Carrot Seed Oil Health and Beauty Benefits

The carrot (*Daucus carota* subsp. *sativus*) is a root vegetable (underground plant parts eaten as food), typically orange in color, though purple, black, red, white, and yellow cultivars exist, all of which are domesticated forms of the wild carrot, *Daucus carota*, native to Europe and Southwestern Asia.

Daucus carota, whose common names include wild carrot, bird's nest, bishop's lace, and Queen Anne's lace, is a flowering (angiosperm) plant in the umbellifer family, Apiaceae (a family of mostly aromatic flowering plants named after the type genus Apium).

The wild carrot is an herbaceous (vascular plants), somewhat variable biennial plant (a flowering plant that completes its life cycle in two years) that grows between 30–120 cm (1–4 ft.) tall. Domesticated carrots are cultivars of a subspecies, *Daucus carota* subsp. *sativus*.

Stem

The stem (structural axis), located just above the ground, is rough, hairy, stiff and solid.

Seed

As the seeds develop, the umbel curls up at the edges, becomes more congested, and develops a concave surface.

Leaves

The leaves are *tripinnate*, finely divided and lacy, and overall triangular in shape. The leaves are 5–15 cm (2–6 in) long, bristly and alternate (with a single leaf attached to a node) in a pinnate (arising from both sides of a common axis) pattern that separates into thin segments.

Flowers

The flowers are small and dull white, clustered in flat, dense umbels (shaped like an umbrella, from the Latin “umbella”). The umbels are terminal and about 8–15 cm (3–6 in) wide. They may be pink in bud and may have a reddish or purple flower in the center of the umbel. The lower bracts (a modified leaf associated with a reproductive structure) are three–forked or pinnate, which distinguishes the plant from other white–flowered umbellifers.

The dried umbels detach from the plant, becoming tumbleweeds (the structural above–ground anatomy of a plant). The function of the tiny red flower, colored by *anthocyanin* (or *anthocyans*, water–soluble vacuolar pigments that appear red, purple, blue or black, depending on pH), is to attract pollinating insects (bees, butterflies, flies). The flowers bloom from May to September.

Function of the Dark Central Florets

The function of the central dark florets has been the subject of many treatments of *D. carota* beginning with Charles Robert Darwin, an English naturalist, geologist and biologist, best known for his contributions to evolutionary biology, who speculated that they are a vestigial trait. Researchers have also suggested that the dark florets’ have adaptive functions of mimicking insects toward discouraging herbivory or attracting pollinators by indicating the presence of food or opportunities for mating.

One study in Portugal investigating the relationship between *D. carota* and the beetle *Anthrenus verbasci* (the varied carpet beetle of the family Dermestidae) found that the dark florets contributed to visitation by *A. verbasci* and that higher numbers of dark florets correlated with increased visitation whereas inflorescences with removed dark florets had decreased visitation.

Replacing the dark florets with one or more freeze–killed *A. verbasci,* who are similar to the florets in size and shape found similar results to those observations of inflorescences with intact florets.

Pollination

The stamens usually split (dehiscence) and fall off before the stigma (tip of a carpel) becomes receptive to pollen. The stamens of the brown, male, sterile flowers degenerate and shrivel before the flower fully opens.

In the other type of male sterile flower, the stamens are replaced by petals, and these petals do not fall off. A nectar–containing disc is present on the upper surface of the carpels (or *gynoecium*, the parts of a flower that produce ovules and develop into fruit and seeds).

Fruit

The fruits are small, dry, bumpy, flattened and oval, with short styles (tip of a carpel) and hooked spines, as well as protective hairs surrounding it.

The fruit that, when mature, dries and develops is a *schizocarp* consisting of two *mericarps* or *bicarpellate* (an artificial group used in the identification of plants based on Bentham and Hooker's classification system).

The *endosperm* (a tissue produced inside the seeds of most flowering plants following double fertilization) of the fruit grows before the embryo (early stage of development of an organism).

Taproot

Taproots are typically long and conical. The root diameter can range from 1 cm (⅜ in) to as much as 10 cm (4 in) at the widest part. The root length ranges from 5–50 cm (2–20 in), although most measure 10–25 cm (4–10 in).

Several different factors can cause the root of a carrot to have abnormal *metabolites* (an end product of metabolism, notably the phenolic compound *6–methoxymellin*) that can cause a bitter taste in the roots. For example, carrots have a bitterer taste when grown in the presence of apples, since *ethylene* (gas) can easily produce stress of the plant, increasing the bitterness.

Carrot Seed Oil

Carrot seed oil is the essential oil extract of the seed from *Daucus carota* (or wild carrot). The oil has a woody, earthy sweet scent and is yellow or amber–colored to pale orange–brown in appearance. The pharmacologically active constituents of carrot seed extract are three flavones (flavonoids): *luteolin*, *luteolin 3'–O–beta–D–glucopyranoside*, and *luteolin 4'–O–beta–D–glucopyranoside*.

Unlike the extract, the distilled (essential) oil of the wild carrot is used in perfumery and food aromatization. The main constituent of this oil is *carotol*. *Carotol* was first isolated by scientists Asahina and Tsukamoto in 1925. It is one of the primary components found in carrot seed oil comprising approximately 40% of its constitution. This *sesquiterpene* alcohol is thought to form in carrot seeds (*Daucus carota L.*) during the vegetation period.

Additionally, studies have shown that *carotol* may be involved in *allelopathic* interactions (produces one or more biochemicals that influence the germination, growth, survival, and reproduction of organisms, these interactions can be beneficial or detrimental) expressing activity as an antifungal, herbicidal and insecticidal agent.

Carrot Oil Seed Oil Composition	
Palmitic Acid (C_{16}:0)	3.71%
Oleic Acid (C_{18}:1)	82%

Linoleic Acid (C_{18}:2, ω–6)	13.19%

**Fatty acid breakdown is shared from Modern Cosmetics Volume 1.*

The Comedogenic Rating for Carrot Seed Oil

Carrot seed oil has been rated rather high on the comedogenic scale, given a rating of 3 or 4. Due to its high content of *oleic acid*, this oil may not be suitable for people with oily skin, or skin that is prone to acne or other similar skin conditions. For people who have acne or sensitive skin, using the essential oil instead of the seed oil, and diluting it with a carrier oil, is best. It has an absorption rating 2, meaning it has a fairly fast absorption and does not leave much of a residue on skin.

