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Review on Fennel (*Foeniculum Vulgare*) is an Universal Medicine

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ABSTRACT: One of the most typical diagnosis in gastroenterology clinical practise is chronic constipation (CC). Depending on how severe the symptoms are, there are various measures in the treatment. Most health specialists advise making changes to your lifestyle including drinking more water and fibre. Anethole, estragole, and fenchone are the primary ingredients of *F. vulgare* seed essential oil. These plants have a variety of pharmacological properties, including antibacterial, diabetic, antihepatotoxic, Antitumor, antifungal, cardiovascular, antithrombotic, and antioxidant. The outcome is that fennel has a phytochemical component that has been shown to exist and can be used as a phytopharmaca, a therapeutic component. Fennel, traditional usage, phytochemical, *Foeniculum vulgare* Drug-related activity

KEYWORDS: Introduction, Habitate, cultivation, health benefits, taxonomy, conclusion

I. INTRODUCTION

The Apiaceae (Umbelliferaceae) family includes the biennial medicinal and aromatic plant *Foeniculum vulgare* Mill. It is a resilient perennial herb with yellow flowers. Feathery leaves, too. It may reach a maximum height of 2.5 m with slender stems. The leaves can reach a length of 40 cm and are very fine. Last segments filiform (thread-like), divided into Regarding 0.5 mm wide. Compound terminal umbels are generated to produce the blooms. The fruit is a 4–10 mm long dry seed. It is typically thought to be native to the Mediterranean coast. But has extensively naturalised in several regions of the sea World, particularly on dry soils near water and on rivers Banks. Some writers distinguish between the piperitum and fennel subspecies (1). Always crucial to human health and healing are herbal plants. Natural treatments and herbal medications are affordable treatment options. Low drug side effects compared to diseases Synthetic pharmaceuticals. The hardy plant fennel (*Foeniculum vulgare*) is a perennial herb with feathery leaves and yellow blooms. It is native to the Mediterranean coasts, however it has Widespread naturalisation in many regions of the world, Particularly on arid soils near the seashore and on Riverbanks. It is a very flavorful and aromatic herb. Combined with the similar-tasting anise, used in cooking Is one of absinthe's main components. Florence Fennel, often known as Finocchio (UK: /fnkio/; US: /-nok- /, Italian: [fiinkkjo]) is a kind with a bulbous, enlarged stem base that is used as a vegetable (2).

It has more than 100 names in addition to the common name “fennel” (Table 1). It has a long history of use as a traditional and widely used herb, A medication. Studies have revealed that *F. vulgare* successfully treats a variety of bacterial, viral, and fungal infections. Origins that are fungal, viral, mycobacterial, and protozoal (3-7)

Irritable bowel syndrome with constipation (IBS-C) and functional constipation (FC) are distinguished by the Rome criteria, which is mostly utilised for scientific purposes. These two distinct categories ought to be exclusive of one another. However, due to the extensive overlap between these two entities in clinical practise, many gastroenterologists find it challenging to distinguish between them clearly. Instead, they should be thought of as a continuum.(8)

Limited clinical trials and animal studies indicate that long-term usage of *F. vulgare* is not hazardous. Fennel can be eaten everyday in salads and snacks when it is raw.

A variety of foods and even grilled or baked, stewed, boiled, grilled, or Utilised while creating herbal spirits or teas. A diet With the right amount of fennel, there may be health benefits. Advantages because of its nutritious makeup, specifically the presence of vital fatty acids (9)



Fennel seed

HABITATE:-

The plant is native to the Mediterranean shores and is currently grown in Egypt, Europe, India, and China.

CULTIVATION:-

Fennel is a robust, flavorful plant crop that is grown for market as an annual herb. Fennel is used both in food preparation (cooking) and pharmaceuticals. The genus “Foeniculum” and family “Apiaceae” are both home to fennel. Hardy fennel is a perennial herb with feathery leaves and yellow blooms. This native plant grows along the coasts of the Originally from the Mediterranean, it has spread greatly over the world. Fennel is a very fragrant and Savoury herb that grows up to 2.5 metres tall. Fennel seeds are most frequently produced in India. One Can choose high-yielding varieties and adhere to excellent production practises to make a respectable profit from fennel seed. Management techniques for farms (10).



