, and antianxiety properties, which are used in the food and pharmaceutical industries to incorporate natural substances into their products (Dhiman and Bhasin, 2022). Marjoram (*Origanum majorana*) is a medicinal herb that belongs to the family Lamiaceae and was earlier known as *Majorana hortensis* Moench (Dhiman and Bhasin, 2022). This herb is native to the mountains of the Mediterranean region including Asia Minor, Cyprus, and some European countries and is now widely grown in different parts of the world. The word Origanum originates from the Greek word oros which means mountain and ganos meaning joy or light and is sometimes known as "joy of mountains" (Dhiman and Bhasin, 2022). Marjoram is used synonymously with oregano which is one of the popular herbs used for its strong flavor and aroma. It is known by different names in various parts of India and around the world such as sweet marjoram, pot marjoram, knotted marjoram, wild marjoram (oregano), Marwa in Hindi, ban tulsi in hilly areas, marru, marwa, maruga, maruvanu in Southern parts of India and murru in Bengali (Dhiman and Bhasin, 2022). Some ancient people used this herb as an antiseptic to treat wounds, cuts, colds and coughs and believed that it heals poison, convulsions, insomnia, anxiety, respiratory issues, and digestive problems (Dhiman and Bhasin, 2022).

This herb is having a very rich history of usage in traditional medicine for curing skin disorders, stomach problems, diabetes, heart related issues and infections caused by bacteria, viruses, and fungus. Ancient people use to keep this herb with them while working in the field to treat any kind of insect or snake bite (Dhiman and Bhasin, 2022). In addition to this, it was also utilized for making herbal tea, for flavor, and for spreading its fragrance in rooms. Nowadays its essential oil is in great demand for utilization in aromatherapy, cosmetics and skincare. Moreover, it is used to treat sore muscles and swollen joints and helps in easing menstrual cramps as well as heavy flow. However, its essential oil must not be used for pregnant and lactating women (Dhiman and Bhasin, 2022). Essential oil (E.O) is a liquid mixture of volatile substances that are concentrated forms of chemical compounds present in different plant parts. Most of the components are hydrophobic that consist of phenol and aromatic hydrocarbons in their chemical structure that produces different types of aromas and flavors. In the food industry, it is being utilized for giving flavor and aroma to food materials and in packaging materials to protect the food materials from spoilage (Dhiman and Bhasin, 2022). These oils contain several pharmacological properties such as antibacterial, antimicrobial, antiviral, anticancer, anti-inflammatory, etc. It is incorporated in various drugs, health supplements, and nutraceuticals to maintain overall health as well as to treat many diseases (Dhiman and Bhasin, 2022).

Marjoram is a perennial herb. It's very cold-sensitive and grows best in warm climates (BWM, 2023). Marjoram is known for its sweet pine and citrus flavours (BWM, 2023). Some cultures use marjoram and oregano interchangeably. Marjoram is also known as sweet marjoram, knotted marjoram, or pot marjoram (BWM, 2023). The marjoram herb is indigenous to the Mediterranean. It also grows in Cyprus, Turkey, the Arabian Peninsula, and Western Asia (BWM, 2023). The Greeks and Romans associated marjoram with happiness (BWM, 2023). It was also used as a medicinal plant that was said to function as an antiseptic (BWM, 2023). During the Middle Ages, marjoram was one of the herbs and spices that made its way from the British Isles and was used extensively there. But marjoram wasn't popular in the United States until after World War II (BWM, 2023). These days it's an essential ingredient for both home cooks and restaurant chefs (BWM, 2023). The Lamiaceae family is of great diversity and variety, with a cosmopolitan distribution. Plants in this family are characterized by verticillaster inflorescence, two-lipped open-mouthed tubular corolla, opposite decussate leaves, quadrangular stem **(**Maithani *et al*., 2023**).** Most of the species belonging to the family are aromatic and possess essential oils. *Origanum vulgare* L., also known as Vantulsi or Badri tulsi**,** is an important herb that is commonly used for it's aromatic properties **(**Maithani *et al.,* 2023**).** Oregano's leaves and flowering parts contain essential oil glands that produce volatile oil, which is what gives the plant its fragrance **(**Maithani *et al*., 2023**).** Carvacrol and/or thymol make up the majority of the essential oil of Oregano, with γ-terpenine, p-cymene, linalool, terpenine 4-ol, and sabinene hydrate **(**Maithani *et al.,* 2023**).** These constituents are primarily responsible for the oil's antiviral, antiseptic, antimicrobial, antioxidant, antifungal, anticoagulant, and energetic action properties **(**Maithani *et al.,* 2023**).** The Lamiaceae family is of great diversity and variety, with a cosmopolitan distribution. It is comprised of about 7200 species organized into 236 genera, which includes plants, herbs, shrubs and trees (Maithani *et al*., 2023**).** Plants in this family are characterized by verticillaster inflorescence, two-lipped open-mouthed tubular corolla, opposite decussate leaves, quadrangular stem. Most of the species are aromatic and possess essential oils **(**Maithani *et al*., 2023**).** Many members of the Lamiaceae family are widely cultivated for their aromatic qualities and for medicinal properties **(**Maithani *et al*., 2023**).** The plants of this family are easy to grow and can be easily propagated **(**Maithani *et al.,* 2023**).** Species of this family are grown for their edible leaves, as decorative (*e.g.* ***Coleus***), as edible seeds (*e.g. Salvia hispanica*: Chia seeds), apart from their culinary and medicinal applications (*e.g*. ***Ocimum*** spp.) **(**Maithani *et al*., 2023**).**

Oregano is one of the multipurpose aromatic perennial herb of the Lamiaceae family which is commonly known as Badri tulsi, Vantulsi, Sathra, Jakhambooti, Baslooghas, and Jonk-Jari in India **(**Maithani *et al.,* 2023**).** Centre for origin of Origanum is hills in Western Asia and the Mediterranean region, but it has now naturalised in some areas of Mexico and the United States **(**Maithani *et al*., 2023**).** *O. vulgare* is cultivated in sub- and temperate regions of India, particularly in the Himalayan area. It is one of the most traded culinary herbs in the world **(**Maithani *et al*., 2023**).** Plants are generally perennial herb and reach up to 80 cm height and have ovate leaves, white or purple flowers and terminal corymbose cyme. The plants are also characterized with gynodioecious and male sterility conditions **(**Maithani *et al*., 2023**).** The essential oil of Oregano is composed of carvacrol and/or thymol as dominant components, followed by γ-terpenine, p-cymene, linalool, terpenine 4-ol, and sabinene hydrate **(**Maithani *et al.,* 2023**).** The oil is known to possess anti-bacterial, anti-viral, anti-septic, anti-microbial, anti-oxidant, anti-fungal, anti-coagulant and energetic action and flavouring properties **(**Maithani *et al*., 2023**).** Marjoram is a perennial herbin the mint family **(**Williams, 2023**).** Native to the Mediterranean and parts of Asia and Africa, some ancient civilizations viewed the herb as a symbol of happiness **(**Williams, 2023**).** In Greek mythology, Aphrodite, the goddess of love, grew marjoram **(**Williams, 2023**).** The fuzzy green leaves form petite clusters that slightly resemble knots. In fact, it is sometimes called "knotted marjoram." **(**Williams, 2023**).** The genus Origanum contains 40 species, but only one of them is considered true marjoram. The rest are considered oregano (Williams, 2023).

Marjoram is an annual plant 20 to 40 cm high, native to southwest Asia (Pages, 2024). It is commonly cultivated for its condimentary properties (Pages, 2024). Its upright stems have small, rounded, opposite, greyish-green leaves (Pages, 2024). The white flowers, grouped in ears ending the stems, are surrounded by characteristic rounded bracts (Pages, 2024). Marjoram is often referred to as "shell" Marjoram (Pages, 2024). The plant gives off a beautiful aromatic scent when rustled (Pages, 2024). Marjoram has a very ancient medical reputation. The Greeks used it extensively, both internally and externally for fomentations (Grieve, 2024). It was a remedy for narcotic poisons, convulsions and dropsy (Grieve, 2024). Among the Greeks, if Marjoram grew on a grave, it augured the happiness of the departed, and among both the Greeks and Romans, it was the custom to crown young couples with Marjoram (Grieve, 2024). *O. majorana* is supposed to be the plant called 'Amaracus' by Greek writers. The whole plant has a strong, peculiar, fragrant, balsamic odour and a warm, bitterish, aromatic taste, both of which properties are preserved when the herb is dry (Grieve, 2024). It yields by distillation with water a small quantity of a volatile oil, which may be seen in vesicles, on holding up the leaves between the eye and the light, and which is the chief source of its properties as a medicinal agent (Grieve, 2024). 1 Ib. of the oil is produced from about 200 lb. of the herb, which should be gathered when just coming into flower, early in July (Grieve, 2024). Large quantities of it are still gathered and hung up to dry in cottages in Kent and other counties for making Marjoram tea (Grieve, 2024). The 'swete margerome' was so much prized before the introduction of various foreign perfumes that, as Parkinson tells us, 'swete bags,' 'swete powders' and 'swete washing water' made from this plant were widely used (Grieve, 2024). The flowering tops yield a dye, formerly used in the country to dye woollen cloth purple, and linen a reddish brown, but the tint is neither brilliant nor durable (Grieve, 2024). The tops are also sometimes put into table beer, to give it an aromatic flavour and preserve it, and before the introduction of hops they were nearly as much in demand for ale-brewing as the ground ivy or wood sage (Grieve, 2024). It is said that Marjoram laid by milk in a dairy, will prevent it being turned by thunder (Grieve, 2024). Goat and sheep eat this herb, but horses are not fond of it, and cattle reject it (Grieve, 2024).

Marjorams are easy to grow, sun-loving Mediterranean herbs (RHS, 2024b). They're closely related to oregano and the two groups are easily confused (RHS, 2024b). In culinary terms, the main difference is flavour – marjoram's leaves are usually milder and sweeter, while oregano is spicier and more pungent (RHS, 2024b). They're all types of Origanum and form low bushy mounds of aromatic foliage and rounded heads of small pink or white flowers in summer, up to 50cm (20in) tall. The flowers are very popular with bees and butterflies (RHS, 2024). Marjoram leaves can be picked in spring and summer and are widely used in Greek and Italian cuisine, especially in tomato, meat and poultry dishes. When used fresh, the leaves are usually added near the end of cooking, to maintain their flavour. They can also be sprinkled in salads or infused in oil, vinegar or salad dressings (RHS, 2024). There are several types of marjoram to choose from – different species and varieties with variations in flavour, plant size, leaf colour, flower colour and tolerance for cold. In general they need protection from wet cold winters (RHS, 2024). You can explore a wide range of herbs, including marjoram, in all the RHS gardens, so do visit them for more herbal inspiration and growing tips (RHS, 2024). Marjoram is a perennial herb that originated in Egypt and Arabia, and is now indigenous to Cyprus and southern Turkey (Urban, 2024). With sweet pine and citrus undertones, it pairs great with tomatoes and tomato-based dishes, like marinara, in salad dressings, soups, and stews (Urban, 2024). Marjoram is also very popular in cosmetics, used in body lotions, shaving gels, and soaps. But its benefits don't stop there—marjoram contains many health benefits (Urban, 2024). Packed with vitamins, antioxidants, calcium, and iron, it's a great herb to add to your diet (Urban, 2024). Marjoram has been used for culinary and medicinal purposes since ancient times. It was used by the ancient Greeks and Romans as a symbol of happiness and for its healing properties (Area2farms, 2024). In ancient Greece, marjoram was used to make wreaths for wedding ceremonies, and to decorate tombs (Area2farms, 2024). The ancient Egyptians believed that marjoram had the power to heal and protect the dead, and it was often included in mummification rituals (Area2farms, 2024). In the Middle Ages, marjoram was used to ward off evil spirits and protect against the plague (Area2farms, 2024). Marjoram is a cold-sensitive perennial herb or undershrub with sweet pine and citrus flavours (Wikipedia. 2024). In some Middle Eastern countries, marjoram is synonymous with oregano, and there the names sweet marjoram and knotted marjoram are used to distinguish it from other plants of the genus Origanum (Wikipedia. 2024). It is also called pot marjoram, although this name is also used for other cultivated species of Origanum (Wikipedia. 2024). Marjoram is indigenous to Cyprus, the Mediterranean, Turkey, Western Asia, the Arabian Peninsula, and the Levant, and was known to the ancient Greeks and Romans as a symbol of happiness (Wikipedia. 2024). It may have spread to the British Isles during the Middle Ages. Marjoram was not widely used in the United States until after World War II (Wikipedia. 2024). The name marjoram (Old French: majorane; Medieval Latin: majorana) does not directly derive from the Latin word maior (major) (Wikipedia. 2024). Marjoram is related to Samhain, the Celtic pagan holiday that would eventually become Halloween (Wikipedia. 2024). It has also

been used in Sephardi Jewish tradition as a ritual medical practice. Ancient Greeks believed the plant was created by Aphrodite (Wikipedia. 2024). In one myth, the royal perfumer of Cyprus, Amaracus, was transformed into marjoram (Wikipedia. 2024). To the Romans the herb was known as the herb of happiness, and was believed to increase lifespan (Wikipedia. 2024). Marjoram is mentioned in De Materia Medica by Pedanius Dioscorides, and was used by Hippocrates as an antiseptic (Wikipedia. 2024). Oregano is a species of flowering plant in the mint family, Lamiaceae. It was native to the Mediterranean region, but widely naturalised elsewhere in the temperate Northern Hemisphere (Wikipedia, 2024a). Oregano is a woody perennial plant, growing to 90 cm tall, with opposite leaves 1–4 cm long. The flowers which can be white, pink or light purple, are 3–4 mm long, and produced in erect spikes in summer (Wikipedia, 2024a). It is sometimes called wild marjoram, while its close relative O. majorana is known as sweet marjoram. Both are widely used as culinary herbs, especially in Turkish, Greek, Spanish, Italian, Latin, and French cuisine (Wikipedia, 2024a). Oregano is also an ornamental plant, with numerous cultivars bred for varying leaf colour, flower colour and habit. (Wikipedia, 2024a). Marjoram is a somewhat cold-sensitive perennial herb or undershrub with sweet pine and citrus flavours (Wikipedia, 2024b). In some middle-eastern countries, marjoram is synonymous with oregano, and there the names sweet marjoram and knotted marjoram are used to distinguish it from other plants (Wikipedia, 2024b). Marijuana, scientifically known as Cannabis, is believed to have originated in Asia, specifically East Asia (Google, 2024). Archaeological and genetic evidence suggest its domestication occurred during the early Neolithic period, around 12,000 years ago (Google, 2024). The plant was initially used for various purposes, including fiber production, food, medicine, and recreational use (Google, 2024).