CARROT OIL, CARROT SEED OIL AND CARROT SEED ESSENTIAL OIL

There is a common misconception about carrot *seed* oil as compared to carrot oil. According to *Aromatherapy Science: A Guide for Healthcare Professionals*, they are often misquoted or erroneously interchanged.

Pressed carrot seed oil is extracted by cold–pressing the seeds of the carrot plant. The properties of pressed carrot seed oil are quite different from those of the essential oil. It has been used in cosmetics for its anti–aging properties. Carrot seed oil, carrot seed essential oil and carrot oil are distinctively different from one another, so pay special attention to which you're actually purchasing:

1. **Carrot oil** is a common carrier or base oil. It is rich in vitamin A and *is not* an essential oil.
2. **Carrot seed oil** should always be cold–pressed extracted from the seeds of the wild carrot, *Daucus carota*. Extracts vary, since there are so many species of carrot. Neither carrot seed oil nor carrot seed *essential* oil contain vitamin A, although they both contain valuable antioxidants that help protect against disease. Carrot seed oil typically contains three bioflavonoids, all derivatives of *luteolin*, a cancer–fighting antioxidant found in many fruits. Carrot seed oil can be used in essential oil diffusers and various aromatherapy practices, even though it has a unique scent.
3. **Carrot seed essential oil** is steam–distilled and may come from either the seeds or the carrot root itself. Studies are lacking on the benefits of carrot seed *essential* oil, while several exist that examine the benefits of carrot seed oil.

You might also find carrot oil infusions. This is where the carrot root is soaked in a carrier oil, such as olive or coconut, and then strained. This process draws the compounds out of the root and suspends them in the fatty oil. Carrot oil infusions are usually used in cooking for added flavor.

DISTINCTIONS AMONG UMBELLIFERS

Similar in appearance to the deadly poison hemlock (*Conium maculatum*, a biennial herbaceous flowering plant in the family Apiaceae), *D. carota* is distinguished by a mix of tripinnate leaves, fine hairs on its solid green stems and on its leaves, a root that smells like carrots, and occasionally a single dark red flower in the center of the umbel.

Hemlock is also different in tending to have purple mottling on its stems, which also lack the hairiness of the plain green Queen Anne's lace (wild carrot) stems. Both plants have been spread into North America by European settlers and are now common native wildflowers.

DISTRIBUTION AND HABITAT OF DAUCUS CAROTA

Native to temperate regions (in the middle latitudes, between the tropics and the Poles) of Europe and southwest Asia (mainly the Middle East), the plant was spread to North America and Australia where it became was naturalized (phenomenon through which a foreign species integrates into a new

ecosystem, capable of reproducing and growing). The plant is commonly found along roadsides and in unused fields. It thrives best in sun to partial shade.

THE ETYMOLOGY OF DAUCUS CAROTA

The word is first recorded in English circa 1530 and was borrowed from Middle French (from the 14th–16th century) *carotte*, itself from Late Latin (from the 3rd–6th centuries CE, and into the 7th century in the Iberian Peninsula) *carōta*, from ancient Greek (1500 BC–300 BC., often divided into: Mycenaean Greek, Dark Ages, Archaic period and Classical period) *καρωτόν karōtón,* originally from the Proto–Indo–European root **ker–* ("horn"), due to its horn–like shape.

In Old English (or Anglo–Saxon, the earliest recorded form of the English language), carrots (typically white at the time) were not clearly distinguished from parsnips: the two were collectively called *moru* or *more* from Proto–Indo–European **mork–* "edible root", cf. German *Möhre* or Russian морковь (*morkov*). Various languages still use the same word for *carrot* as they do for *root*; e.g. Dutch *wortel*.

THE CULTURAL SIGNIFICANCE OF DAUCUS CAROTA

Both written history and molecular genetic studies indicate that the domestic carrot has a single origin in Central Asia. The history of *Daucus carota* and its cultivation in different parts of the world can be traced back through historical texts and artwork. The wild carrot probably originated in Persia (regions of which are now Iran and Afghanistan), which remains the center of diversity for the wild carrot *Daucus carota*, and was originally cultivated for its leaves and seeds.

The most commonly eaten part of the plant is the taproot (a large, central root from which other roots sprout), although the stems and leaves are also edible. Carrots are commonly consumed raw or cooked in various cuisines.

A naturally occurring subspecies (refers to one of two or more populations of a species) of the wild carrot was presumably bred selectively over the centuries to reduce bitterness, increase sweetness and minimize the woody core; this process produced the familiar garden vegetable.

When they were first cultivated, carrots were grown for their aromatic leaves and seeds rather than their roots. Carrot seeds have been found in Switzerland and Southern Germany (modern Bavaria and Baden–Württemberg) dating back to 2000–3000 BC. Some close relatives of the carrot are still grown for their leaves and seeds, such as parsley, cilantro, coriander (annual herb), fennel (annual herb), anise, dill (the only species in the genus *Anethum*) and cumin.

The first mention of the root in classical sources is from the 1st century AD; the Romans ate a root vegetable called *pastinaca*, which may have been either the carrot or the closely related parsnip (root vegetable).

The plant is depicted and described in the Eastern Roman (also referred to as the Byzantine Empire or Byzantium) *Juliana Anicia Codex*, (the Vienna Dioscurides or Vienna Dioscorides) an early 6th–century Byzantine Greek illuminated manuscript Constantinopolitan (the capital of the Roman Empire) copy of Greek physician, pharmacologist, botanist, and author Pedanius Dioscorides' 1st–century pharmacopoeia of herbs and medicines, *De Materia Medica* (a five–volume work written between 50–70 CE).

Where three different types of carrots are depicted. Another copy of this work, *Codex Neapolitanes* from late 6th or early 7th century, has basically the same illustrations but with roots in purple. The plant was introduced into Spain by the Moors (an exonym used to designate the Muslim inhabitants of the Maghreb, the Iberian Peninsula, Sicily and Malta during the Middle Ages) in the 8th century. In the 10th century, roots from West Asia, India and Europe were purple.

The modern carrot originated in Afghanistan at about this time. The 11th–century Byzantine scientist, translator and official Jewish scholar Symeon Seth (under Emperor Michael VII Doukas) describes both red and yellow carrots, as does the 12th–century Arab–Andalusian (a European ethnic group, native to Andalusia, an autonomous community in southern Spain) agriculturist, Ibn al–'Awwam (also called Abu Zakariya Ibn al–Awwam).