Plant of Foeniculum Vulgare



Health Benefits:-

Mouth Freshener

For the purpose of eliminating any unpleasant mouth odour, fennel seeds have been employed as a component . Both sugared and unglazed Mouth refresher uses fennel seeds.(11)

GASTRO-PROTECTIVE ACTIVITY

It was hypothesised that fennel water extract pretreatment considerably reduced the gastrointestinal damage caused by ethanol in rats and that this was because it decreased lipid peroxidation and increased antioxidant activity. The anti-ulcer benefits are partially attributed to the antioxidant activity of phenol concentrations.(12)

ANTI-BACTERIAL ACTIVITY:-

Fruits of the *F. vulgare* plant yielded essential oil that showed antibacterial activity against foodborne pathogens such *Staphylococcus aureus*, *Bacillus megaterium*, and *Escherichia coli*. (29) It has also been reported that the essential oil from the seeds of *F. vulgare* exhibits antibacterial activity against certain pathogenic bacteria that affect humans. *F. vulgare* ethanol and water extracts have demonstrated efficacy against *Helicobacter pylori* and *Campylobacter jejuni*.(30)

Antistress Activity:-

Natural foods and medications are important components of public health systems and are being researched as treatments for a variety of stress-related illnesses.(31) Anxiolytic qualities may be present in crude fennel extract, which may help lessen anxiety. This is because phytoestrogens, or plant components that can mimic the actions of estrogen in the body, are found in fennel.

Expectorant Activity:-

The trachea's smooth muscles contract when stimulated by the volatile oil of *F. vulgare*, which may lead to the expectoration of mucus, bacteria, and other Body parts unrelated to the respiratory systems.(32)

Memory-Enhancing Property :-

Children were typically fed these along with their supper. *F. vulgaris* is an Ayurvedic rasayana (combination) with a variety of neuropharmacological effects. The Fennel's antidepressant properties are well-established. Within ethnomedicine. All of the plant material (50, 100, and 200 mg/kg) of *F. vulgare* showed signs of improving memory. In opposition to rats with scopolamine-induced amnesia. This trial Was assessed using the CAR, or conditioned avoidance response. Method. Rats' CAR after receiving the extract Elevated over the course of seven to twelve days to 95%. The purchase (duration required to get 95% CAR) in rats given the Compared to the control, the extract was dose- and time-dependent. Group, whose acquisition required 12 days. The percentage Avoidance in the groups treated with extract was consistently higher. In contrast to the control group. It took ten days for animals given 200 mg/kg body weight of the extract, but it took eleven days for groups given 100 and 50 mg/kg doses And twelve days to arrive to the acquisition point, respectively. Scopolamine administration resulted in amnesia, as observed From a decrease in the recorded CAR. Amnesia was more severe Compared to the groups that received extract treatment. However, continuing *F. vulgare* treatment resulted in improved Retention and recuperation in a way reliant on dosage The animals in the car. It took three to five days for the extract-treated groups to recover from scopolamine-induced amnesia. In contrast to the typical (control) group that assumed Six days. Overall, this development indicates that *F. vulgare* extract Has the ability to improve memory.(33)

Antimicrobial and Antiviral Activities

The ethnic medicine *foeniculum vulgare* has been used to treat a wide range of infectious diseases with bacterial, fungal, viral, and mycobacterial origins. Numerous studies have been conducted. Previously demonstrating the efficacy of its antibacterial, antimycobacterial, And antiviral capacity.(13) Compared to the methanolic and ethanolic extracts, *F. vulgare* essential oil demonstrated substantial antibacterial activity against several microbes. The Growth inhibition zone



sizes ranged from 14 to 31 mm. (with the disc's diameter being 6 mm) with the highest Values of the inhibitory zone against *Bacillus megaterium* *Bacillus subtilis* (29 mm), and (31 mm). Roby and co.(14)

Antithrombotic activity

Due to their broad-spectrum antiplatelet activity, clot destabilising effect, and vasorelaxant action, the essential oil of *F. vulgare* and its primary component, anethole, have been found to have a safe antithrombotic activity. The primary fennel oil ingredient anethole was examined in guinea pig plasma. Was equally effective at inhibiting arachidonic acid as fennel oil, Aggregation was brought on by collagen-ADP and U46619. Nethole as well At doses, inhibited thrombin-induced clot reaction Like fennel oil in flavour. Anethole and fennel oil underwent testing. Similar NO-independent vasorelaxant effect at antiplatelet concentrations in rat aorta with or without endothelium. Concentrations that have been shown in vitro not to have any harmful effects. Additionally, each *F. vulgare* necessary Significant protection was provided by anethole (100 mg/kg oral dosing) and oil.(15)

Stimulant ,Carminative and Expectorant

Fennel is considered to promote a healthy appetite and digestion; Patel and Srinivasan (2001) found that adding various well-known dietary spices—including fennel—to the diet significantly sped up meal transit time. Fennel contains significant levels of anethole, which is distributed widely throughout the plant but is primarily concentrated in the seeds. It is believed that this compound gives fennel its digestive and carminative properties. Fennel's excellent flavour and distinctive aroma also make it an appealing vegetable to include in meals. Vegetable charcoal has been used for a very long time and is well recognised for its capacity to quickly absorb gases and liquids in the intestines while also supporting healthy intestinal flora that aid in digestion. Commercial encapsulated vegetable-based charcoal with fennel is offered for sale. Herbal mixtures and cough syrups benefit from the delectable flavour and fragrant boost provided by fennel. Fennel's main chemical components, anethole and fenchone, have been shown to have a secretolytic effect on the respiratory tract. As a result, it can help clear wind from the alimentary canal, freeing the respiratory system and providing a calming effect on coughs and bronchitis (Brender et al., 1997). In syrups for coughs, wheezing, and shortness of breath, fennel seeds are boiled. For coughs, fennel oil and honey can be eaten, and the tea can be gargled with. Fennel has been "thoroughly tried" as a treatment for gas, an acidic stomach, gout, cramps and colic, according to Kloss (1994).

