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## Phytomedicine Fennel

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**Abstract-** *Foeniculum vulgare* Mill commonly called fennel has been used in traditional medicine for a wide range of ailments related to digestive, endocrine, reproductive, and respiratory systems. Additionally, it is also used as a galactagogue agent for lactating mothers. The review aims to gather the fragmented information available in the literature regarding morphology, ethnomedicinal applications, phytochemistry, pharmacology, and toxicology of *Foeniculum vulgare*. fennel is cultivated for medicinal purpose in many part in the world, including the U.S., Europe, Asia and Africa. Fennel is most often associated with Italian dishes because his properties licorice-like in flavour. It is still very highly for its diverse medicinal benefits. The objective of this review article is to present the existing knowledge of F.vulgare's phytochemical cocomposition, its culinary uses, use in local medicine, and reported in vitro and in vivo pharmacological studies on plant-derived extracts, isolated phytochemicals.

**Keywords-** Fennel: introduction, Biological source, Geographical source, Morphological characters, Botanical classification, Use in local traditional medicine, Mechanism of action, Phytochemistry, Conclusion.

**Introduction-** fennel is traditionally is used for medicinal and culinary purposes. The entire plants is valuable in medicinal industry; its enlarged base is used as vegetable; its leaves are used for culinary purposes and its seed as spice and for essential oil extraction. Fennel pollen is the most potent from fennel, its extremely expensive the flower and leaves are also used to makes yellow and brown dyes<sup>1</sup>.fennel is cultivated for medicinal purpose in many part in the world, including the U.S., Europe, Asia and Africa. Fennel is most often associated with Italian dishes because his properties licorice-like in flavour. It is still very highly for its diverse medicinal benifits<sup>2</sup>.

A native of southern Europe and the Mediterranean regions (cleverly et al.,1998). Fennel has become naturalized along roadside, in pastures and in other open sites in many regions, including<sup>3</sup>.

**Biological source:** fennel is consist of the dried ripe fruits of *foeniculum vulgare* miller.

**Geographical source:** it is indigenous to mediternean countries and asia; it largely cultivated in france, Saxony, japan, Galicia, Russia, india and Persia.

**Morphological character: Fennel**, is a perennial herb. It is erect, glaucous green and grows to heights of up to 2.5 metres (8ft), with hollow stems. The leaves grow up to 40 centimetres (16 in) long; they are finely dissected, with the ultimate segments fillform (threadlike), about 0.5 millimetres wide.

**Botanical classification:**

**Botanical name:** *foeniculum vulgare*

**Family name:** umbiliferae

**Kingdom:** plantae

**Division:** Magnoliophyta

**Class:** magnolipsida

**Order:** Apiales

**Vernacular names**

**English:** *Foeniculum fulgare*, Finugi

**Hindi:** Saunf, Saipha, saumfa

**Malayalam:** perumjeerakam, sutahakuppa

**Marathi:** Badishep, Saunf

**Gujarati:** variari, warjari

## Use in local traditional medicine:

On account of its carminative properties, fennel is chiefly used medicinally with purgative to allay their side effects and for this purpose from one of the ingredients of the well-known compound liquorice powder. Fennel water has properties similar to those of anise and dill water: mixed with sodium bicarbonate and syrup, these waters constitute the domestic 'gripe water', used to correct flatulence of infants<sup>4</sup>. A decoction of fennel of fennel seeds is used in Indian and Chinese medicine for abdominal pain, colic and stomach chills. The infusion is treat indigestion and abdominal distention<sup>5</sup>. A fennel extractive, peppermint and ginger in an enteric-coated hard gelatine capsule are also available on the market, to treat discomfort, abdominal colic and gastrointestinal disease. There are five commercial ayurvedic products, satapuspadi churana, satapushpa arka, satapushpadya ghrita, abhayrishta and panchsakar churna, which are prescribed by ayurvedic practitioners to improve digestion, control colic pain and other gastrointestinal problems<sup>6</sup>.

The objective of this review article is to present the existing knowledge of *F.vulgare*'s phytochemical composition, its culinary uses, use in local medicine, and reported in vitro and in vivo pharmacological studies on plant-derived extracts, isolated phytochemicals and also to highlight the potential for developing for developing evidence-based *F.vulgare* preparations. Various types of pharmacological activity of fennel-