Cultivated carrots appeared in China in the 12th century, and in Japan in the 16th or 17th century. There are many claims that Dutch growers created orange carrots in the 17th century to honor the Dutch flag (the Prince's Flag) at the time and William of Orange (William the Silent, also known as William the Taciturn, the main leader of the Dutch Revolt).

Daucus carota was introduced and naturalized in North America, where it was often known as Queen Anne's lace. Both Anne, Queen of Great Britain, and her great–grandmother, Anne of Denmark, are taken to be the Queen Anne for whom the plant is named.

It is so called because the flower resembles lace (a delicate fabric made in an open web–like pattern), prominent in the fine clothing of the day; the red flower in the center is said to represent a droplet of blood where Queen Anne pricked herself with a sewing needle when she was making the lace.

"Queen Anne's Lace" is the title and subject of a poem by American poet, writer, and physician William Carlos Williams, published in the 1921 collection of poems titled *Sour Grapes.*

Paintings from the 16th and 17th century of maids in a market or farmers' most recent crops, can provide information on carrots' history. Studying such paintings shows that yellow or red roots were cultivated in Turkey, North Africa and Spain. Orange roots were cultivated in 17th–century Netherlands.

Modern carrots were described at about this time by English antiquary (aficionado or student of antiquities), natural philosopher and writer John Aubrey (1626–1697). European settlers introduced the carrot to colonial America in the 17th century. More recently, outwardly purple carrots, still orange on the inside, were sold in British stores beginning in 2002.

THE TAXONOMY OF DAUCUS CAROTA

The carrot was first officially described by Swedish botanist, zoologist, taxonomist, and physician Carl Linnaeus, who formalized binomial nomenclature, in his 1753 work *Species Plantarum*. In 2016, an international team sequenced the full genome of *Daucus carota*.

SUBSPECIES OF DAUCUS CAROTA

The cultivated carrot's only ancestor is *Daucus carota*. Both domestic and wild carrots are from the same species, *Daucus carota L*. There are several subspecies of *D. carota* that have evolved to different climates and atmospheres.

Two examples of these subspecies are specifically from the Netherlands. *D. carota* subsp. *sativus* has thicker and sweeter–tasting roots that can be a wide range of colors. The whorl (or *verticil*, an arrangement of leaves that radiate from a single point and wrap around the stem) of barbs above the spine on the vallecular ridges of the *mericarp* of *D. carota* subsp. *sativus* mature very well.

D. carota subsp. *carota* has white roots that do not vary in color and, unlike *D. carota* subsp. *sativus*, have thin, bitter–tasting roots that are not edible. The middle umbellete of *D. carota* subsp. *carota* is not well developed (unlike in *D. carota* subsp. *sativus*) and the color of the flower can vary from red to deep purple.

SUBTAXA OF DAUCUS CAROTA

The following *subtaxa* are accepted:

- *Daucus carota* var. *abyssinicus* A.Braun
- *Daucus carota* subsp. *annuus* (Bég.) Mart.Flores, D.M.Spooner & M.B.Crespo
- *Daucus carota* subsp. *azoricus* Franco
- *Daucus carota* subsp. *cantabricus* A.Pujadas
- *Daucus carota* subsp. *capillifolius* (Gilli) Arbizu
- *Daucus carota* subsp. *caporientalis* Reduron
- *Daucus carota* subsp. *carota*
- *Daucus carota* subsp. *commutatus* (Paol.) Thell.
- *Daucus carota* subsp. *corsoccidentalis* Reduron
- *Daucus carota* subsp. *drepanensis* (Arcang.) Heywood
- *Daucus carota* subsp. *fontanesii* Thell.
- *Daucus carota* subsp. *gadecaei* (Rouy & E.G.Camus) Heywood
- *Daucus carota* subsp. *gummifer* (Syme) Hook.f.
- *Daucus carota* subsp. *halophilus* (Brot.) A.Pujadas
- *Daucus carota* subsp. *hispanicus* (Gouan) Thell.
- *Daucus carota* subsp. *major* (Vis.) Arcang.
- *Daucus carota* subsp. *majoricus* A.Pujadas
- *Daucus carota* subsp. *maritimus* (Lam.) Batt.
- *Daucus carota* subsp. *maximus* (Desf.) Ball
- *Daucus carota* var. *meriensis* Reduron
- *Daucus carota* subsp. *otaportensis* Reduron
- *Daucus carota* subsp. *rupestris* (Guss.) Heywood
- *Daucus carota* subsp. *sativus* (Hoffm.) Schübl. & G.Martens
- *Daucus carota* subsp. *tenuissimus* (A.Chev.) Mart.Flores, D.M.Spooner & M.B.Crespo
- *Daucus carota* subsp. *valeriae* Reduron

THE PHYTOCHEMISTRY OF DAUCUS CAROTA

Skin contact with the foliage of *Daucus carota*, especially when wet, can cause skin irritation (*allergic dermatitis*) in some people. It may also have a milder effect on horses.

Polyacetylenes (organic compounds with alternating single and triple bonds) can be found in Apiaceae vegetables like carrots where they show *cytotoxic* (toxic) activities. *Falcarinol* (a natural pesticide and fatty alcohol found in carrots, red ginseng and ivy) is naturally found in *Daucus carota* for protection against fungal diseases. Lab tests show *falcarinol* to be toxic to mice and the water flea *Daphnia magna* (a small planktonic crustacean of the subclass Phyllopoda).

Falcarindiol (*cis–heptadeca–1,9–diene–4,6–diyne–3,8–diol*) is also naturally found in *Daucus carota*. *Falcarindiol* shows antifungal activity towards *Mycocentrospora acerina* (a *deuteromycete* fungus plant pathogen) and *Cladosporium cladosporioides* (mold). *Falcarindiol* is also the main compound responsible for bitterness in carrots. Normal consumption of carrots has no toxic effect in humans.

The essential oil of *D. carota* subsp. *carota* is composed of *monoterpene hydrocarbonsm* (46.6%), oxygen containing *monoterpenes* (29.5%), *geranyl acetate* (29.0%), *α-pinene* (27.2%), oxygen containing *sesquiterpenes* (15.6%), *11αH-himachal-4-en-1β-ol* (9.2%), *limonene* (9.0%), *carotol* (6.2%), *β-pinene* (4.5%), *sesquiterpene hydrocarbons* (3.5%), *myrcene* (2.5%), *(e)-methyl isoeugenol* (1.4%), *γ-terpinene* (1.4%), *β-himachalene* (1.3%), *α-longipene* (1.0%), camphene (0.9%), *z-β-ocimene* (0.4%), *e-β-ocimene* (0.4%), *e-β-caryophyllene* (0.4%), *α-humulene* (0.4%), *β-bisabolene* (0.3%), *caryophyllene oxide* (0.2%), *terpinen-4-ol* (0.1%), *verbenone* (0.1%), *geraniol* (0.1%), *bornyl acetate* (0.1%), *p-cymene* (0.1%),

germacrene D (0.1%), *sabinene* (0.1%), and trace amounts of *α-thujene*, *α-terpinene* and *linalool*. Carrot seed oil is also rich in natural antioxidants like vitamin A and *carotene*.