Marjoram, perennial plant of the mint family (Lamiaceae), grown as a culinary herb (Britannica, 2025). Its fresh or dried leaves and flowering tops are used to season many foods, imparting a warm, aromatic, slightly sharp, and bitterish flavour (Britannica, 2025). Marjoram is particularly appreciated for the taste it lends to sausages, meats, poultry, stuffings, fish, stews, eggs, vegetables, and salads (Britannica, 2025). Native to the Mediterranean region and western Asia, marjoram is also cultivated as an annual in northerly climates where winter temperatures kill the plant (Britannica, 2025). Marjoram is a bushy herbaceous plant that typically reaches 30–60 cm in height. The square branching stems are densely covered with hairy ovate leaves, arranged oppositely in pairs. The pale two-lipped flowers are not particularly showy and are borne in small spikelike clusters. Marjoram contains about 2 percent essential oil, the principal components of which are terpinene and terpineol (Britannica, 2025). Oregano, (*Origanum vulgare*), aromatic perennial herb of the mint family (Lamiaceae) known for its flavorful dried leaves and flowering tops (Britannica, 2025). Oregano is native to the hills of the Mediterranean countries and western Asia and has naturalized in parts of Mexico and the United States (Britannica, 2025). The herb has long been an essential ingredient of Mediterranean cooking and is widely used to season many foods (Britannica, 2025). Culinary varieties, such as Greek or Italian oregano, have a strong aroma and a warm pungent taste. Ornamental cultivars are typically bland in flavor and not suitable for cooking (Britannica, 2025). Oregano is usually grown as a small evergreen subshrub in mild climates. It reaches one to two feet (30–90 cm) in height, with branched woody stems and creeping roots (Britannica, 2025). The opposite, oval leaves are petiolate, measuring about 1.5 cm, and are covered with glandular trichomes (plant hairs). The young stems are typically square and hairy and become woody with age (Britannica, 2025). The flowers are small and borne in clusters; they range in color from white to pink or pale purple (Britannica, 2025). The name oregano comes from the Greek words oros (“mountain”) and ganos (“brightness” or “joy”), a reference to the plant’s natural habitat (Britannica, 2025). In Greek mythology oregano was believed to be a creation of goddess Aphrodite and symbolized happiness (Britannica, 2025). The Greeks used oregano in wedding ceremonies and placed it on graves to bring peace to the deceased (Britannica, 2025). Greek physician Hippocrates (460–375 bce) documented its use as an antiseptic and a treatment for digestive issues and respiratory ailments. He applied oregano oil to treat skin infections such as psoriasis and cuts, and relieve stomach pain (Britannica, 2025). In medieval Europe oregano was known for its healing properties, and people chewed it to relieve pain, indigestion, and cough (Britannica, 2025). To this day it is often used as a traditional remedy for asthma, cramps, and gastrointestinal issues (Britannica, 2025). *Origanum vulgare*, commonly known as oregano, is a perennial herb belonging to the mint family (Lamiaceae) (IOPS, 2025). It is native to the Mediterranean region and is widely cultivated for its aromatic leaves and medicinal properties (IOPS, 2025). The plant is also known as wild marjoram, and its name is derived from the Greek words "oros" (mountain) and "ganos" (joy) (IOPS, 2025).

ORIGIN AND DISTRIBUTION

Mediterranean, Euro-Siberian and Irano-Siberian regions are centre for diversity of the genus Origanum. About 75% of the Origanum species are concentrated in the East Mediterranean sub region. Presently, it’s found throughout Central Europe, North America and in some countries of Asia Minor. In India, the plant is generally found in the temperate Himalaya between 1,500 and 3,600 m high from Kashmir to Sikkim. O. vulgare was discovered in seven districts of Uttarakhand including Nainital (1480-2240 m), Uttarkashi (2500-2800 m), Rudraprayag (3555 m), Chamoli (3260 m), Bageshwar (2260 m), Champawat (1840 m) and Almora (2220 m), all of which are located at various altitudes (Maithani *et al*., 2023). While the exact location is debated, the consensus points to Asia as the birthplace of Cannabis (Google, 2024). Genetic and archaeological findings indicate that humans began cultivating Cannabis in East Asia around 12,000 years ago (Google, 2024). Over time, Cannabis has spread globally through cultivation and trade, becoming a widely known and used plant species. Marjoram is native to the Mediterranean region, Cyprus, and Western Asia. It has also been naturalized in parts of Mexico and the United States. While commonly cultivated in Europe, Africa, America, and Asia, its original habitat is in the Mediterranean and parts of Asia Minor. Mediterranean and Western Asia: Marjoram is believed to have originated in these regions. Cyprus and Turkey: The plant is specifically native to Cyprus and the adjacent part of South Turkey. Arabian Peninsula and Levant: The plant is also indigenous to these areas, according to Wikipedia. Global Cultivation: Due to its popularity as a spice and herb, it is now cultivated in various countries worldwide, including Europe, Africa, America, and Asia (Google, 2024). Marjoram is a plant native to Asia and the Mediterranean basin. It has been cultivated in France since the 16th century sunny lands of the Hexagon (Pages, 2024). Marjoram stems from Asia Minor. Since it is a popular spice, it is cultivated not only in Mediterranean countries, but also in Central and

Eastern Europe, although best qualities require a fairly hot climate (Gernot, 2024). Oregano is native to Europe, Central Asia, the Mediterranean, and North Africa. It was introduced to the United States after World War II. Soldiers upon their return home to the United States reported how much they enjoyed the taste of oregano on pizza while in Italy. The demand for oregano has grown significantly (NCSU, 2024). Native: Afghanistan, Albania, Algeria, Austria, Baltic States, Belarus, Belgium, Bulgaria, Central European Russia, China North-Central, China South-Central, China Southeast, Cyprus, Czechoslovakia, Denmark, East European Russia, East Himalaya, Finland, Germany, Great Britain, Greece, Hungary, India, Iran, Iraq, Ireland, Italy, Kazakhstan, Lebanon-Syria, Libya, Morocco, Nepal Netherlands, North European Russia, Northwest European Russia, Norway, Pakistan, Palestine, Poland, Portugal, Romania, Saudi Arabia, Sicily, South European Russia, Spain, Sweden, Switzerland, Tibet, Turkey, Ukraine, West Himalaya, West Siberia, Xinjiang, and Yugoslavia (NCSU, 2024).

TAXONOMY

Origanum is one of over 200 genera in the Lamiaceae (mint family), and the genus includes culinary, fragrant, medicinal and ornamental plants. Herbaceous perennials or subshrubs, origanums are native to the Mediterranean and Eurasia, and grow in mountainous areas with rocky, calcareous soil. Some species grow in mounds that are only 2-3 inches high while others grow erect up to 39 inches tall. All members of the genus have flowers that occur in spikes; for most species these form a panicle with multiple branched stems growing from a central stalk (Marjoram, 2005a). When most people think of oregano, pizza and pasta sauce come to mind. Oregano and marjoram may seem familiar and straightforward to the average cook, but in reality, these common herbs have a very complicated taxonomic history. Although Linnaeus first classified Origanum as a single genus, over the years, plants in the genus have been ordered under various botanical names including Amaracus, Origanum and Majorana. It's best to think of oregano as a flavor rather than a genus or species. Plants from several genera including Lippia and Plectranthus are also considered oreganos due primarily to the presence of the chemical carvacrol, which is largely responsible for oregano's signature scent and flavor. According to current estimates there are 44 species, 6 subspecies, 3 varietates (botanical varieties) and 18 naturally occurring hybrids. Because *Origanum taxa* are so variable and cross easily, there are hundreds of unclassified hybrids growing in gardens where close proximity encourages crossing that isn't likely in the wild (Marjoram, 2005a). Genus Origanum (Lamiaceae) consists of 43 species and 18 hybrids arranged in three groups and 10 sections. Members of this genus comprise some of the most important aromatic plants throughout the world such as: sweet marjoram (*O. majorana* L.), dittany from Crete (*O.dictamnus* L.), Italian oregano or pot marjoram (*O. onites* L.), Greek oregano or marjoram (*O. heracleoticum* L.) and Turkish wild oregano (*O. vulgare*) and bible hyssop or Syrian oregano (*O. syriacum*). These are all commercially available and exportable plants with appreciable market values (Potty and Krishna Kumar, 2012). Origanum is one of the genera represented by 10 sections with 43 species, 6 subspecies, 3 botanical varieties and 18 naturally occurring hybrids. It is an aromatic, branched, perennial herb and average plant height of 30-80cm has been reported by many researchers. Weglarz *et al*. (2020) studied the differences between Greek oregano, *O. vulgare* L. subsp. *hirtum* (Link) Letswaart, and common Oregano, *O. vulgare L.* subsp. *vulgare*, in central Europe, and reported that the plant height in common Oregano was 36.11 ± 1.93 cm while in Greek Oregano, it was 26.15 ± 1.86 cm. Greek Oregano plants grown in Poland were about 10 cm lower than common Oregano plants (Maithani *et al*., 2023). Many subspecies and strains of oregano have been developed by humans over centuries for their unique flavours or other characteristics. Tastes range from spicy or astringent to more complicated and sweet. Simple oregano sold in garden stores as O. vulgare may have a bland taste and larger, less-dense leaves, and is not considered the best for culinary use, with a tasteless remarkable and pungent. It can pollinate other more sophisticated strains, but the offspring are rarely better in quality (Wikipedia, 2024a).

- *O. v.* subsp. *glandulosum* (Desf.) Ietsw. – Tunisia, Algeria.
- *O. v.* subsp. *gracile* (K.Koch) Ietsw. (= *O. tyttanthum*) has glossy green leaves and pink flowers. It grows well in pots or containers, and is more often grown for added ornamental value than other oregano. The flavor is pungent and spicy. – Central Asia, Iran, India, Turkey, Afghanistan, Pakistan.
- *O. v.* subsp. *hirtum* (Link) Ietsw. – (Italian oregano, Greek oregano) is a common source of cultivars with a different aroma from those of *O. v. gracile*. Growth is vigorous and very hardy, with darker green, slightly hairy foliage. Generally, it is considered the best all-purpose culinary subspecies. – Greece, Balkans, Turkey, Cyprus.
- *O. v.* subsp. *virens* (Hoffmanns. & Link) Ietsw. – Iberian Peninsula, Macaronesia, Morocco.
- *O. v.* subsp. *viridulum* (Martrin-Donos) Nyman – widespread from Corsica to Nepal.
- *O. v.* subsp. *vulgare* – widespread across Europe + Asia from Ireland to China; naturalized in North America + Venezuela. (Wikipedia, 2024a).

Marjoram makes an attractive addition to herb gardens, containers and any sunny spot. There are several species and varieties, including the most common, sweet or knotted marjoram and pot marjoram (*O. onites*) which generally need winter protection in all but the mildest parts of the UK whereas O. 'French' is a little hardier (RHS, 2024b). The genus name, Origanum, is derived from the Greek words, oros meaning "mountain" and gamos meaning "beauty." The plant is referred to as the "beauty of the mountain" because of its physical appearance and native habitats. Typically, the common name of most of the species or varieties describes that particular plant's flavour (NCSU, 2024).

Species (NCSU, 2024).