The effects of fennel in obesity are thought to be related to an appetite suppressant effect, although this area of efficacy is still under-researched. The essential oil of fennel is described as excellent for treating obesity and has carminative qualities that are at least as effective as peppermint oil (Guenther, 1982). The carminative impact of essential oils may be linked to how they affect intestinal foam, according to a popular theory. As a result, possibly, of the stimulation of stomach and intestinal secretion, peppermint, fennel, cinnamon, orange, dill, and caraway oils have been demonstrated to be particularly effective in disturbing gastrointestinal foam (Harries et al., 1978).(16)

Applications to Health Promotion and Disease Prevention

Fennel seeds and seed oil (*Foeniculum vulgare* Mill.) are used in food flavouring, health promotion, and illness prevention. The seeds are consumed as an appetiser since they are delicious, laxative, stomachic, and stimulating. They are also used as a brain tonic, to treat deafness, and to treat other conditions like headache, mania, the flu, eye issues, impaired eyesight, and eye disorders. Fennel seeds are used to treat piles, bloat, diarrhoea, and menstrual irregularities in Greco-Arab (Unani) medicine. Fennel seeds have been used as a traditional herbal remedy in Europe and China for many years. many applications for fennel (*Foeniculum vulgare* Mill.) seeds in various forms, uses, and cultures.(17)



TAXONOMY:-

Kingdom	Plantae
Clade	Trichophytes
Clade	Angiosperms
Clade	Eudicots
Clade	Asteroids
Order	Apiales
Family	Apiaceous
Genus	Foeniculum
Species	F. vulgare

Phytochemistry:-

Research on the phytochemistry of *Foeniculum vulgare* has resulted in the isolation of volatile components, hydrocarbons, phenolic components, fatty acids, and a few other types. Numerous secondary metabolites originating from its many sections. These phytochemicals are primarily present in essential oils. Among *F. vulgare*'s phytoconstituents were Find use as anti-aging and colouring agents (18,19).

Volatile compounds

Enumerates the volatile substances found in *F. vulgare* essential oil. The essential oils of *F. vulgare* give it its distinct anise scent. It creates A fantastic flavouring ingredient for a variety of foods and Associated goods. There have been reports regarding fennel essential oil. To include over 87 volatile substances(20-26)

Phenolic compound

The phenolic components found in fruits and vegetables are gaining attention due to their potential to improve human health and reduce the risk of disease. Watery Fruit fennel extract has a high content of phenolic components. Numerous them exhibit hepatoprotective and antioxidant qualities. The phenolic substances found in *F. Vulgare* are thought to be connected to the avoidance Several illnesses that could be brought on by oxidative stress, like Inflammation, cancer, and heart problems. Such Phenolic compounds have drawn a lot of interest. Among food scientists, dietitians, and



consumers because To how they affect human health. It has been noted that fennel To include flavonoid and derivatives of hydroxyl cinnamic acid. Flavonoid aglycones and glycosides (27) For the first time, two chemicals from wild fennel, designated A and B, were isolated and characterised. They were found to be 3,4-dihydroxyphenethylalcohol-6-O-caffeoyl- β -Dglucopyranoside and 3,8-bisangelicin, respectively. The. Total amounts of flavonoids and phenolics in wild fennel (2.4% and 1.2% resp.) were lower than the 3.1% of grown fennel. And 1.6%, in turn.(28)

II. CONCLUSION

F. vulgare is a medicinal and aromatic plant with a diverse pharmacological spectrum and having Considerable importance in particular to food industry. The scientific study that is now accessible on *Foeniculum vulgare* has demonstrated that it is a significant medicinal plant utilised in a variety of ethnomedical therapies, especially for Stomachaches, emetic drugs, aperitifs, arthritis, cancer, and colic Diarrhoea, depurative symptoms, conjunctivitis, and constipation in youngsters Fever, flatulence, gastralgia, gastritis, dieresis, emmenagogue, Irritable bowel syndrome, renal disease, as a laxative, insomnia Stomachache, liver pain, mouth ulcer, and leucorrhoea. Anethole, fenchone, and estragole, which are antispasmodic and anti-inflammatory compounds, are found in fennel seeds. They are fantastic in relieving bloating, indigestion, and constipation. Drink fennel tea to maintain a healthy and happy digestive tract for improved results.

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