Other compounds such as *pyrrolidine* (also known as *tetrahydropyrrole*, is present in the leaves), *6–hydroxymellein* (a *dihydroisocoumarin phenolic* compound), *6–methoxymellein* (a *dihydroisocoumarin phenolic* compound), *eugenin* (a chromone derivative), *2,4,5–trimethoxybenzaldehyde* (*gazarin*) or *(Z)–3–acetoxy–heptadeca–1,9–diene–4,6–diin–8–ol* (*falcarindiol 3–acetate*) can also be found in carrots.

THE MANY USES OF DAUCUS CAROTA

Like the cultivated carrot, the *D. carota* root is edible while young, but it quickly becomes too woody to consume. The flowers are sometimes battered and fried. The leaves and seeds are also edible.

D. carota bears a close resemblance to poison hemlock, and the leaves of the wild carrot may cause *phytophotodermatitis* (known as “berloque dermatitis” or “margarita photodermatitis”, a skin reaction resulting fr4om contact with a phytochemical followed by exposure to UV light), so caution should also be used when handling the plant.

The seeds and flowers have been used as a method of contraception (a form of birth control) and an abortifacient (any substance that induces abortion) for centuries. If used as a dyestuff (colored substance), the flowers produce a creamy, off–white color.

D. carota, when freshly cut, will draw or change color depending on the color of the water in which it is held. This effect is only visible on the "head" or flower of the plant. Carnations (*Dianthus caryophyllus*) also exhibit this effect. This occurrence is a popular science demonstration in grade school.

DAUCUS CAROTA AS A BENEFICIAL WEED

This beneficial weed (an invasive plant that is edible, contributes to soil health or adds ornamental value) can be used as a companion plant (agricultural practice of growing different crops in proximity for pest control, pollination, maximizing use of space or to increase productivity).

Like most members of the Umbellifer family, in its native geography it will attract predatory pollinators (wasps) that kill many garden pests; however, in geography where it has been naturalized, it will attract very few wasps. In northeast Wisconsin, when planted with blueberries, it succeeded in attracting pollinators (butterflies and wasps).

This species is also documented to boost tomato plant production when planted nearby, and it can provide a microclimate (a localized set of atmospheric conditions that differ from those in the surrounding areas) of cooler, moister air for lettuce, when intercropped (agricultural practice of growing two or more crops in proximity simultaneously on the same field).

However, the states of Iowa, Michigan and Washington have listed it as a noxious weed (or harmful weed, a plant designated by a governing authority as injurious to crops, ecosystems, humans or livestock), and it is considered a pest in agricultural pastures. It persists in the soil “seed bank” (the natural storage of dormant seeds in the soil of an ecosystem) between 2–5 years.

GENETICS OF THE CARROT

The carrot is a *diploid* (the number of complete sets of chromosomes in a cell) species, and has nine relatively short, uniform–length chromosomes (long DNA molecule containing the genetic material of an organism), 2*n*=18. The genome size is estimated to be 473 mega base pairs (fundamental unit of double–stranded nucleic acids), which is four times larger than *Arabidopsis thaliana* (the thale cress, mouse–ear cress or *arabidopsis*), one–fifth the size of the maize (corn) genome, and about the same size as the rice genome.

THE CULTIVATION OF THE CARROT

Carrots are grown from seed and can take up to four months (120 days) to mature, but most cultivars mature within 70–80 days under the right conditions. Fast–growing cultivars mature within three months (90 days) of sowing the seed, while slower–maturing cultivars need a month longer (120 days). They grow best in full sun but tolerate some shade. The optimum temperature is 16–21°C (61–70°F). The ideal soil is deep, loose and well–drained, sandy or loamy, with a pH (basicity or acidity) of 6.3–6.8.

Fertilizer should be applied according to soil type because the crop requires low levels of nitrogen, moderate phosphate and high potash. Rich or rocky soils should be avoided, as these will cause the roots to become hairy or misshapen. Irrigation is applied when needed to keep the soil moist. After sprouting, the crop is eventually thinned to a spacing of 8–10 cm (3–4 in) and weeded to prevent competition beneath the soil.

CARROT DISEASES

There are several diseases that can reduce the yield and market value (or OMV, the price at which an asset would trade in a competitive auction setting) of carrots. The most devastating carrot disease is *Alternaria* (a genus of *Deuteromycetes fungi* plant pathogens) leaf blight, which has been known to eradicate entire crops.

A bacterial leaf blight caused by *Xanthomonas campestris* (a bacterium that causes wilt and "black rot") can also be destructive in warm, humid areas. Root knot nematodes (plant parasites of the *Meloidogyne* species) can cause stubby or forked roots, or galls (*cecidia*, a kind of swelling growth on the external tissues of plants).

Cavity spot (fungal plant disease), caused by the *oomycetes Pythium violae* (a soil–borne plant pathogen) and *Pythium sulcatum* (a *chromalveolate* plant pathogen), results in irregularly shaped, depressed lesions on the taproots.

CARROT CULTIVATION PROBLEMS

Physical damage can also reduce the value of carrot crops. The two main forms of damage are splitting, whereby a longitudinal crack develops during growth that can be a few centimeters to the entire length of the root, and breaking, which occurs postharvest. These disorders can affect over 30% of commercial crops. Factors associated with high levels of splitting include wide plant spacing, early sowing, lengthy growth durations and genotype.

CARROT COMPANION PLANTING

Carrots benefit from strongly scented companion plants. The pungent odor of onions, leeks and chives help repel the carrot root fly. Other vegetables that team well with carrots include lettuce, tomatoes and radishes, as well as the herbs rosemary (*Salvia rosmarinus*, a shrub with fragrant, evergreen leaves native to the Mediterranean) and sage (*Salvia officinalis*, a perennial, evergreen subshrub member of the family Lamiaceae).