Plants from the genus Oregano may be used in herb gardens, cottage gardens, and rock gardens. They may serve as a groundcover, borders, or container plant. Some of the species include:
Origanum dictamnus (Dittany of Crete): dwarf, evergreen, gray-white leaves, tiny pink flowers, ornamental
Origanum laevigatum: perennial, ornamental, purple-pink flowers, ornamental

Origanum majorana (Sweet marjoram): perennial evergreen subshrub with tiny pink or white flowers, culinary herb
Origanum x majoricum (Italian Oregano): perennial with white flowers, culinary herb
Origanum vulgare (Oregano or Wild Marjoram): perennial with purplish-pink flowers, culinary herb

Synonyms: *Origanum creticum, Origanum officinale, Origanum orientale* (Jafari Khorsand *et al*., 2022).

Majorana hortensis Moench, *Majorana hortensis , Origanum dubium* Boiss. , *Origanum dubium , Origanum majorana* L., *Origanum majorana* and sweet marjoram (Pubchem, 2024).

Synonyms (Indiabiodiversity, 2024).

Amaracus majorana (L.) Schinz & Thell.
Majorana cretica var. *hortorum* Alef.
Majorana dubia (Boiss.) Briq.
Majorana fragrans Raf.
Majorana hortensis Moench
Majorana majorana (L.) H.Karst., nom. inval.
Majorana mexicana M.Martens & Galeotti
Majorana ovalifolia Stokes
Majorana ovatifolia Stokes
Majorana suffruticosa Raf.
Majorana tenuifolia Gray
Majorana uncinata Stokes
Majorana vulgaris Gray, nom. superfl.
Origanum confertum Pi.Savi
Origanum dubium Boiss.
Origanum majorana var. *majoranoides* (Willd.) Nyman, nom. superfl.
Origanum majorana var. *tenuifolium* Weston
Origanum majoranoides Willd.
Origanum odorum Salisb., nom. superfl.
Origanum salvifolium Roth
Thymus majorana (L.) Kuntze

BOTANICAL DISCRIPTION

Sweet marjoram is obtained from *Origanum majorana* L. (syn. *Majorana hortensis* Moench., *M. vulgaris* Miller), a dwarf shrub of dry and rocky places, native on Cyprus and the adjacent part of South Turkey. It is cultivated in several countries in Europe, Africa, America, and Asia. The plants are up to 60 cm high and have ovate, whitish or greyish leaves, one-lipped calyces and white corollas. The flowers are arranged in spikes forming a paniculate inflorescence. Because of their fragrant odor and pleasant, highly aromatic, slightly sharp and spicy taste, the dried leaves of *O. majorana* are widely used as flavoring agents for dressings, egg and vegetable dishes, soups, stews, cheese, liver, Polish sausages, and fancy meats (Kokkini *et al*., 2003). Sweet marjoram is an aromatic herb of the mint family and grows to a height of 30–60 cm. The herb develops a large number of leafy stalks with small leaves. The leaves are whole and the large ones are always fragmented. Leaves are light, greyish green and oblate to broadly elliptical, margin entire, reaching about 21 mm in length and 11 mm breadth. The flowers are small, white or pinkish or red. Essential oil is very strong and of very pleasant fragrance. The highest percentage is found in the leaves, whereas only traces are found in flowers and stalks. Long periods of blooming encourage the accumulation of oil in seeds. Sweet marjoram is characterized by a strong spicy and pleasant odour. The flavour is fragrant, spicy, slightly sharp, bitterish and camphoraceous. Though a perennial, it is treated as an annual under cultivation. The colour of the dried herb is light green with a slight greyish tint. The whole leaves are small with hairs on both sides of the leaf. When examined under the low power of a microscope, many dot-sized oil glands are seen on the leaf. They yield 3.5% volatile oil. The colourless oil is obtained from the whole plant, including the square stem, the long leaves and the white labiated blossoms. The scent is reminiscent of a mixture of lemon and lavender (Potty and Krishna Kumar, 2012). Marjoram is an herb that comes from the leaves of the plant that belong to the genus Origanum, which is of the mint family. Marjoram leaves are light green color and have an oval shape. Marjoram is often confused with oregano because they are similar. However, marjoram is a considered to be mild as compared to oregano and has sweet tasting characteristics that oregano does not contain. Marjoram is a perennial herb (Hisrory, 2014).

Marjoram consists of dried leaves, with or without flowering tops. The pinnate leaves are obovate to broadly elliptical, 21 mm × 11 mm in size with entire margins and short petioles; both surfaces are grayish green, glandular-punctate, and pubescent. The floral parts have light grayish yellow, obovate, thin, and up to 5.5 mm × 3.5 mm bracts; gamosepalous calyxes, about 3 mm long with five prominent teeth; and gamopetalous, white to pink or pale lilac corolla, about 3.5 mm long. In a transverse section and/or surface view, it is possible to see an epidermis with a thin cuticle, one to two palisade layers, and upper and lower epidermal cells with slightly wavy, knotty, and vertical walls. Glandular and nonglandular hairs occur on both surfaces, and the latter are uniseriate, with two to five cells in length and more or less bent inward at the apex; some are papillose. Glandular hairs are of two types, one with a one- to two-celled stalk and a one- to two-celled glandular head and the other with no stalk and a large, eight-

celled head; the latter is sunk in a depression in the epidermis; stomata occur on the lower epidermis with two 'neighboring' cells. The odor and taste of sweet marjoram are aromatic, characteristic, and slightly pungent; the plants are harvested as soon as they flower. The plants are cut and tied in bunches and dried in open air or spread on wire trays in ventilated rooms and dried by circulating warm air. Marjoram was shown to contain a considerable amount of antioxidants that could be most effectively extracted using supercritical fluid extraction (Wilson, 2016). *O. vulgare* is a perennial herb, which is widespread throughout the Mediterranean region, Western and South- western Eurasia and in the Irano-Turanian region. According to the most widely accepted taxonomic reference for the genus, *Origanum vulgare* L. comprises six subspecies, which are distinguished on the basis of differences in the indumentum, the size or colour of bracts and flowers and in the number of oil glands on the leaves. The plants from the genus Origanum have bracts or non-typ-ical leaves, which surround the calyx and corolla. The leaves are spade-shaped, olive-green and are covered with fine hairs called trichomes. The leaves and flowering parts of the plant contain essential oil glands that produce volatile oils, which give the plant its fragrance. *O. vulgare* has flowers that occur in spikes forming a panicle with multiple branched stems growing from a central stalk. Corollas are purple, pink or white, depending on the subspecies (Alekseeva *et al*., 2020). It is a perennial plant; the length of the plant is 30–90 cm, the leaves are 1–4 cm in length. The good growth of the oregano plant is between 6.0 to 4.0 pH. The flowers of oregano are purple in color, which are 3–4 mm long, formed in erect spikes. It does not grow much larger in size. Its leaves are broad and elliptical in shape. The flowers are blue or pink. Fruits are small in size and smooth, brown in color. The branches of the plant are woody. The leaves have small-sized dotted glands that contain volatile oil, which gives aroma and color to the plant (Verma, 2021).Oregano is a spicy, Mediterranean, perennial herb, particularly common in Greek and Italian cuisines. It is an aromatic, woody-based perennial, which grows to 20-90 cm in height. Its leaves are ovate, 1-4 cm long and 0.5-2.5 cm wide, oppositely arranged. The edges of the leaves are smooth or very shallowly toothed, and the leaf tips vary from pointed to blunt. The flowers are tiny, borne in many-flowered, short dense lateral or branch-end spikes. The flowers are white to purplish, 4-8 mm long, and have two lips. The calyx is five-toothed. Each flower has four stamens. Each fruit has four small nutlets. Oregano is found in Europe and Asia. In India it is found in the Himalayas at altitudes of 1500-3600 m (Jafari Khorsand *et al*., 2022). Marjoram is an herbaceous perennial sometimes grown annually according to climatic conditions. It contains small oval-shaped leaves with small pink to purple flowers that grow on top of the leaf foliage. This herb is having a minty and sweet flavor somewhat like oregano but mild in taste having a strong fragrance that is recognizable from a distance. Marjoram is a cross-pollinated plant, and this trait is exploited to develop new varieties to use its chemical compounds in various sectors. Morphological variations are present in this herb due to cultivation in different regions of the earth. Apart from marjoram subspecies grown and utilized from the genus Origanum, the first is pot marjoram (Origanum *onites)* used for its leaves for flavoring dishes, and the second is wild marjoram (*Origanum vulgare*) commonly known as oregano and is which is native to Europe and Asia. Sweet marjoram is a bushy herbaceous plant that grows up to a height of 30-60 cm and thrives in mild weather conditions with temperatures ranging from 25-30 ℃, sunny and dry. Mostly grown from March to September in loamy-fertile soil with a pH of 6-7. It bears hairy ovate leaves arranged in pairs, and spike-like small pink to purple flowers are present in clusters (Dhiman and Bhasin, 2022). For instance, common Oregano plant's height ranged from 18 to 59 cm while in Greek Oregano, it vared from 67.8 to 79.9 cm. Leaves are broadly ovate, 10-44 mm long and 5-25 mm wide with opposite phyllotaxy and the number of primary branches ranged from 5 to 55. The flowers grow in terminal corymbose cyme. Flowers are pale, white or pink in colour and 5-8 mm long. The calyx has five sepals and four stamens. The nutlets are brown in colour. Dorsi ventral leaves have diacytic type of stomata. Trichomes are simple or covering type and glandular type. The peltate trichomes consists of enlarged secretory head, made up of 12–16 glandulous cells covered by a common cuticle. Volatile oils are released upon rupture of the cuticle, which are responsible for synthesis of other more hydrophilic metabolites like phenolic compounds and polysaccharides. The upper and lower epidermal cells were found to be wavy with thin cell wall. Vascular bundle is restricted to the midrib region and comprises of collateral arrangement of xylem and phloem in stem. The variation in *O. vulgare* L. populations in terms of morphological, anatomical, histo-chemical, germination and essential oil composition was primarily restricted to European nations, whereas such studies from India are limited (Maithani *et al*., 2023).

Oregano is a perennial, although it is grown as an annual in colder climates, as it often does not survive the winter. It grows to 90 cm tall and 50 cm wide. The leaves are spade-shaped and olive-green. The flowers are purple, pink or white, 4–7 cm long and grouped in clusters. Oregano is related to the herb marjoram, sometimes being referred to as wild marjoram (Wikipedia, 2024a). Was alleged created by Aphrodite as a symbol of happiness! Also known as sweet or knotted marjoram. Sweet pine and citrus flavoured grey green foliage. A very valuable herb as an infusion as it is a relief for stomach pains. A member of the mint family (Victoriananursery, 2024). Marjoram is the name given to many species of perennial herb belonging to the genus Origanum, including the major species *Origanum majorana* which is grown for its leaves which are commonly used as a herb in cooking. Marjoram plants can be woody or herbaceous and possess multiple branching stems. The leaves are oval or round and are arranged alternately on the stems. The plants produce small pink, purple or white flowers and small oval, brown fruits and can reach up to 1 m in height. Marjoram is perennial and can be grown for 3–4 years but is commonly grown as an annual in northern climates. Marjoram may also be referred to as sweet marjoram and originated from the eastern part of the Mediterranean in Cyprus and southern Turkey (Plantvillage, 2024). Sweet marjoram, a low-growing plant native to the Mediterranean, makes a pretty summer groundcover or edging. A subtly colored plant, marjoram has thin, gray-green leaves and, in early summer, small knot-like flowers along the stem ranging in color from lilac to white. It grows well in the garden or in containers, and you can plant a nice kitchen window box using marjoram with parsley, basil, and summer annuals (Bonnieplants, 2024). It is a perennial herb, with creeping roots, sending up woody stems about a foot high, branched above, often purplish. The leaves are opposite, petiolate, about an inch long, nearly entire hairy beneath. The flowers are in corymbs, with reddish bracts, a two-lipped pale purple corolla, and a five-toothed calyx, blooming from the end of June, through August. There is a variety with white flowers and light-green stalks, another with variegated leaves. It is propagated by division of roots in the autumn. When cultivated, the leaves are more elliptical in shape than the Wild Marjoram, and the flower-spikes thinner and more compact. Marjoram has an extensive use for culinary purposes, as well as in medicine, but it is the cultivated species (Grieve, 2024). Plant this sub-shrub edible herb in well-drained

neutral to alkaline soil in the full sun. It prefers sandy loam and really needs good drainage to thrive. It has excellent drought tolerance once established and heat tolerance making it a good choice for hot southern summers. It may not be cold tolerant however and so planting in containers that can be brought in to overwinter may be a good option. Plant in borders, along edges, in hanging baskets, or window boxes or mass along a slope. To encourage more dense and bushy growth pinch or prune back stems before flowers appear in the summer. Harvesting leaves before the flowers bloom will ensure the best flavor. It has a more mild flavor than *O. vulgare*. Flowers have a sweet, spicy flavor and are used in soups, stews, dressings, and sauces (Plants,2024).
Oregano is the name given to many species of perennial herb belonging to the genus Origanum, including the major species *Origanum vulgare* which is grown for its leaves which are commonly used as a herb in cooking. Oregano plants can be woody or herbaceous and possess multiple branching stems. The leaves are oval or round and are arranged alternately on the stems. The plants produce small pink, purple or white flowers and small oval, brown fruits and can reach up to 1 m in height. Oregano is perennial and can be grown for 3–4 years but is commonly grown as an annual in northern climates. Oregano may also be referred to as European oregano or wild marjoram and originated from the Mediterranean (Plantvillage, 2024). Origanum, or oregano, is a genus of subshrubs and herbaceous perennials in the Lamiaceae or mint family that are grown primarily as ornamentals or culinary herbs. This genus has 45 species, 6 subspecies, and 3 varieties. Oregano may grow in bushy mounds, prostrate, or erect. The plants may measure 6 inches to 3 feet in height and 1 to 2 feet in width. The leaves are aromatic, small oval to round, and either smooth or hairy. The blooms may be white, pink, or purple and appear in small 1-inch spikes, panicles, or corymb. The fruit is small, ovoid, brown nutlet. The different species can vary in flavor, aroma, size, and color (NCSU, 2024). Origanum vulgare is a small, shrub-like plant that grows up to 90 cm in height, with oval-shaped leaves that are typically 1-4 cm long. The leaves are pungent and have a warm, earthy flavor, which makes them a popular ingredient in various cuisines, particularly in Greek and Italian cooking (IOPS, 2025).