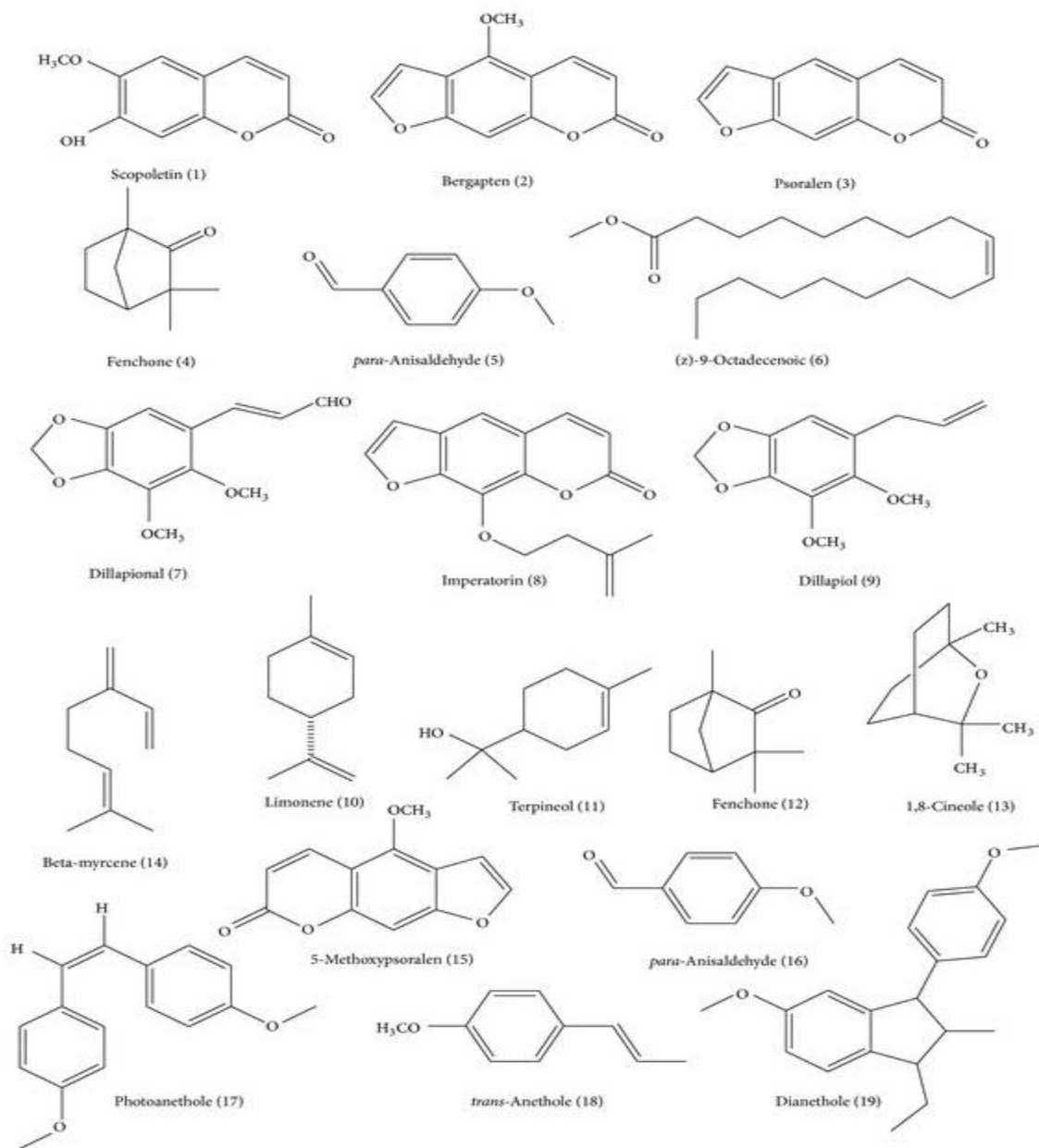
1. Antimicrobial and Antiviral Activity
2. Anti-inflammatory Activity
3. Antiallergic Activity
4. Hepatoprotective Activity
5. Antistress Activity
6. Memory-Enhancing Power Property
7. Antihirsutism Activity

## Mechanism of action:

The mechanism of action of fennel is inhibits vitamin K coumarin competitively and interfere with blood clotting. Vitamins C is body's primary water-soluble antioxidant, which able to neutralize the free radicals in all aqueous environment of body. Fennel is bronchodilatory effect due to potassium channel opening effect<sup>7</sup>.

The vitamin C found in fennel bulb is directly antimicrobial and is also needed for the proper function of the immune system. as a very good source of fiber, fennel bulb may help to reduce elevated cholesterol levels<sup>8</sup>.

**Phytochemistry** - Some of the phytoconstituents of *F. vulgare* were find application as coloring and antiaging agents. Phytochemical research carried out on *Foeniculum vulgare* has led to the isolation of fatty acids, phenolic components, hydrocarbons, volatile components, and few other classes of secondary metabolites from its different parts<sup>9</sup>. Mostly these phytochemicals are found in essential oil. They also have biological and pharmacological activities.



**Fig –** Chemical structures of various phytoconstituents isolated from *Fennel*

## 1. Volatile compound –

It makes an excellent flavoring agent in various types of food and food related products. The essential oil of fennel has been reported to contain more than 87 volatile compounds<sup>10</sup>. The molecular structures of major volatile components of *F. vulgare* seed essential oil have been illustrated in Fig., The accumulation of these volatile compounds inside the plant is variable, appearing practically in any of its parts, namely, roots, stem, shoots, flowers, and fruits<sup>11</sup>.

## 2. Flavonoids-

It has been reported that the presence of flavonol glycosides in fennel species is related to its morphological heterogeneity and variation. Flavonoids are generally considered as an important category of antioxidants in the human diet<sup>12</sup>. Flavonoids are abundant in the plants of Apiaceae family, Further, quercetin, rutin, and isoquercitrin were reported to have the immunomodulatory activities<sup>13</sup>.

## 3. Phenolic Compound –

The phenolic compounds present in fennel are considered to be associated with the prevention of diseases possibly induced by oxidative stress such as cardiovascular diseases, cancer, and inflammation. These phenolic compounds have received tremendous attention among nutritionists, food scientists, and consumers due to their role in human health. Aqueous extract of fennel fruits are rich in phenolic compounds. Many of them have antioxidant activities and hepatoprotective properties<sup>14</sup>.

## Conclusion-

This plant has been in use for a long period of time without any documented serious adverse effects. Studies carried out in the past and present indicate that fennel possesses diverse health benefits and are an important constituent of food. Studies have shown that various extracts of fennel possess a range of pharmacological actions, such as antiaging, antiallergic, hepatoprotective, antihirsutism, anti-inflammatory, antimicrobial, antiviral memory-enhancing property, activity supporting its traditional use. Fennel also contains mineral and trace elements like aluminum, barium, calcium, cadmium, cobalt, chromium, copper, iron, magnesium. This can be fulfilled only by generating interest among the research community through writing of critical appraisals (paper) and extending the interdisciplinary research area to focused studies on fennel.

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