Carrots thrive in the presence of caraway ("meridian fennel" or "Persian cumin", a biennial plant in the family Apiaceae), coriander (Chinese parsley, *dhania*, *kothmir*, or cilantro, an annual herb in the family Apiaceae), chamomile (plants of the family Asteraceae, like *Matricaria recutita* and *Anthemis nobilis*), marigold (*Calendula*, herbaceous plants in the family Asteraceae) and Swan River daisy (*Brachyscome iberidifolia*, an annual herb found in Western Australia).

Carrot Cultivars

Carrot cultivars can be grouped into two broad classes, “eastern carrots” and “western carrots”. A number of novelty cultivars have been bred for particular characteristics.

"Eastern" carrots were domesticated in Persia around the 10th century. Specimens of the "eastern" carrot that survive to the present day are commonly purple or yellow, and often have branched roots. The purple color common in these carrots comes from *anthocyanin* (or *anthocyans*) pigments.

The “western” carrot emerged in the Netherlands in the 17th century. There is a popular belief that its orange color made it popular as an emblem of the House of Orange (the current reigning house of the Netherlands) and the struggle for Dutch independence (1566–1648).

The orange color results from abundant carotenes (also *carotin*, from the Latin *carota*, "carrot", which are synthesized by plants but cannot be made by animals) in these cultivars.

“Western” carrot cultivars are commonly classified by their root shape. The four general types are:

- **Chantenay carrots.** Although the roots are shorter than other cultivars, they have vigorous foliage and greater girth, being broad in the shoulders and tapering towards a blunt, rounded tip. They store well, have a pale–colored core and are mostly used for processing. Cultivars include “Carson Hybrid” and “Red Cored Chantenay”.
- **Danvers carrots.** These have strong foliage and the roots are longer than Chantenay types, and they have a conical shape with a well–defined shoulder, tapering to a point. They are somewhat shorter than Imperator cultivars, but more tolerant of heavy soil conditions. Danvers cultivars store well and are used both fresh and for processing. They were developed in 1871 in Danvers, Massachusetts. Cultivars include “Danvers Half Long” and “Danvers 126”.
- **Imperator carrots.** This cultivar has vigorous foliage, is of high sugar content, and has long and slender roots, tapering to a pointed tip. Imperator types are the most widely cultivated by commercial growers. Cultivars include “Imperator 58” and “Sugarsnax Hybrid”.
- **Nantes carrots.** These have sparse foliage, are cylindrical, short with a blunter tip than Imperator types, and attain high yields in a range of conditions. The skin is easily damaged and the core is deeply pigmented. They are brittle, high in sugar and store less well than other types. Cultivars include “Nelson Hybrid”, “Scarlet Nantes” and “Sweetness Hybrid”.

Carrot breeding programs have developed new cultivars to have dense amounts of chemically–stable *acylated* pigments (pigments which have had an acyl group added), such as *anthocyanins*, which enrich carrot color based on the density and types of *anthocyans* to produce different carrot colors.

One particular cultivar lacks the usual orange pigment, owing its white color to a recessive gene (the phenomenon of one variant of a gene masking the effect of a different variant of the same gene, the first variant is dominant and the second recessive) for *tocopherol* (vitamin E), but this cultivar and wild carrots do not provide nutritionally significant amounts of vitamin E.

THE PRODUCTION OF CARROTS

The United Nations (UN) Food and Agriculture Organization (FAO) reports that world production of carrots and turnips (the two combined) for 2018 was 40 million tonnes (metric ton), with 45% of the world total grown in China.

In 2020, world production of carrots (combined with turnips) was 41 million tonnes, with China producing 44% of the world total. Other major producers were Uzbekistan and the U.S.

Carrot And Turnip* Production—2020		
Country		**(Millions Of Tonnes)**
	China	18.1
	Uzbekistan	2.9
	United States	1.6
	Russia	1.4
	Indonesia	0.7
	Kazakhstan	0.6
	Japan	0.6
World		**41**

*Carrots And Turnips Combined

Source: Food and Agriculture Organization Statistical Databases (FAOSTAT) of the UN

Proper Storage of Carrots

Carrots can be stored for several months in the refrigerator or over the winter in a moist, cool place. For long term storage, unwashed carrots can be placed in a bucket between layers of sand, a 1:1 mix of sand and wood shavings, or in soil. A temperature range of 0–4°C (32–40°F) and 98% humidity is best.

Consumption of Carrots

Carrots can be eaten in a variety of ways. Only 3% of the β–carotene in raw carrots is released during digestion: this can be improved to 39% by pulping, cooking and adding cooking oil. Alternatively they may be chopped and boiled, fried or steamed, and cooked in soups and stews, as well as baby and pet foods.

A well–known dish is *carrots julienne* (*allumette*, or "french cut", a culinary term for cutting a food item into long thin strips, like matchsticks). Together with onion and celery, carrots are one of the primary vegetables used in a *mirepoix* (a flavor base made from diced vegetables cooked in fat) to make various broths.

In India carrots are used in a variety of ways, as salads or as vegetables added to spicy rice or dal (dried, split pulses or peas) dishes. A popular variation in north India is the *Gajar Ka Halwa* (also known as *gajorer halua*, *gajrela*, *gajar pak*, and carrot *halwa*) carrot dessert, which has carrots grated and cooked in milk until the whole mixture is solid, after which nuts and butter are added.

Carrot salads are usually made with grated carrots with a seasoning of mustard seeds and green chilies popped in hot oil. Carrots can also be cut in thin strips and added to rice, can form part of a dish of mixed roast vegetables or can be blended with tamarind (a leguminous tree bearing edible fruit, the species *Tamarindus* of the family Fabaceae is monotypic and indigenous to tropical Africa) to make chutney (a relish made from a variety of ingredients).

Since the late 1980s, baby carrots or mini–carrots (carrots that have been peeled and cut into uniform cylinders) have been a popular ready–to–eat snack food available in many supermarkets. Carrots are puréed and used as baby food, dehydrated to make chips, flakes, and powder, and thinly sliced and deep–fried, like potato chips.

The sweetness of carrots allows the vegetable to be used in some dessert roles. Grated carrots are used in carrot cakes, as well as carrot puddings (an English dish thought to have originated in the early 19th century). Carrots can also be used alone or blended with fruits in jams and preserves. Carrot juice is also widely marketed, especially as a health drink, either stand–alone or blended with juices extracted from fruits and other vegetables.