Botanical description and products are given in Fig.1 and 2.

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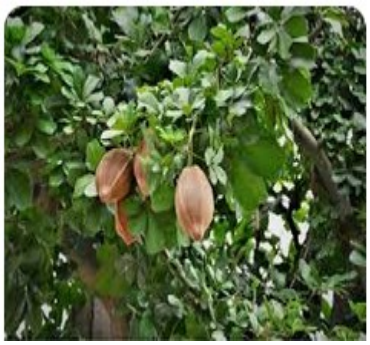
<tr><td>  </td><td>  </td><td>  </td></tr>
<tr><td>Fruits</td><td>Seeds</td><td>Seeds</td></tr>
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<tr><td>Seeds</td><td>Sowing</td><td>Seedlings</td></tr>
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<tr><td>Plants</td><td>Plants</td><td>Leaves</td></tr>
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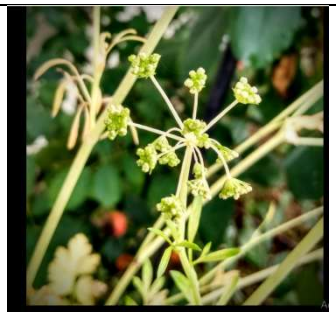
Stem



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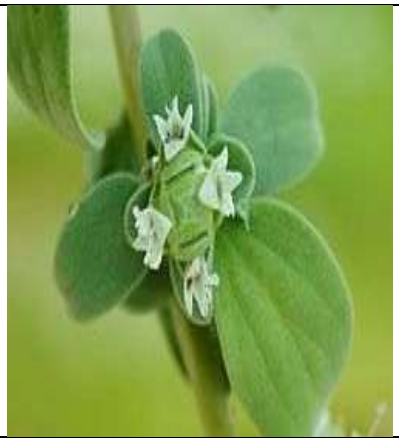
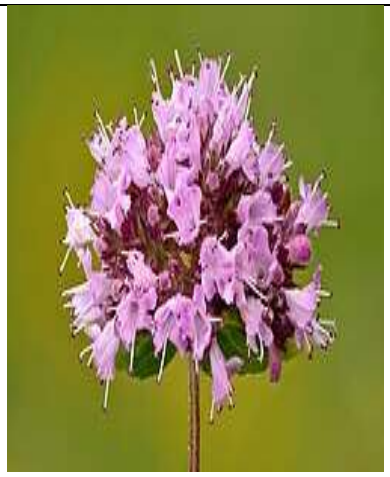
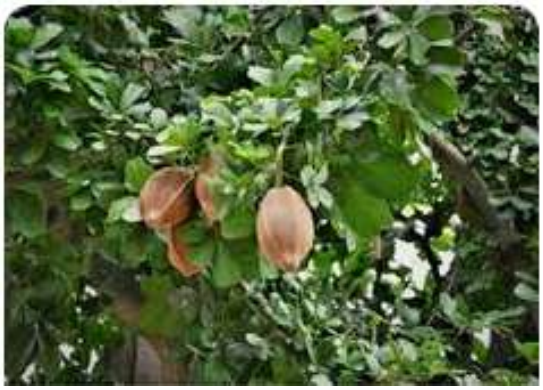


Flowers

Flowers



Flowers



Fruits

Fig. 1: Botanical Description

Fresh and dried oregano

Flakes

Oregano essential oil

Fig. 2: Products of Marjoram

Pollination: In *Origanum* species, controlled hybridization using the flower emasculation technique is very expensive due to small size of the flowers and the type of inflorescence. The well-known dioeciousness in Origanum genus can provide us with tools to control crossing. Male sterility is well-studied in *O. vulgare* subsp. *vulgare* and it has a complex genetic background. This male sterility can be used in heterozygous breeding for higher dry matter production and improved homoplasmy dominance, or in interspecific crosses to combine desirable traits from different species (Maithani *et al*., 2023).

GENETICS AND CYTOGENETICS

Most of the *Oregano* spp. consists of 2n=30 chromosome number and the basic number of chromosome are x = 15 (Maithani *et al*., 2023). Marjoram, scientifically known as *Origanum majorana*, is a diploid herb with a chromosome number of 2n=30. Studies

on its genetics and cytogenetics, including genome size and chromosome number, have provided valuable insights into its classification, breeding potential, and taxonomic relationships within the Origanum genus. *Origanum majorana* has a chromosome number of 2n=30, meaning it's a diploid species (Google, 2024a). Sweet Marjoram has a chromosome number of 2n=2x=30m (CBCB, 2024).

GENETIC DIVERSITY

In the present investigation we focus to study the phylogenetic and chemical variability (essential oil) among four Origanum species under Egyptian condition. Twenty-three components were identified across the four species of genus Origanum. Carvacrol, thymol, p-cymene, and γ-terpinene were found as major components in oils of Origanum vulgaris, Origanum vulgare subsp. Hirtum and Origanum syriacum var. sinaicum, whereas, the volatile oils of marjoram 'cymyl'-compounds are almost completely absent and high percentages of 'sabinyl'-compounds are present. The grouping patterns between the four species provided by ISSR and SRAP were similar, while the combined data of diversity analysis was great accurate to distinguished between the individual species and sub-species. A set of 16 ISSR and 12 SRAP primers combination were compared in terms of their informativeness and efficiency for analysis of genetic relationships among the four Origanum species. The ISSR and SRAP exhibited a remarkable variation among the tested species. The SRAP exhibited effective and relatively higher level of assay efficiency index (72.50), effective multiples ratio (16.58) and marker index (16.08), than the ISSR. Considering the results of SRAP marker system seems to be more effective than ISSR for studies on intraspecific diversity and relationships among Origanum germplasm. SRAP had more sensitive, distinctive nature and higher discrimination capacity and could simultaneously detect several polymorphic markers per reaction. These findings can be very applicable to resolve the evolution genetic relationships, breeding strategies and management of its genetic resources within the genus Origanum (Amar and El Wahab, 2013.). A field experiment was conducted during 2005–2009 to evaluate the 18 accessions of Indian Oregano (Origanum vulgare L.) collected from western Himalaya region of Uttarakhand. All the accessions collected were screened for herb yield and essential oil yield. The highest herb yield was recorded in 'OV7' (926.40 g) followed by 'OV4' and 'OV9' with 671.40 and 635.00 g, respectively. The essential oil yield was found to be highest in accession 'OV7' (1.83 ml). The 'OV4' accession dominated by thymol as the major compound yielded 1.40 ml followed by 'OV9' with carvacrol as major compound yielding 1.26 ml. The result of the experiment evaluated accession 'OV7' for high herb and essential oil yield. While accessions 'OV4' and 'OV9' can be domesticated as high thymol and carvacrol rich lines (Chauhan *et al*., 2013). Studies on systematic, genetic diversity and identification of Origanum species have been mostly focused on the morphological characteristics and the composition of the essential oil. However, in the last decades, molecular markers such as AFLP, ISSR, SAMPL, SSR, RAPD and CAPS have been applied to detect DNA polymorphism between/within populations and to identify phylogenetic relationships. Developed the first simple sequence repeat (SSR) markers for the genus Origanum. Elaborated 13 SSR markers from expressed sequence tags (ESTs) of essential oil glands of *O. vulgare*. The developed markers were also able to cross-amplify PCR products from O. majorana. The authors analyzed a total of 20 *O. vulgare* and 19 O. majorana plants. The number of alleles for a marker ranged between 2 and 4. The observed and expected heterozygosities ranged from 0.00 to 0.60, and from 0.14 to 0.67, respectively (Alekseeva *et al*., 2020). The species and subspecies included *O. heracleoticum* (from USA, this is the old name of *O. vulgare* ssp. *hirtum*), *O. majorana, O. syriacum, O. vulgare* ssp. *gracile*, *O. vulgare* ssp. *hirtum, O. vulgare* ssp. *vulgare*. The results of ISSR-PCR revealed polymorphism between species and subspecies of the genus Origanum, which ranged from 80 to 100%. The identification of all tested accessions was possible based on the banding profiles. Certain ISSR primers could be used to distinguish the *O. vulgare* subspecies. Specific bands enabled distinction between accessions of the same species but of different origin. The results suggested that ISSR primers can be successfully used for identification and estimation of genetic variability within Oregano genus (Alekseeva *et al*., 2020). Besides aromatic characteristics of the other oregano species, essential oil of *Origanum acutidens* has lethal effects on some cancer lines. This study was performed to determine genetic diversity in the 70 oregano (*Odostomia acutidens*) genotypes based on several agro-morphological traits and start codon targeted (SCoT) markers in the endemic spread zone of *O. acutidens*. The result of principal component analysis (PCA) revealed that the first two components accounted for 79.56% of the total agro-morphological variation. Cluster analysis based on phenotypic data grouped all investigated genotypes into three main clusters. GGE Biplot analysis indicated that genotype numbers as G35, G11, G24, G10, and G22 with the lowest interaction with different environments were more stable than the others ones. Taking into account all analyses, genotype numbers G36, G12, G10, and G33 were selected as ideal materials. In the molecular section, 10 SCoT primers generated 109 polymorphic fragments. The mean value of polymorphic information content (PIC) was 0.36. The mean number of effective alleles (Ne), Nei's genetic diversity (H), and Shannon's information index (I) were 1.63, 0.38, and 0.57, respectively. The unweighted pair-group method with arithmetic mean (UPGMA) algorithm grouped the 70 investigated genotypes into three main clusters. Mantel test showed no correlation between genetic distance and geographical distance in these individual ($r = 0.01$, $p = 0.69$). Moreover, population structure analysis showed that all genotypes formed three sub-populations. In general, population structure of the 70 investigated oregano genotypes collected from different origins of Turkey were successfully characterized with the aid of SCoT markers. Our results suggest that evaluation of genetic diversity and structure analysis in the natural populations could efficiently provide comprehensive information for conservation of endemic and endangered species that can be used in future breeding programs (Karagöz *et al*., 2022).

BREEDING

Conservation

Efforts are being made to promote sustainable cultivation and harvesting practices, as well as to conserve the plant's genetic diversity (IOPS, 2025).

Breeding

For genetic improvement, high variability is found in Origanum population which can be good source for selection work. Conventional and molecular breeding can be used for enhancing essential oil content and its most distinctive chemical compounds. Recent findings revealed that Random Amplified Polymorphic DNA (RAPD), Amplified Fragment Length Polymorphism (AFLP) and Selectively Amplified Microsatellite Polymorphic Loci (SAMPL) markers were effective instruments for identifying the genetic makeup of *O. vulgare* taxa (Maithani *et al*., 2023).

Varieties

‘Aureum’ is a variety with attractive golden leaves widely grown as an ornamental plant.
‘Greek’ is highly aromatic and pungent than the common variety, with bright green foliage.
‘Rosenkuppel’ an ornamental plant with dark purple bracts and mauve flowers.
Oregano is closely related to marjoram (O. marjorana), which is also an easy-care culinary herb (Chauhan *et al*., 2013).
'Aureum' – golden foliage (greener if grown in shade), mild taste: It has gained the Royal Horticultural Society's Award of Garden Merit.

'Greek Kaliteri' – O. v. subsp. hirtum strains/landraces, small, hardy, dark, compact, thick, silvery-haired leaves, usually with purple undersides, excellent reputation for flavor and pungency, as well as medicinal uses, strong, archetypal oregano flavor (Greek kaliteri: the best).
'Hot & Spicy' – O. v. subsp. hirtum strain.
Nana' – dwarf cultivar. (Wikipedia, 2024a).
Sweet marjoram: A member of the oregano family with a sweet, delicate flavor.
Variegated marjoram: Low growing, with yellow-green variegated foliage (Boeckmann, 2025).