The greens are edible as a leafy vegetable, but rarely eaten by humans as some sources suggest that they contain toxic alkaloids (a class of organic compounds with neutral or weak acidic properties). When used for this purpose, the greens are harvested young in high–density plantings, before significant root development, and typically used stir–fried, or in salads.

Some people are allergic to carrots. In a 2010 study on the prevalence of food allergies (an abnormal immune response to food that can range from mild to severe) in Europe, 3.6% of young adults showed some degree of sensitivity (or intolerance, a negative reaction producing symptoms, but is not an allergy) to carrots.

Because the major carrot allergen (an antigen that produces a strong immune response), the protein *Dauc c 1.0104*, is cross–reactive with *homologues* in birch pollen (*Bet v 1*) and mugwort (common name for species of aromatic flowering plants in the genus *Artemisia*) pollen (*Art v 1*), most carrot allergy sufferers are also allergic to pollen from these plants.

Highly excessive consumption over a period of time can result in *carotenemia* (a benign and reversible medical condition), a yellow–orange discoloration of the skin caused by a buildup of *carotenoids*.

THE NUTRITIONAL VALUE OF CARROTS

Carrots, raw			**Carrots, boiled**		
Nutritional value per 100 g (3.5 oz.)			Nutritional value per 100 g (3.5 oz.)		
Energy	173 kJ (41 kcal)		**Energy**	147 kJ (35 kcal)	
Carbohydrates	9.6 g		**Carbohydrates**	8.22 g	
Sugars	4.7 g		Sugars	3.45 g	
Dietary fiber	2.8 g		Dietary fiber	3 g	
Fat	0.24 g		**Fat**	0.18 g	
Protein	0.93 g		**Protein**	0.76 g	
Vitamins	**Quantity**	**%DV**†	**Vitamins**	**Quantity**	**%DV**†
Vitamin A equiv. beta–Carotene lutein zeaxanthin	835 µg 8285 µg 256 µg	104% 77%	Vitamin A equiv. beta–Carotene lutein zeaxanthin	852 µg 8330 µg 687 µg	107% 77%
Thiamine (B^1)	0.066 mg	6%	Thiamine (B^1)	0.066 mg	6%
Riboflavin (B^2)	0.058 mg	5%	Riboflavin (B^2)	0.044 mg	4%
Niacin (B^3)	0.983 mg	7%	Niacin (B^3)	0.645 mg	4%
Pantothenic acid (B^5)	0.273 mg	5%	Pantothenic acid (B^5)	0.232 mg	5%
Vitamin B^6	0.138 mg	11%	Vitamin B^6	0.153 mg	12%

Folate (B^9)	19 µg	5%	Folate (B^9)	14 µg	4%
Vitamin C	5.9 mg	7%	Vitamin C	3.6 mg	4%
Vitamin E	0.66 mg	4%	Vitamin E	1.03 mg	7%
Vitamin K	13.2 µg	13%	Vitamin K	13.7 µg	13%
Minerals	**Quantity**	**%DV**†	**Minerals**	**Quantity**	**%DV**†
Calcium	33 mg	3%	Calcium	30 mg	3%
Iron	0.3 mg	2%	Iron	0.34 mg	3%
Magnesium	12 mg	3%	Magnesium	10 mg	3%
Manganese	0.143 mg	7%	Manganese	0.155 mg	7%
Phosphorus	35 mg	5%	Phosphorus	30 mg	4%
Potassium	320 mg	7%	Potassium	235 mg	5%
Sodium	69 mg	5%	Sodium	58 mg	4%
Zinc	0.24 mg	3%	Zinc	0.2 mg	2%
Other Constituents	**Quantity**		**Other Constituents**	**Quantity**	
Water	88 g		Water	90.2 g	

Link to USDA Database Entry

†Percentages are a rough approximation using U.S. recommendations.

The Reference Daily Intake (DV) is the daily intake level of a nutrient considered to be sufficient to meet the requirements of healthy individuals.

Raw carrots contain dietary fiber (plant food that cannot be completely broken down by digestive enzymes) and ash, among other nutrients. Carrot dietary fiber comprises mostly *cellulose* (an organic polysaccharide), with smaller proportions of *hemicellulose* (one of a number of *heteropolymers*, such as *arabinoxylans*, present in terrestrial plants), *lignin* (a class of organic polymers that form the tissues of plants) and starch (or *amylum*, a polymeric carbohydrate).

Free sugars (sugars naturally present in fruits) in carrot include sucrose (a *disaccharide*), glucose (sugar produced by plants during photosynthesis), and fructose (fruit sugar, one of the three dietary *monosaccharides*).

The carrot gets its characteristic, bright orange color from a high quantity of β–carotene (*beta–carotene*), and lesser amounts of α–carotene (*alpha–carotene*), γ–carotene (*gamma–carotene*), *lutein*, and *zeaxanthin* (one of the most common carotenoids).

A– and β–carotenes are partly metabolized into vitamin A, providing more than 100% of the daily value (DV) per 100 g serving of carrots. Carrots are also a good source of vitamins K and B^6, but otherwise have modest content of other essential nutrients.

THE MYTH OF NIGHT VISION

The provitamin A (*beta–carotene*) from carrots does not actually help people see in the dark unless they suffer from vitamin A deficiency (or *hypovitaminosis A*, lack of vitamin A in blood and tissues common in developing countries, especially among children and women of reproductive age).

This myth was propaganda used by the Royal Air Force (RAF, the air and space force of the UK) during WWII to explain why their pilots had improved success during night air battles, but was actually used as a disinformation strategy to disguise advances in radar technology and the use of red lights on instrument panels.

Nevertheless, the consumption of carrots was advocated in Britain at the time as part of a "Dig for Victory" campaign. "Victory gardens", also called "war gardens" or "food gardens for defense", were vegetable, fruit, and herb gardens planted at private residences and public parks in the U.S., UK, Canada, Australia and Germany during WWI and WWII.

A radio program called *The Kitchen Front* encouraged people to grow, store and use carrots in various novel ways, including making carrot jam and Woolton pie (a pastry dish of vegetables created at the Savoy Hotel in London by Maître Chef de Cuisine, Francis Latry), named after English businessman and politician Frederick James Marquis, 1st Earl of Woolton, (the Minister for Food from 1939–1958).

The British public during WWII generally believed that eating carrots would help them see better at night, and in 1942 there was a 100,000–ton surplus of carrots from the extra production.