Uses

Sweet marjoram was a popular culinary herb in Europe during the Middle Ages when it was used in cakes, puddings and porridge and records of its culinary use date back to the 1300s in Spain and Italy when it was added to stews and shellfish. O. majorana was a common salad herb in the 16th century and was used to flavor eggs, rice, meats and fish during the Renaissance. Both marjoram and oregano have been used to make teas, and prior to the introduction of hops, wild marjoram/oregano was an ingredient in beers and ales. Although oregano has been used in the cuisines of its native countries and was employed since 7th century B.C. to flavor meat, vegetables, fish and wine, the herb’s pervasive culinary popularity is somewhat more recent. Oregano has been grown in America since colonial times but was not in widespread use in the U.S. until the end of WWII, when American GIs returned from Europe with a taste for pizza and Italian sauces. Dittany of Crete has had more limited culinary use, but the flowers and bracts were reportedly used to make tea, and the plant was combined with garlic, parsley, thyme, salt and pepper in a Saxon fish sauce (Marjoram, 2005a). Origanums have historically been used for hygiene, fragrance and cleaning. The Egyptians used oregano as a disinfectant, preservative and medicine. Marjoram was combined with oregano, rosemary and lavender by the Romans in linen and bath sachets and sachets of dried Origanum were used to protect stored clothes from moths and other insects. According to Culpeper, “Marjoram is much used in all odiferous Waters, Pouders, etc., that are used for Ornament or delight” and Parkinson recommended marjoram, which he called sweete marierome, for use in nosegays, sweet bags and sweet washing waters. Gerard described sweet marjoram as “of a most pleasant taste and aromatical smell” and recommended the leaves as “excellent good to be put into all odiferous ointments, waters, powders, broths, and meats”. Marjoram was used to polish furniture and floors in Europe and was listed as one of Tusser’s strewing herbs scattered over floors to freshen, disinfect and ward off disease, although it isn’t completely clear whether the plant in question was sweet or wild marjoram (Marjoram, 2005a).

Marjoram has pleasantly aromatic and distinctly mint-sweet flavour with slightly bitter undertones. This subtle aroma makes it an ideal addition to many herb mixtures as it helps give ‘body’ and depth to a variety of dishes. Marjoram is used in many foods where a well-rounded herb note is desired. It is more often used in western rather than eastern cooking. It is used in the whole and ground form and to a limited extent as an essential oil or oleoresin. Nowadays, marjoram is added to soups, salad dressings, sauces for stewed meats (mainly mutton) and stuffings. Use of marjoram in a ground herb blend which goes well with poultry flavoured foods. It is used in Italian herb blends and is often a component of pizza and spaghetti sauce mixes. Italian sauces often contain marjoram with other spices such as onion, oregano, basil, fennel, black pepper, red pepper if heat is desired, and possibly thyme. Greek cuisine uses oregano and marjoram frequently. Its widest use, however, is in seasoning sausages and salamis. Marjoram has a delicate perfume, which can be lost easily while cooking. Hence, some consider it is at its best when added shortly before the end of cooking or used in dishes which are cooked very little, such as an omelette. It may also be used raw, and it is particularly delicious when finely chopped and with lemon juice (Potty and Krishna Kumar, 2012).

Fresh leaves are employed as garnish and incorporated in salads. The dried leaves and floral tops are also superb for seasoning all meats, poultry, sea food and baked or grilled fish, egg and tomato dishes, soups such as chicken, mutton and turtle, green vegetables, stews and fruit salads, in flavouring vinegar and in formulation of liqueurs and vermouths. Sometimes it is used together with other fresh herbs in ‘bouquet garni’. It has been used as a substitute for oregano when prices for that spice go up. Marjoram can also be added to practically any dish in which one would use thyme. Marjoram was used in brewing beer before hops were known, and in France for making a wine called ‘hippocras’. It was also added to water used to rinse the fingers at the table during banquets. Dried flowering tops are used for sachets and potpourri. Seed of sweet marjoram finds use in meat products

and confectioneries, and French confitures make use of both the seeds and the oil. Sweet marjoram oil is used for flavouring fats, oils, baked foods, coconut foods, meat products, processed vegetables, condiment relishes, soups, vinegars, snack food and gravies. It is also employed in perfumery to introduce a fresh slightly medicinal–aromatic warm note and in medicinal formulations (Potty and Krishna Kumar, 2012). Marjoram tastes similar to mild oregano and they are often substituted for other another. Oregano has a much stronger flavor than marjoram. This herb is a common ingredient called for in German and Polish sausage recipes. In French cooking, it is frequently included in the herbes de provence blend. Marjoram is great in marinades, salad dressings, and soups because it adds a nice, mild flavor. It is also a key ingredient in Thanksgiving stuffing (Hisrory, 2014).

Marjoram is used to flavor and garnish soups, stews, salads, sauces, dressings, and more. It can also be made into an herbal tea (Williams, 2023). Marjoram leaves are carefully dried to be used for cooking. This aromatic herb can be used alone or as part of a spice blend like herbs de Provence or za'atar. The flowering leaves can be used to distill marjoram essential oil, which can be used for medicinal or cosmetic purposes. In cooking, dried marjoram is often used to add a citrusy flavor to salad dressings. It pairs well with chicken and meat dishes. It is often used to season preserved meats such as German sausage. The subtle flavor of marjoram is also a great complement to sauces, especially tomato-based dishes like tomato sauce or pizza sauce. Some of the herbs that marjoram blends well with are lavender, basil, rosemary, thyme, fennel, thyme, sesame, and sumac. Middle Eastern and Italian dishes often include marjoram as one of the primary seasonings because of the delicate but delightful notes of citrus that it adds (BWM, 2023). The early uses of Cannabis were diverse, including producing fiber for rope and textiles, using it as a source of food and medicine, and even for religious or recreational purposes (Google, 2024). Marjoram is consumed in many forms. It is obviously found in herbal teas. Just let the Marjoram leaves brew for ten minutes to smell its pleasant fragrance, appreciate its taste and enjoy its virtues. It is ideal to drink a delicious infusion of Marjoram just before bedtime. The leaves and flowering tops of Marjoram can also be used. Fresh or dry, they can be used to flavour cooked dishes, soups, sauces and marinades. The very distinct aromatic aroma of Marjoram gives it a very justified use in cooking. Its slightly smoky taste is ideal with a Provençal vegetable dish, zucchinis, eggplants or potatoes. Marjoram also goes very well with pizzas, cheese pies or salads. It is a very interesting aromatic culinary ally. The word "Marjoram" is also used as a female first name. Inspired by the name of the plant, this Latin name, at the time of its first uses, referred to the "Majorana". The botanical name of Origanum being "Origanum majorana", the first name Marjoram is directly linked to the fields of Origan and bears soft Provençal symbols (Pages, 2024). The leaves of the oregano plant are used fresh or dried as a herb in cooking. They may also be dried and used to extract essential oil which is used in soaps or as flavorings in wines and liqueurs (Plantvillage, 2024). Culinary uses of oregano include flavoring tomato sauces, egg dishes, soups, stews, dips, vinegar, vegetable dishes, and pizza (NCSU, 2024).

Marjoram is used for seasoning lamb and vegetable dishes, soups, stews, salad dressings, sauces, herbal teas,[18] and sausages. Its flavor resembles that of oregano. Marjoram has long been used as a medicinal herb. Marjoram or marjoram oil has been used to treat cancer, colds, coughs, cramps, depression, as a diuretic, ear infections, gastrointestinal problems, headaches, and paralysis, as well as arthritis, chest congestion, and muscle aches. It has also been used as an aphrodisiac, mouthwash, tea, and in poultices, tinctures, and infusions. Though not all of its historic uses are scientifically backed, the plant has verifiable medical use. For example, it contains the phenol carvacrol, which is antibacterial, antifungal and antimicrobial. Ethanol extract is cytotoxic against fibrosarcoma cell lines, ethyl acetate extract has antiproliferative properties against PER.C6 and HeLa cells, as have hesperetin and hydroquinone, which can be isolated from marjoram extract. Cardioprotective, hepatoprotective, antiulcerogenetic, anticholinesterase, anti-polycystic ovary syndrome (PCOS), and anti-inflammatory effects were also found in dried marjoram, marjoram tea, or in compounds extracted from marjoram. Marjoram is generally not toxic, but should not be used by pregnant or lactating women. However, it is always important to be cautious and consult a doctor when using medical herbs (Wikipedia. 2024).

Oregano is a culinary herb, used for the flavour of its leaves, which can be more intense when dried than fresh. It has an earthy, warm, and slightly bitter taste, which can vary in intensity. Good-quality oregano may be strong enough to almost numb the tongue, but cultivars adapted to colder climates may have a lesser flavour. Factors such as climate, season, and soil composition may affect the aromatic oils present, and this effect may be greater than the differences between the various species of plants. Among the chemical compounds contributing to the flavour are carvacrol, thymol, limonene, pinene, ocimene, and caryophyllene. Oregano is the staple herb of Italian cuisine, most frequently used with roasted, fried, or grilled vegetables, meat, and fish. Oregano combines well with spicy foods popular in Southern Italy. It is less commonly used in the north of the country, as marjoram is generally preferred. Its popularity in the U.S. began when soldiers returning from World War II brought back with them a taste for the "pizza herb", which had probably been eaten in Southern Italy for centuries. Oregano is widely used in cuisines of the Mediterranean Basin and Latin America, especially in Mexican cuisine and Argentine cuisine. In Turkish cuisine, oregano is mostly used for flavouring meat, especially mutton and lamb. In barbecue and kebab restaurants, it can be usually found as a condiment, together with paprika, salt, and pepper. During the summer, generous amounts of dried oregano are often added as a topping to a tomato and cucumber salad in Portugal, but it can be used to season meat and fish dishes as well. In Spain, apart from seasoning, it is used in preparations of a variety of traditional dishes such as morcilla (Iberian pig blood sausage) and adobo sauce for fish and meat. The dried and ground leaves are most often used in Greece to add flavour to Greek salad, and is usually added to the lemon-olive oil sauce that accompanies fish or meat grills and casseroles. In Albania, dried oregano is often used to make herbal tea which is especially popular in the northern part of Albania (Wikipedia, 2024a). Marjoram has always been used as a condiment in ancient Egypt. It was also used to fight against digestion problems of nervous origin, colic and flatulence. Marjoram was also used to get rid of migraines, which is still the case today. At the beginning of the 20th century, Marjoram was classified as a sedative plant recommended to fight insomnia and anxiety. It is said to lower the tone of the sympathetic, to slow down anxiety and even to reassure the heart. Marjoram has long proven its effectiveness against rheumatic pain in external use. It is now very pleasant to use it for its unique taste (Pages, 2024). Sweet marjoram, used lightly at the end of the cooking process,

adds a nice, mellow flavour to vegetables such as spinach, beans, peas, and carrots. It is good in salads and herbed butters, as well as in vinaigrettes (Bonnieplants, 2024). Leaves, stems, and flowers. The roots are not palpable, even though they aren't toxic in any way (WC, 2025). Oregano is used to add flavor to a variety of dishes, including pizza, pasta sauces, and salads. In addition to its culinary uses, oregano has been used for centuries in traditional medicine to treat various ailments, including respiratory issues, digestive problems, and skin infections (IOPS, 2025). Oregano became widely known in the United States after World War II, when returning soldiers, who had developed a taste for Italian cuisine, made it popular. Oregano is used in cooking, medicine, and commercial products. A key ingredient in Mediterranean and Middle Eastern cuisines, it enhances meat dishes, vegetables, sauces, and soups. It is essential in Italian pizza and pasta sauces, Greek salads and gyros. Medicinally, oregano is valued for its antiseptic, anti-inflammatory, and digestive benefits. Essential oils extracted from oregano contain thymol and carvacrol, compounds known for their antibacterial, antifungal, and antioxidant properties. The essential oil is used in cosmetics and food preservation (Britannica, 2025). Oregano is traditionally used in Italian cuisine as a seasoning. It is in the mint family, and is a strong flavor perceptible in most Italian dishes. It can be used dried or fresh — dried oregano has a stronger presence, but less nutritional value. It all comes down to preference really (WC, 2025).

Nutritional Value

Of all the *Origanum* species, only *O. vulgare* (subspecies not identified), *O. onites* (pot marjoram), *O. majorana* (sweet marjoram) and *O. dictamnus* (dittany of Crete) are considered GRAS (Generally Recognized as Safe). *O. majorana* leaves are GRAS at concentrations of 1.9 to 9946 ppm, the essential oil from 1 to 40 ppm, and the oleoresin from 37-75 ppm. *O. vulgare* leaves are GRAS at 320-2800 ppm. Although *O. xmajoricum* isn't on the GRAS list, it is a hybrid of *O. vulgare* and *O. majorana* and has widespread culinary use. *O. dictamnus* is only GRAS as a natural flavoring substance. According to an analysis by the USDA, 1 average teaspoon of dried marjoram has 2 calories, .04 grams of fat, .36 grams carbohydrate, .08 grams protein, .2 grams fiber, 12 mg of calcium, 9 mg of potassium and 48 IU vitamin A, plus small amounts of a variety of other vitamins and minerals. The same quantity of dried oregano is slightly more nutritious with 6 calories, .2 grams protein, .18 grams fat, and 1.16 grams carbohydrate and .8 grams fiber. It also contains 28 mg calcium, 30 mg potassium, and 124 IU vitamin A. In addition to vitamins and minerals, it has been reported that *Origanum vulgare* also includes the flavonoids, galangin and quercetin, which can reduce mutations in the dietary carcinogen Trp-P-2. Aside from oregano's inherent nutritional value, it may impact overall nutrition by stimulating or curbing appetite, depending on the amount used (Marjoram, 2005a). Different parts of the marjoram plant (leaves, stems, flowers) contain almost 2-3% of E.O and are extracted through traditional methods (steam-hydro distillation) and novel methods (supercritical fluid extraction, microwave-assisted extraction). Mostly hydrocarbons and phenolic compounds are there that form the chemical composition of E.O. Some of the compounds identified in marjoram E.O are monoterpene, linalool, thymol, geraniol, sabinene carvacrol, carvone, limonene, α-β pinene, vanillic acid, ferulic acid, gallic acid coumaric acid, terpenoids, phellandrene, carvacrol, eugenol. Moreover, marjoram contains flavonoids that predominate in marjoram such as quercetin, catechin, kaempferol, luteolin, and apigenin. Chemical constituents are responsible for the medicinal as well as culinary properties of marjoram and they are stored in form of E.O. These compounds are having several pharmacological properties like antimicrobial, antibacterial, antispasmodic, antiseptic, anti-depressant, antiviral and many more **(**Dhiman and Bhasin, 2022**).**

Plants of the family Lamiaceae comprise a rich storehouse of phytochemical and biochemical such as flavonoids, phenolic compounds, and terpenoids etc. which can be oppressed for its antimicrobial activities, antioxidant activities, food preservatives, insect repellants and other therapeutic properties. The essential oil of Oregano contains carvacrol and/or thymol as the main component(s) and other minor constituents such as c-terpinene, **p**-cymene, linalool, terpinen-4-ol, and sabinene hydrate. Carvacrol is an important impact compound of Oregano aroma and the largest component of the active extract of the aroma. Thymol and carvacrol are biosynthesized by aromatization of **c**-terpenine to **p**-cymene followed by hydroxylation of **p**-cymene. The yield of essential oil was affected by various factors which include geographical variation, genetic variation, seasonal and maturity variation, growth stages, part of plant utilized and postharvest drying and storage. During the flowering period, the essential oil content is at its highest level **(**Maithani *et al*., 2023**).**

Oregano contains polyphenols, including numerous flavones. The essential oil of oregano is composed primarily of monoterpenoids and monoterpenes, with the relative concentration of each compound varying widely across geographic origin and other factors. Over 60 different compounds have been identified, with the primary ones being carvacrol and thymol ranging to over 80%, while lesser abundant compounds include *p*-cymene, γ-terpinene, caryophyllene, spathulenol, germacrene D, β-fenchyl alcohol and δ-terpineol. Drying of the plant material affects both quantity and distribution of volatile compounds, with methods using higher heat and longer drying times having greater negative impact. A sample of fresh whole plant material found to contain 33 g/kg dry weight (3.1 g/kg wet) decreased to below a third after warm-air convection drying. Much higher concentrations of volatile compounds are achieved towards the end of the growing season (Wikipedia, 2024a). The content of essential oil depends on soil, climate and season, but generally lies between 0.7% and 3.5%. The main aroma component is a bicyclic monoterpene alcohol, *cis*-sabinene hydrate (max. 40%); furthermore, α-terpinene, 4-terpineol, α-terpineol, terpinenyl-4-acetate and 1,8-cineol are found in significant amounts. Phenolic compounds, which make up for the typical fragrance of the closely related oregano, are missing altogether (Gernot, 2024).

Health Benefits

Origanums have long been valued for their culinary, fragrant and medicinal properties. These qualities are the result of naturally occurring chemicals in the plant. One source for these qualities is the volatile or "essential" oil. Other plant metabolic chemical products such as fixed oils and flavonoids also contribute. The composition of the essential oil depends on both the genetics of the

plant and where it is grown. Some species, although beautiful, lack the subjective culinary or fragrance chemistry and are used exclusively as ornamentals. There are two primary chemicals associated with culinary origanums, carvacrol and sabinene hydrate. Carvacrol is the signature chemical largely responsible for the sharp, pungent oregano flavor of *Origanum vulgare* subsp. *hirtum, O. onites, O. minutiflorum* and *O. syriacum*. Sabinene hydrate is the signature chemical linked to O. majorana's sweet flavor and can occur heavily in its hybrids with *O. vulgare* subspecies (*O. xmajoricum*). Carvacrol is a creosote-scented phenol with antibacterial and antifungal properties. Like all plant chemicals, the amount of carvacrol varies depending on the species, subspecies and growing conditions. According to one report, "extreme water stress" can actually increase the amount of carvacrol (and thymol) in the essential oil of *O. vulgare*. Greek oregano, *O. vulgare* subsp. *hirtum*, is valued for its flavor due largely to a high concentration of carvacrol. Some of the other subspecies of *O. vulgare*, including *O. vulgare* subsp. *vulgare*, have little or no carvacrol and do not have the characteristic oregano scent and flavour (Marjoram, 2005a).

Oregano in medicinal form is being used as herbal tea due to its beneficial properties. At the present time, its demand is increasing continuously due to the large use of oregano in India, but production is less than consumption. For this reason, products made from this plant have a higher market value. In view of the situation, it has become necessary to promote the cultivation of oregano so that the growing demand can be met and at the same time the cost of the products made from it can be reduced by producing more quantity (Verma, 2021). Oregano has been used as a culinary and medicinal herb for thousands of years. It has a beneficial effect upon the digestive and respiratory systems and is also used to promote menstruation. The leaves and flowering stems are strongly antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, emmenagogue, expectorant, stimulant, stomachic and mildly tonic. The plant is taken internally in the treatment of colds, influenza, mild feverish illnesses, indigestion, stomach upsets and painful menstruation. It is strongly sedative and should not be taken in large doses, though mild teas have a soothing effect and aid restful sleep (Jafari Khorsand *et al*., 2022). Marjoram is one of the traditional herbs utilized for culinary and medicinal purposes since older times. It has a very subtle, sweet, and a little bit of pungent taste which is like oregano but gentle. This herb is used in the preparation of several medicines in Ayurveda to homeopathy for the treatment of a variety of ailments **(**Dhiman and Bhasin, 2022**).**

You should first and foremost consume marjoram because it's delicious. But it doesn't hurt that it's touted for having antimicrobial properties and anti-inflammatory benefits too. In its fresh or dried form, sweet marjoram contains antioxidants, essential oils, and flavonoids associated with fighting free radicals and toxins. Ready to start using more fresh marjoram? Like other delicate herbs such as sage or mint, fresh marjoram should be added towards the end of the cooking process in order to preserve its vibrant green color and flavor. Heat will cause both qualities to deteriorate over time so unless a recipe specifically calls for adding it early on, there's no need to do so. Oh and if all you have on hand is dried marjoram, cut the amount by ⅔; dried herbs are always much more potent than fresh so it takes far less to bring flavour (Hard, 2022). Marjoram, which is generally consumed as spice or flavor, has a wide range of biological activities, with antioxidant, antimicrobial, anti-inflammatory, and hepatoprotective effects among others. The anti-inflammatory effects of marjoram and its major active component, the polyphenolic molecule rosmarinic acid, were investigated in two studies from the same investigators in a human THP-1 macrophage model; the results showed significant decreases in macrophage TNF-α, IL-1β, and IL-6 secretion. In addition, the immunomodulatory properties of oral treatment with marjoram via assessing anti-inflammatory cytokines in a murine model of myocardial toxicity induced by doxorubicin and showed significant decreases in serum TNF-α and IL-6 levels, besides other protective effects against doxorubicin cardiac toxicity. The anti-inflammatory effect of marjoram extract was recently investigated in rats with polycystic ovary syndrome. Treatment with both oral marjoram alone and a marjoram-metformin combination resulted in significantly decreased IL-6 and TNF-α levels in ovary tissue. Thus, experimental evidence points to marjoram as a relevant anti-inflammatory agent (Pelvan *et al.,* 2022). Some nutritional highlights of marjoram include: Marjoram is rich in antioxidants, which can have anti-inflammatory properties. Chronic inflammation may lead to chronic diseases like cancer and diabetes. Though its effectiveness has not been definitively proven, some research suggests marjoram may have antimicrobial uses. This means it may help to treat things like fungal infections and bacterial overgrowth in the gut **(**Williams, 2023**).** One tablespoon of marjoram contains 3% of your daily Vitamin A intake, 4% of your daily calcium intake, 1.75% of your Vitamin C intake, and 9% of your daily iron intake. These numbers may seem small, but remember: this is only in **one** tablespoon! The herb also promotes digestion, relieves nausea, eliminates flatulence and other stomach issues, and acts as an anti-septic, anti-bacterial, anti-fungal, and anti-viral agent. It improves cardiovascular health, and has anti-inflammatory effects (Urban, 2024). Marjoram yields about 2 per cent of a volatile oil which is separated by distillation. This must not be confused with oil of Origanum, which is extracted from Thyme. Its properties are stimulant, carminative, diaphoretic and mildly tonic; a useful emmenagogue. It is so acrid that it has been employed not only as a rubefacient, and often as a liniment, but has also been used as a caustic by farriers. A few drops, put on cotton-wool and placed in the hollow of an aching tooth frequently relieves the pain. In the commencement of measles, it is useful in producing a gentle perspiration and bringing out the eruption, being given in the form of a warm infusion, which is also valuable in spasms, colic, and to give relief from pain in dyspeptic complaints. Externally, the dried leaves and tops may be applied in bags as a hot fomentation to painful swellings and rheumatism, as well as for colic. An infusion made from the fresh plant will relieve nervous headache, by virtue of the camphoraceous principle contained in the oil (Grieve, 2024). Marjoram has a range of health benefits due to its rich nutritional profile and medicinal properties. Here are some potential health benefits of marjoram (Area2farms, 2024):

Digestive health support: Marjoram has been traditionally used to soothe digestive issues such as stomach cramps, bloating, and constipation. It has antispasmodic properties that can help to relax the muscles in the digestive tract, which can reduce discomfort and promote healthy digestion.

Anti-inflammatory effects: Marjoram contains compounds such as flavonoids and terpenes that have anti-inflammatory properties. These compounds can help to reduce inflammation in the body, which can contribute to the prevention of chronic diseases such as heart disease, cancer, and arthritis.

Packed with antioxidants: Marjoram is rich in antioxidants, including phenolic compounds and flavonoids, which can help to protect cells from damage caused by free radicals. This can help to reduce the risk of chronic diseases such as cancer and heart disease.

Respiratory health support: Marjoram has been used traditionally to treat respiratory issues such as coughs, bronchitis, and asthma. It has expectorant properties that can help to clear mucus from the lungs and airways, which can promote healthy respiratory function.

Stress relief: Marjoram has been shown to have a calming effect on the nervous system, which can help to reduce stress and anxiety. It contains compounds such as terpenes and rosmarinic acid that have been shown to have anxiolytic and sedative effects.

Cardiovascular health support: Marjoram has been shown to have hypotensive effects, meaning it can help to reduce blood pressure. This can contribute to the prevention of heart disease and stroke. Marjoram and its other species are a rich source of vitamins and minerals that help in promoting good health, if consumed in appropriate amounts. Fresh marjoram contains high amounts of vitamin C (51.4 µg of recommended dose per 100g), which helps in boosting immunity, healing wounds and has antiviral effects. Additionally, this herb is enriched with several bioactive compounds like carotene, zeaxanthin, and lutein which are termed protective scavengers against free radicals in the human body.

Digestive health: Marjoram is a medicinal herb that consists of various therapeutic properties and was used by Greek ancients as a healing agent in form of a paste, decoction, or aromatherapy. This herb is considered one of the best medicines for gastrointestinal ailments, utilized in different forms like herbal tea or as seasoning. It is believed to enhance the production of the digestive enzyme after a few minutes of consumption, stimulating the appetite and digestion. Its E.O can be massaged on the abdominal area to reduce the flatulence and cramps, hence soothing the digestive tract.Several studies are being conducted on marjoram leaf extracts for the treatment of stomach ulcers. It was found that the daily intake of 250-500 gm of marjoram extract can lower the risk of ulcers in the future. Moreover, it helps in maintaining gut health by promoting the growth of good bacteria.

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Antia~~n~~xiety: Stress and anxiety are two main causes that result in several health problems including, depression, insomnia, disturbed mental health, etc. Chemical constituents present in marjoram E.O produce soothing effects that relax the nerves and muscles surrounding the brain. This herb is nervine (strengthens the nervous system) and utilized as an anti-anxiety herb that produces happy hormones and promotes a good mood. It has been used since ancient times for releasing stress and tension by massaging the oil on the affected part or by inhaling the E.O.