THE HEALTH AND BEAUTY BENEFITS OF CARROT SEED OIL

Among its more popular uses, carrot seed oil can be included in skin care and hair care products as a protective agent. The oil has long been used in traditional medicine to treat a range of conditions. In Chinese medicine, for instance, carrot seed essential oil has been used to expel worms and to treat dysentery.

Carrot seed essential oil is made up of various chemical constituents which give it so many of its medicinal properties. These properties include antiseptic, antibacterial, antifungal, anti–inflammatory, antioxidant, depurative (eliminates toxins), carminative (relieves gas), emmenagogue (stimulates or increases menstrual flow) and vermifuge (expels intestinal worms) or antiparasitic actions.

1. Helps Kill Fungi and Bacteria

The most thoroughly researched quality of carrot seed oil is its ability to kill certain bacteria and fungi. Some of these pathogens are common and of particular concern in developing countries, where carrot seed oil may provide a unique and accessible way to fight illness. The bacteria and fungi that seem to be the most affected are:

- **Dermatophytes**—Keratin is required for these fungi to grow, it typically affect the skin, nails and hair. Infections from dermatophytes typically affects the hair, skin and nails and result from direct contact with people, animals and soil infected with the fungus. A 2009 study showed antifungal activities of oils extracted from wild carrots growing in the Mediterranean and Atlantic coasts, these antifungal activities are especially high in the Sardinian carrot oil.
- ***Alternaria alternata***—this fungus lives on leaves and can cause rot and blight in crops, especially impacting farmers with limited resources. A 2004 study found that the main constituent of carrot seed oil, *carotol*, inhibited the radial growth of this fungi by 65%.
- ***Escherichia coli***—An E. coli infection can cause diarrhea and, in some rare extreme cases, anemia and kidney failure. In a 2013 study, carrot seed essential oils were tested against one Gram–positive (*Staphylococcus aureus*) and two Gram–negative foodborne bacteria (*Escherichia coli* and *Salmonella typhimurium*), as well as against a pathogenic yeast (*Candida albicans*), all the essential oils exhibited antibacterial and antifungal activities against the microorganisms.
- **Acinetobacter**—Strains of the Gram–negative bacterium *Acinetobacter* cause a number of serious infections including UTIs, pneumonia and secondary meningitis. It is most often seen in a

hospital environment. In a 2017 study, undiluted essential oils obtained from green carrot seeds showed a large inhibition spectrum against Gram–positive strains and also vs. *Acinetobacter spp.* and S*tenotrophomonas maltophilia*, which is most likely to cause infections in patients with a weak immune system including cancer and cystic fibrosis patients, and people undergoing immunosuppressive treatments.

- ***Aedes albopictus***—this last one isn't a virus; it is actually an insect. But it is worth mentioning, because in a 2015 study carrot seed essential oils were evaluated for their larvicidal activity against this Asian tiger mosquito, the essential oils resulted in greater than 80% larval mortality. *Aedes albopictus* carry and often spread dangerous viruses such as yellow fever, dengue fever, Zika and others to humans.

2. Has Antibacterial Properties

More recent findings in 2016 of the original 2013 study show that the essential oil of *Daucus carota* subsp. *carota* from Portugal, with high amounts of *geranyl acetate* (29.0%), *α-pinene* (27.2%), and *11αH-himachal-4-en-1β-ol* (9.2%) showed antimicrobial activity against several Gram-positive and Gram-negative bacteria, yeasts, dermatophytes, and *Aspergillus* strains. The study results show that the oil was significantly more effective against Gram-positive bacteria.

The essential oil showed antibacterial potential against both Gram-positive strains (*Bacillus subtilis*, *Listeria monocytogenes* and *Staphylococcus aureus*) and Gram-negative ones (*Escherichia coli* and *Salmonella typhimurium*), with significant activity towards against several yeasts (*Candida* strains, *Cryptococcus neoformans*), dermatophytes (*Trichophyton* spp., *Epidermophyton*, and *Microsporum* spp.) and *Aspergillus* strains.

Even at low concentrations, the oil decreased both mass and viability of *Candida albicans* by more than 50%. Carrot seed essential oil exhibits anti-inflammatory potential by decreasing nitric oxide production in macrophages by around 20%, without decreasing viability. Moreover, the oil proved safe at very low concentrations on keratinocytes.

Because of its potent antiseptic properties, carrot seed oil can be applied to minor grazes, scratches, bites and wounds to help prevent bacterial infections.

3. Has Antifungal Properties

In the same study, the essential oil showed antifungal properties against *Candida* strains, a *Cryptococcus neoformans* strain, dermatophyte strains and *Aspergillus* strains. The oil was more effective against *Cryptococcus neoformans* and dermatophyte strains and much less effective against *Candida* spp. and *Aspergillus* spp.

Geranyl acetate demonstrated good antifungal effects against dermatophytes and *Cryptococcus neoformans*; but weak effects against *Candida* strains and *Aspergillus* spp. Similarly, α-pinene showed inhibitory effects against *C. albicans* and *Cryptococcus neoformans* as well as a potent effect against dermatophyte strains. The study pointed to the antifungal activity of *limonene* against several fungi strains.

A research study in 2017 showed carrot seed oil, isolated compounds (*daucene*, *daucol*, *β-farnesene*, *β-elemene* and *β-cubebene*), and derivatives of *carotol* showed antifungal potential at different concentrations against *Alternaria triticina*, *Bipolaris sorokiniana* and *Ustilago segetum tritici*. All the compounds showed fairly good antifungal activity against the tested fungi.

4. May Fight Cancer Cells

In a 2015 study, a *Daucus carota* oil extract was cytotoxic to human acute myeloid leukemia cells. The oil extract demonstrated a significant increase in cell death and decrease in cell proliferation, showing it possesses both antioxidant and promising anticancer activities against leukemia, colon cancer and breast cancer cell lines.

A 2011 animal study investigating the chemopreventive effects of carrot oil extract on induced skin cancer (squamous cell carcinoma) in mice. The oil extract delayed tumor appearance by 40%, and inhibited tumor incidence and yield by 89%.

5. Included as Part of Natural Sunscreen Option

An oft–cited study about the benefits of carrot seed oil was published in 2009 by the Institute of Pharmacy, Pt. Ravishankar Shukla University in Raipur, India. The study investigated the efficacy of sunscreens containing various herbs for protecting skin from UVA and UVB rays. Research findings showed emulsions containing carrot seed oil had an SPF range of 15–40.

The compound *umbelliferone*, or *7–hydroxycoumarin* found in carrot seed oil absorbs UVB light and is commonly used in sunscreens.