Effective in respiratory ailments: In recent years, the E.O extracted from marjoram is also used to treat respiratory problems through aroma therapy. The oil is diluted and rubbed in the chest area as well as sprayed around the person in form of fragrance. It acts as a natural decongestant and clears the phlegm, resulting in the reduction of chronic cough or sinus. Marjoram has been utilized from older times to treat the common cold and viral diseases. The chemical compounds present in this herbal E.O exhibits antiviral properties that act upon the protective coating of the virus, hence killing them.

Cardioprotective benefits: The bioactive compounds found in marjoram essential oil contain antioxidant properties and help in eliminating free radicals from blood vessels. High cholesterol diets tend to increase LDL levels which result in the accumulation of lipid layers in blood vessels causing several cardiovascular diseases. This herb helps in curing such problems if consumed on daily basis in small amounts and maintains heart health. Marjoram can be taken as a supplement to avoid blood clotting and helps in thinning the blood hence protecting against heart attacks. The Cardioprotective properties of the genus Origanum help in avoiding severe heart problems like thrombosis by improving the flow of blood through the circulatory system.

Hepatoprotective benefits: The chemical components terpenes and terpenoids found in marjoram leaf oil aid in the treatment of liver disorders by removing excess toxins from the body, allowing the liver to operate more efficiently. It was found in some studies that marjoram E.O can cure the damage caused by some chemical compounds to the hepatic cells. Furthermore, marjoram E.O is said to have antioxidant properties. It helps in regenerating liver cells thereby, stabilizing the cell membrane that results in blocking the entry of hepatotoxic substances into the liver.

Menstrual health: Menstrual health is very important for women to maintain overall health as any kind of change in hormones may result in many ailments. Marjoram extracts and its E.O are very useful in treating painful periods, restoring hormonal balance, and regulating the menstrual cycle. Moreover, some of the main compounds present in marjoram help in stimulating the hormonal levels that help in treating polycystic ovary syndrome and the complications linked with it. This herb oil can be used to relieve mood swings and other premenstrual symptoms that cause discomfort before periods. Marjoram E.O is very effective in dysmenorrhea that causes immense pain during periods. This oil is used through aromatherapy to reduce the severe symptoms of dysmenorrhea. Several types of research are conducted on the ethnomedicinal properties of this herb as it contains several compounds that exhibit many health-promoting benefits.

Aromatherapy: Aromatherapy is a treatment for mental and physical balance by utilization of different E.O extracted from various plants such as marjoram, lavender, eucalyptus, sage, citrus, and rose. These oils help in relieving stress and tension by acting upon the limbic system in the brain that revitalizes the nervous system. Essential oils are either inhaled or massaged over the effective part until it gets absorbed in the skin. Various essential oil blends are used to treat several illnesses, including depression, sleeplessness, anxiety, migraines, muscular discomfort, skin difficulties, and respiratory concerns. Can ease tonsilitus. Can help flatulence. Can ease stomach bloating. Can help sleep or calm children. Can ease anxiety. Homeopaths sometimes use to treat female sex disorders and painful menstruation.Good for bruises. Has good antiseptic properties. Used to make essential oils (Victoriananursery, 2024). Good for use in stews, soup, on pizza, with pasta, eggs and cheese! Can be infused for tea. Chopped into salad. Can be used in bouquet garni. Good compliment for fish. Flowers are edible (Victoriananursery, 2024). The leaves of the marjoram plant are used fresh or dried as a herb in cooking. They may also be dried and used to extract essential oil which is used as a flavouring (Plantvillage, 2024). Origanum vulgare contains a number of bioactive compounds, including carvacrol, thymol, and rosmarinic acid, which are responsible for its medicinal properties. These compounds have been shown to have antioxidant, anti-inflammatory, and antimicrobial effects, making oregano a potential natural remedy for various health conditions (IOPS, 2025). Oregano has been known to aid in digestion and help promote menstruation. It should be noted that pregnant people should not ingest large amounts of oregano medicinally, but small amounts in food is fine. Mild teas made from oregano can be used as a sleep aid, as it is a sedative. The plant is also antiseptic and has been used externally for arthritis, muscular pain, bronchitis, and asthma. Use of this plant medicinally has not been studied extensively, so please consult a doctor before use. These are just examples of what the plant has been used for, but evidence of it actually alleviating symptoms has not been scientifically founded. The essential oil has been used to kill lice, though take caution as it may irritate the skin as well (WC, 2025).

CULTIVATION

Propagation

Marjoram is propagate by seed, or by division or basal softwood cuttings in spring (RHS, 2024a). They may be propagated by seeds, cuttings, or division. Bees and butterflies are attracted to their blooms (NCSU, 2024). Marjoram can be propagated from seed, cuttings, layering or by dividing the root. The optimum method of vegetative propagation depends on the size and growth habit of the mother plant. ~~Seeds~~ Seeds should be sown outdoors when the soil has warmed and all danger of frost has passed. Seeds can also be started indoors to produce transplants. Marjoram seeds should be sown indoors 6–8 weeks before planting outside. Sow seeds in a sterile seed starting mix in seed trays or pots 0.2–1.0 cm deep and water gently. Ensure the temperature remains between 15.5 and 27°C. Seeds should germinate in about 5 days at 21°C. Due to the slow growing nature of the plant, many home growers choose to start with small plants which can be obtained from a nursery or garden center. Layering: Sprawling marjoram varieties are easily layered by selecting a branch and covering with soil. A rock can be placed on top to hold the branch securely under the soil. The branch will develop it's own root system and once established, can be cut from the mother plant and transplanted to a new site. Cuttings: Larger, upright plants lend themselves to propagating from cuttings. Cuttings should be taken from approximately 20 cm (8 in) down the stem so that the basal portion of the cutting is hard and woody. The upper 5 cm (2 in) of the cutting can be nipped off to promote branching. Cuttings can be rooted in water, sand or a mixture of sand, peat and perlite. Dividing clumps of mat-forming plants in autumn or spring. Taking softwood cuttings in summer (RHS, 2024).

Cultivation

Oregano is a small-leafed, prostrate culinary herb from the Mediterranean and other parts of Europe and is part of the mint family. Its small dark green, oval leaves are widely used in cooking where it is often teamed with tomato and lamb. It can also be dried to use year-round. It can be grown in the ground in well-drained soil or in containers such as a pot or trough. It grows happily in among paving stones or to edge steps and can spread 1.5m across. Flowers are seen mainly in summer and are usually pinky purple. Plants may die back in areas with cold winters but will resprout in spring. New plants can be grown from division of an established plant, cuttings taken in summer, or seed sown in spring (Chauhan *et al*., 2013). Wild oregano is herbaceous perennial, native to the Mediterranean region, particularly in high locations. In these are 1186 *Marina Alekseeva*, *Tzvetelina Zagorcheva*, *Ivan Atanassov* and *Krasimir Rusanoveas* oregano is harvested mainly from wild populations at the flowering stage, once or twice a year. The interest towards cultivation of oreganoin Greece and Bulgaria is focused on the high essential oil subspecies of *O. vulgare* ssp. Hirtum (syn. *O. heracleoticum*) also known as Greek oregano. Oregano harvests can be two or three annually. During the winter period the aerial parts are destroyed, but the roots maintain their vitality for the revegetation in spring. Oregano is tolerant to cold and dryness and grows in medium soils and in areas with high elevation and cool summer. The optimal climatic conditions for *O. vulgare* are temperatures 5-28°C with an annual precipitation of 0.4-2.7 mm and soil pH 4.5-8.7 (Alekseeva *et al*., 2020). The demand and consumption of medicinal plants is increasing worldwide. The cultivation of herbs is a good alternative not only to avoid overexploitation of wild populations, but also because it gives the opportunity to overcome the problems that are inherent in herbal extracts: misidentification, genetic and phenotypic variability, extract variability and instability, toxic components and contaminants. Cultivation of herbs also creates opportunities for development of agriculture in mountainous regions where growing traditional crops is not a feasible option. Therefore, efforts have been made in domestication and cultivation of oregano, which can be grown as an annual plant in cold climates where it will not overwinter well. When grown as a perennial, roots should be divided every 3 years for best growth and flavour. Ploughing of the soil and fertilization with ammonium phosphate during November-December is sufficient for oregano cultivation. The necessary pest control is a simple weeding out (manually or by using herbicides) at least 4 times a year. The average yield is 2.5-3.5 t/ha and the essential oil yield ranges from <0.5% to > 2 % of dry weight depending on the subspecies (Alekseeva *et al*., 2020). Marjoram is a relatively hardy plant, although it is sensitive to the cold. It's classified as a tender perennial and grows best in USDA Zones 7-9. It's usually

cultivated in a pot because if it's grown in the ground, it can rapidly take over a garden. Marjoram leaves are simple and smooth. They are petiolated, ovate to oblong-ovate, 0.5–1.5 cm long, 0.2–0.8 cm wide, with obtuse apex, entire margin, symmetrical but tapering base, and reticulate venation (BWM, 2023). Oregano is planted in early spring, the plants being spaced 30 cm apart in fairly dry soil, with full sun. It will grow in a pH range between 6.0 (mildly acidic) and 9.0 (strongly alkaline), with a preferred range between 6.0 and 8.0. It prefers a hot, relatively dry climate, but does well in other environments (Wikipedia, 2024a). An excellent attractant and nectar source for bees and other beneficial insects. Tender perennial. Reaches 2 feet (60 cm) tall. Likes a warm sunny position. Likes dry, rocky, free draining soil. Suitable for container growing. Flowers July - September with small white to pale pink flowers. If you cut plants to 1" (2.5 cm) in Autumn they can be brought indoors (Victoriananursery, 2024). Marjoram seedlings can be transplanted to the garden when they are between 6 and 8 weeks old, about 2 weeks after the last frost date. Plants should be spaced approximately 30 cm apart, allowing 45 cm between rows. Pinching back the growing tip of the plants after transplanting will encourage the growth of new shoots. Marjoram requires more moisture than oregano and soil moisture can be conserved by applying a layer of mulch around the plants (Plantvillage, 2024). Established marjoram plants are tolerant of drought but cannot tolerate water-logging. Established plants require additional irrigation only in very dry conditions. Marjoram planted outdoors requires minimum fertilization, particularly if planted in sandy or gravelly soils. In contrast, container grown plants require frequent addition of fertilizer. A half strength balanced fertilizer can be applied every two weeks if required. Marjoram plants should be pruned regularly to stimulate new growth. This pruning can simply be a method of harvesting from the plant but in the winter, any dead or damaged wood should be removed from the plant (Plantvillage, 2024). Plant sweet marjoram in spring after the last frost. It grows well in containers but is also a great choice if you're looking for an edible groundcover. Space plants 12 inches apart in an area with full sun and fertile, well-drained soil with a pH of 6.7 to 7.0. Add nutrients to your native soil by mixing in several inches of aged compost or other rich organic matter. Feed regularly with a water-soluble plant food to get the best results from your growing efforts. Check soil moisture every few days and water when the top inch of soil becomes dry. Harvest sweet marjoram leaves 4 to 6 weeks after planting (Bonnieplants, 2024). Plant sweet marjoram in the spring once there is no longer threat of frost. Sweet marjoram is slow-growing, so you will want to start with young plants instead of seed. Choose strong young sweet marjoram plants from Bonnie Plants®, which has been helping home gardeners succeed for over 100 years. Plant them 12 inches apart in full sun in rich, well-drained soil with a pH between 6.7 and 7.0. To improve the nutrition and quality of your existing soil, mix in some compost or aged compost-enriched Miracle-Gro® Performance Organics® All Purpose In-Ground Soil. For best results, you'll want to pair all that great soil with regular feedings for your marjoram plants throughout the season. Fertilize with a water soluble plant food like Miracle-Gro® Performance Organics® All Purpose Plant Nutrition (as directed on the label). Sweet marjoram will grow to about 12 to 24 inches tall. Be sure to trim plants when buds appear (and before they flower) to ensure continued growth (Bonnieplants, 2024). The Marjorams are some of the most familiar of our kitchen herbs, and are cultivated for the use of their aromatic leaves, either in a green or dried state, for flavouring and other culinary purposes, being mainly put into stuffings. Sweet Marjoram leaves are also excellent in salads. They have whitish flowers, with a two-lipped calyx, and also contain a volatile oil, which has similar properties to the Wild Marjoram. Winter Marjoram is really a native of Greece, but is hardyenough to thrive in the open air in England, in a dry soil, and is generally propagated by division of the roots in autumn. Pot Marjoram, a native of Sicily, is also a hardy perennial, preferring a warm situation and dry, light soil. It is generally increased by cuttings, taken in early summer, inserted under a hand-glass, and later planted out a space of 1 foot between the rows and nearly as much from plant to plant, as it likes plenty of room. It may also be increased by division of roots in April, or by offsets, slipping pieces off the plants with roots to them and planting with trowel or dibber, taking care to water well. In May, they grow quickly after the operation. May also be propagated by seed, sown moderately thin, in dry, mild weather in March, in shallow drills, about 1/2 inch deep and 8 or 9 inches apart, covered in evenly with the soil. Transplant afterwards to about a foot apart each way. The seeds are very slow in germinating (Grieve, 2024). Grow in well-drained soil in a sheltered, sunny position. This variety is frost-tender so in colder areas, may need protection from very low temperatures and excess winter wet. Also suitable for growing in containers that can be overwintered in an unheated greenhouse (RHS, 2024a). Sow seed indoors in early spring. To speed up germination, soak seeds in water overnight. Cover seeds with a light layer of potting soil and water lightly. Transplant the seedlings into bigger pots when large enough to handle. Grow indoors until all danger of frost has passed. Plant the seedlings about 12 inches apart in well-drained soil in a sunny, sheltered spot (Boeckmann, 2025). Water regularly, but do not overwater. Keep plants trimmed by cutting the leaves throughout the growing season. When flower buds appear, cut the plants back low to the ground to stimulate new growth. In southern regions, Zones 9 and above, marjoram is a perennial and can be left in the ground. In northern areas, the herb is an annual and may be potted up at the end of the season and placed in a sunny window indoors (Boeckmann, 2025). *Origanum vulgare* is a relatively easy plant to cultivate, and it can be grown in a variety of soil types and climates. However, the plant is sensitive to frost and requires well-drained soil to thrive. In recent years, there has been a growing concern about the conservation of *Origanum vulgare*, as over-harvesting and habitat destruction have threatened its populations in certain regions (IOPS, 2025). Pruning and Training Pick sprigs regularly from the shoot tips to encourage bushier growth and lots of fresh new leaves. Remove the faded flower stems at the base (RHS, 2024). Pruning: Cut back old flower stems in early spring (RHS, 2024a) Harvesting Marjoram leaves can begin to be harvested any time after the plants have reached a height of 15–20 cm. Harvest leaves by pinching the leaves from the tips of the stems to encourage the more branching. Leaves should be pinched regularly to keep the plants productive and prevent them from going to seed. The best time to harvest marjoram leaves is just prior to flowering. Waiting or buds to form before harvesting will ensure the maximum essential oil content in the leaves (Plantvillage, 2024). Organo is best harvested just before flowering. The entire plant can be harvested by clipping the branches to leave only the lowest set of leaves. The leaves can be used fresh or they can be dried for longer storage. The clipped plant will begin to set out new growth within 2 weeks of harvest (Plantvillage, 2024). Harvest marjoram leaves as required in late spring and summer – simply snip off a few shoots, then strip off the leaves. The flavour is best before the flowers open. To keep marjoram plants productive over winter, move potted plants indoors in autumn, onto a warm, sunny windowsill. Marjoram leaves are usually used fresh but can also be dried or frozen in ice-cube trays. The flowers are also edible and can be scattered in salads to add extra colour. See our guide to edible flowers. To dry marjoram leaves, hang up leafy sprigs in a dark, well-ventilated place for