Due to the way natural ingredients interact to create the SPF in these emulsions, it is unlikely that carrot seed oil on its own has a significant enough SPF to be used in place of conventional sunscreens containing other chemicals. It does, however, mean it can be efficacious when used as part of a complete sunscreen formulation.

6. Powerful Antioxidant

One of the uses in traditional medicine for this oil was as a treatment for jaundice. Carrot seed oil contains powerful antioxidants that can help to protect against disease. These *polyphenols* were studied in animal tests for their liver–protecting (*hepatoprotective*) activities. In a 2012 study, carrot seed oil extract shielded the liver from oxidative stress, and in a 2015 study, the oil extract exhibited strong antioxidant activities and hepatoprotective effects against induced hepatotoxicity.

7. Gastrointestinal Tract Benefits

The *alpha-pinene* content of carrot seed essential oil showed gastroprotective effects and antiulcerogenic activity in a 2015 animal study. It was found to reduce the incidence of gastric ulcers.

8. Supports Skin and Hair Health

Traditionally, carrot seed oil is a popular beauty product for moisturizing skin and hair. It is safe for topical use. Its antioxidant content can protect skin and hair from free radical and sun damage, and combat the premature signs of aging like wrinkles and fine lines. Carrot seed oil is regenerative, meaning it can increase cell turnover. This oil is also known for helping brighten skin, which can help with hyperpigmentation (darkening of the skin).

Carrot seed oil can be blended with other natural ingredients to create a healthier alternative to store–bought, chemical sunscreens.

Carrot Oil can also be used in a variety of serums, moisturizers and creams. Adding carrot seed oil with its high *carotol* content to your beauty regimen can help boost your skin's health, tone and tighten the skin, and hydrate the cells. Carrot seed oil has excellent anti–inflammatory properties as well as antiseptic actions that may help treat several skin conditions including rosacea and psoriasis.

9. Potential for Anti–Aging Cosmetic Applications

In a 2019 study, cosmetic emulsions composed of carrot seed oil were evaluated for various physical, chemical, and biochemical parameters such as antioxidant activity, sun protection factor (SPF), skin irritation and biochemical studies. The study's data suggest that these cosmetic emulsions have potential to be used for antiaging preparations.

10. Women's Reproductive Health

Carrot seed oil can help provide some relief from menstrual cramps. The oil also has emmenagogue properties meaning that it can help women suffering from irregular periods. The oil is commonly used for women to help encourage the production of breast milk following childbirth.

11. Stress and Anxiety

Carrot seed oil is often used by aromatherapists to help treat people suffering from stress and anxiety. Its earthy aroma takes some getting used to, but some people respond to it well.

THE THERAPEUTIC USES OF CARROT SEED OIL

Carrot seed oil blends very well with other essential oils including cinnamon, lavender, juniper and geranium. It also blend well with citrus essential oils like lime, lemon and bergamot.

Carrot seed oil is one of the ingredients in our homemade facial scrub that can help remove dead skin cells and leave your face feeling supple and glowing. The combination of ingredients in this scrub can help repair dry, damaged skin and aid in wrinkle prevention.

1. **To Treat a Sunburn:** Dilute carrot seed oil with some soothing aloe vera gel and apply it to the affected areas of your skin.
2. **To Nourish Damaged Hair:** Add 4–6 drops of carrot seed oil to your regular conditioner and use as usual.
3. **Inhalation:** You can inhale this essential oil directly from your hands or a handkerchief in order to bolster your mood.
4. **Diffuse:** Diffusing carrot seed essential oil in your home or office is a great way to relieve anxiety or stress and to help you focus.
5. **Bath Soak:** Add 5–6 drops of carrot seed essential oil to a hot bath, soak for at least 20 minutes for best results.

CARROT SEED OIL SUBSTITUTES

Chia seed oil a carrier oil with similar properties to carrot seed oil. It is regenerative, protective, and helps aging skin. It is less likely to clog pores and absorbs quickly into skin.

Evening primrose oil is another oil that helps reduce signs of aging and protects skin from further signs of aging. This oil is also great for people who are looking for deep hydration of the skin and it helps heal damaged skin.

Precautions

Remember, carrot seed oil, carrot seed essential oil and carrot oil are distinctively different from one another, so pay special attention to which you're actually purchasing. Carrot seed oil should always be from organic carrots (if available). Carrot seed oil can be used in essential oil diffusers and various aromatherapy practices.

It can also be applied topically directly on the skin to take advantage of its benefits. When applying carrot seed oil topically (on your skin), always perform a 24–hour skin patch test first using 1–2 drops, read how for further details. Store in tightly–sealed dark glass containers; in a cool, dark place away from light. Carrot seed oil can be found at most health food stores or online.

Many sources suggest using carrot seed oil in food recipes and ingesting it in a variety of ways. There has been no research conducted on the efficacy of ingesting this oil. In general, it is inadvisable to ingest any essential oils. If you do wish to utilize this product in this way, first consult with your primary care or naturopathic physician before ingesting it in any way.

Pregnant and nursing women should especially avoid ingesting it. If nursing or pregnant, consult your physician prior to using carrot seed oil. Do not use carrot seed oil on children. Some brands clearly labels their essential oils “KidSafe” on the bottle if it can be used on children ages 2–10. As with all carrier oil and essential oil products, be aware of the quality of what you purchase and always buy from reputable, well–sourced manufacturers.

Do not apply carrot seed oil directly to broken or damaged skin. Do not apply directly to open wounds. Never use carrot seed oil in eyes or in mucous membranes. If you experience an allergic reaction (externally or otherwise) after using carrot seed oil, discontinue use immediately and consult your physician. Carrot seed oil has *no known* medicinal interactions.

Always dilute carrot seed oil with a carrier oil due to its high concentration and high comedogenic rating. Common carrier oils you could use include babassu, argan, sunflower, sweet almond or hemp seed. Begin with a small percentage dilution ratio, and patch test on skin to see how your skin reacts, increasing the percentage dilution gradually until you see the desired results.

In general, essential oils should never be used by people who suffer from epilepsy, as they could be overstimulating to the central nervous system, possibly leading to seizures.

Carrot seed oil contains high amounts of *furanocoumarins*, which could potentially increase sun sensitivity (photosensitivity) in the skin. It could also potentially cause other symptoms of hypersensitivity, as well as contact dermatitis. Take care when exposing your skin to the sun in the first 48 hours after applying the oil, and be sure to wear proper sunscreen.