a few weeks. When fully dried, strip off the leaves and store in an air-tight jar (RHS, 2024). Harvest the young leaves throughout the growing season and use fresh or freeze for later use. Marjoram can also be dried and stored in an airtight container in a dark, dry area (Boeckmann, 2025). It is a temperate climate plant, Oregano is found in the Mediterranean region and tropical regions of Asia. Oregano is cultivated in many areas of tropical to temperate climates of Europe, Asia, North Africa and America. Our nature has given us countless virtuous plants; one of them is Oregano which is known as Suthra in Hindi language. Our country is poised to grow continuously. It is constantly expanding in every field. Our living and eating habits are constantly changing. Oregano plant is found naturally growing at an altitude of 1500 to 3000 meters above sea level. Oregano is being cultivated in the world in America, Australia, England and Turkey. In India, oregano is mainly found in Jammu and Kashmir, Assam, Karnataka, Tamil Nadu, Meghalaya, Uttar Pradesh, Uttarakhand and hilly parts of Madhya Pradesh (Verma, 2021). Essential Oil. The characteristic compounds of the commercially exploited marjoram essential oils are terpinen-4-ol, α-terpinene, γ-terpinene, α-terpineol and cis-sabinene hydrate, occurring in variable quantities. O. majorana also produces essential oils with different compositions, which are either rich in linalool or p-cymene and its biosynthetically related compounds thymol and carvacrol (Kokkini *et al*., 2003). Monoterpene hydrocarbons, including α and β-pinene, camphene, sabinene, α- and β- phellandrene, ρ-cymene, limonene, β-ocimene, γ-terpinene, terpinolene, α-terpinene, carvone, and citronellol have been detected in essential oil of O majorana. Terpinene 4-ol and cis-sabinene hydrate are 2 main oxygenated monoterpenes isolated from O majorana. Linalool, linalyl acetate, α-terpineol, trans- and cis-carveol, thymol, anethole, geraniol, and carvacrol are other oxygenated compounds identified in essential oil and leaves of O majorana (Bina and Rahimi, 2016). Oregano oil has been used in folk medicine over centuries. Oregano essential oil is extracted from the leaves of the oregano plant. Although oregano or its oil may be used as a dietary supplement, there is no clinical evidence to indicate that either has any effect on human health. In 2014, the U.S. Food and Drug Administration (FDA) warned a Utah company, Young Living, that its herbal products, including oregano essential oil, were being promoted to have numerous unproven anti-disease effects, and so were being sold as unauthorized misbranded drugs subject to seizure and federal penalties (Wikipedia, 2024a).

Exploration of marjoram oil Essential oils produced from herbal plants have a variety of health and well-being benefits and are widely utilized in the manufacture of healthcare supplements, nutraceuticals, pharmaceutical goods, Ayurvedic medicine and skin care, among other things. The preservation of fresh lettuce leaves was tested using marjoram oil, ascorbic acid, and chitosan. This mixture was found to boost total phenols and antioxidant levels in fresh-cut lettuce leaves, as well as produce a nice scent. Apart from that, lettuce leaves do not turn brown in storage and retain their fresh flavor for longer periods of time, making marjoram E.O a powerful antioxidant. In the food sector, food components must be protected from physical, chemical and biological deterioration, and expanding customer expectations about the partial or complete use of food preservatives are posing a challenge for processors. Marjoram is used in the food sector because of its antioxidant and antibacterial characteristics, which can be used as a preservative and flavoring agent. It is mostly used in dried form to flavor sausages, preserved meats, soups, herb mixes, sauces, beverages and some other foods (Dhiman and Bhasin, 2022). The marjoram E.O has recently been used to produce antimicrobial packing film through the nanoencapsulation technique that helps in protecting the food material from microbial spoilage during storage and transportation. Essential oils are very volatile in nature, insoluble in water, hydrophobic, and unstable due to which their use is limited to some products. Several studies are conducted to improve the efficiency of E.O by developing new technology. To increase their stability these oils are entrapped in some carrier agents so that they can be used under ambient conditions. Furthermore, marjoram E.O has been used in the manufacturing of mouthwashes, skin ointments, antibiotic medications, herbal shampoos, toothpaste and many other products with exterior applications only (Dhiman and Bhasin, 2022). Marjoram consists of several bioactive compounds that have many health benefits and pharmacological properties such as antimicrobial, antiviral, hepatoprotective, antidiabetic, anti-inflammatory, etc. therefore, it has a great potential to be used as a nutraceutical or as a health supplement to enhance overall health and wellness. Moreover, marjoram can be used as a source of vitamins and minerals to boost immunity and can work as a laxative to remove toxins from the body. Marjoram is considered highly effective in protecting against cardiovascular diseases and is incorporated in nutraceutical medicines meant for treating high blood pressure (Dhiman and Bhasin, 2022). Sensory quality Aromatic and slightly bitter. There is not much olfactory resemblance to the botanically related oregano (Gernot, 2024). “Marjoram’s flavor lacks the oiliness and abrasiveness of oregano. Marjoram is more delicate and floral than oregano. It is sometimes called 'sweet marjoram' and for good reason.” Even if you think you're not familiar with marjoram's flavor, you’ve likely had it in its dried form. Dried marjoram often shows up in herb blends like za’atar and herbs de Provence (Hard, 2022). Marjoram has an earthy and woodsy flavor, with notes of balsam-like pine and citrus. Warm, sharp, and bitter, the taste is reminiscent of oregano and thyme (Williams, 2023). Troubleshooting Note that the care of sweet marjoram differs depending on your location. Sweet marjoram is perennial, but you might need to use mulch for protection in winter. Marjoram should be grown only as a summer annual in zones 6 and colder. However, in south Florida, marjoram is a winter annual, which means that it will not endure summer heat and humidity. Water the plants during extended dry spells, but be sure not to over-water, as sweet marjoram likes a slightly dry climate (Bonnieplants, 2024). Insects, Diseases, and Other Plant Problems No serious problems but it will rot in poorly-drained, saturated soils (Plants. 2024). May be susceptible to aphids and red spider mite and generally disease-free (RHS, 2024a). Oregano usually has no serious insect or disease problems. Aphids, leaf miners, and spider mites may be found. In wet or poorly drained soils, root rot or stem rot may occur. Monitor for fungal diseases and protect the plant from excessive winter moisture (NCSU, 2024). Mint rust *Puccinia menthae* (Plantvillage, 2024). Symptoms: Small, dusty, bright orange, yellow or brown pustules on undersides of leaves; new shoots may be pale and distorted; large areas of leaf tissue die and leaves may drop from plant Cause: Fungus Comments: Disease also affects mint and can spread from nearby mint plants Management: Infected plants and rhizomes should be removed to prevent spread; heat treatment of roots may help to control the disease; roots should be immersed in hot water at 44°C (111°F) for 10 minutes, cooled using cool water and then planted as usual Aphids (Peach aphid) Myzus persicae (Plantvillage, 2024). Symptoms: Small soft bodied insects on underside of leaves and/or stems of plant; usually green or yellow in color, but may be pink, brown, red or black depending on species and host plant; if aphid infestation is heavy it may cause leaves to yellow and/or distorted, necrotic spots on leaves and/or stunted shoots;

aphids secrete a sticky, sugary substance called honeydew which encourages the growth of sooty mold on the plants Cause: Insects Comments: Distinguishing features include the presence of cornicles (tubular structures) which project backwards from the body of the aphid; will generally not move very quickly when disturbed Management: If aphid population is limited to just a few leaves or shoots then the infestation can be pruned out to provide control; check transplants for aphids before planting; use tolerant varieties if available; reflective mulches such as silver colored plastic can deter aphids from feeding on plants; sturdy plants can be sprayed with a strong jet of water to knock aphids from leaves; insecticides are generally only required to treat aphids if the infestation is very high - plants generally tolerate low and medium level infestation; insecticidal soaps or oils such as neem or canola oil are usually the best method of control; always check the labels of the products for specific usage guidelines prior to use Cutworms Agrotis spp. (Plantvillage, 2024). Symptoms: Stems of young transplants or seedlings may be severed at soil line; if infection occurs later, irregular holes are eaten into the surface of fruits; larvae causing the damage are usually active at night and hide during the day in the soil at the base of the plants or in plant debris of toppled plant; larvae are 2.5–5.0 cm in length; larvae may exhibit a variety of patterns and coloration but will usually curl up into a C-shape when disturbed Cause: Insect Comments: Cutworms have a wide host range and attack vegetables including asparagus, bean, cabbage and other crucifers, carrot, celery, corn, lettuce, pea, pepper, potato and tomato Management: Remove all plant residue from soil after harvest or at least two weeks before planting, this is especially important if the previous crop was another host such as alfalfa, beans or a leguminous cover crop; plastic or foil collars fitted around plant stems to cover the bottom 3 inches above the soil line and extending a couple of inches into the soil can prevent larvae severing plants; hand-pick larvae after dark; spread diatomaceous earth around the base of the plants (this creates a sharp barrier that will cut the insects if they try and crawl over it); apply appropriate insecticides to infested areas of garden or field if not growing organically Thrips (Western flower thrips) *Frankliniella occidentalis* (Plantvillage, 2024). Symptoms: If population is high leaves may be distorted; leaves are covered in coarse stippling and may appear silvery; leaves speckled with black feces; insect is small (1.5 mm) and slender and best viewed using a hand lens; adult thrips are pale yellow to light brown and the nymphs are smaller and lighter in color Cause: Insect Comments: Transmit viruses such as Tomato spotted wilt virus; once acquired, the insect retains the ability to transmit the virus for the remainder of its life Management: Avoid planting next to onions, garlic or cereals where very large numbers of thrips can build up; use reflective mulches early in growing season to deter thrips; apply appropriate insecticide if thrips become problematic Spider mites (Two-spotted spider mite) *Tetranychus urticae* (Plantvillage, 2024). Symptoms: Leaves stippled with yellow; leaves may appear bronzed; webbing covering leaves; mites may be visible as tiny moving dots on the webs or underside of leaves, best viewed using a hand lens; usually not spotted until there are visible symptoms on the plant; leaves turn yellow and may drop from plant Cause: Arachnid Comments: Spider mites thrive in dusty conditions; water-stressed plants are more susceptible to attack Management: In the home garden, spraying plants with a strong jet of water can help reduce buildup of spider mite populations; if mites become problematic apply insecticidal soap to plants; certain chemical insecticides may actually increase mite populations by killing off natural enemies and promoting mite reproduction

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