

# A Brief Review on *Foeniculum Vulgare* Mill Highlighting Gastroprotective Activity

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**Abstract:-** Fennel is the common name for *Foeniculum vulgare*. A medicinal herb called *Foeniculum vulgare* is used to cure a variety of illnesses. Information about traditional usage, phytochemicals, and pharmacological activities are highlighted in this review. Fennel has been used traditionally in medicine to treat a wide range of illnesses, including cancer, fever, stomachaches, mouth ulcers, gastritis, flatulence, gastralgia, sleeplessness, and liver discomfort. Research has indicated that fennel seeds may be used as a medication to treat hypertension, the primary ingredients of fenchone, estragole, and anethole in *F. vulgare* seed essential oil.

**Keywords:-** *Fennel*, *Gastroprotective Activity*, *STAT Signaling*.

liver discomfort. Research has indicated that fennel seeds may be used as a medication to treat hypertension.[3]

- In both modern phytotherapy and traditional Iranian medicine (TIM), fennel, or *Foeniculum vulgare* Mill. (*F. vulgare*), is a commonly utilized medicinal plant with a variety of pharmacological properties. These actions encompass qualities that are anti-inflammatory, cytotoxic, antimicrobial, bronchodilatory, estrogenic, diuretic, lithotriptic, galactagogue, emmenagogue, hypotensive, gastroprotective, hepatoprotective, memory-improving, and antimutagenic.

## III. GASTROPROTECTIVE ACTIVITY OF FENNEL

### I. INTRODUCTION

- **Synonyms:** Fennel, fruits, Fructus *Foeniculum*. [1]
- **Biological source:** Fennel consists of dried ripe fruits of the plant known as *Foeniculum vulgare miller*, family Umbelliferae, obtained by cultivation (It should contain not less than 0.6 percent of anethole calculated on dried basis.). [1]
- **Family:** Umbelliferae [1]
- **Geographical source:** It is indigenous to Mediterranean countries and largely cultivated in Romania, Russia, Germany, France, India and Japan. In India, it is cultivated in Gujarat, Punjab, Maharashtra, Rajasthan, Uttar Pradesh and West Bengal.[1]

### II. TRADITIONAL USES OF FENNEL

- In traditional Chinese, Arabic, Roman, Indian, European, and Iranian medicine, fennel is utilised as a balancing and alternative remedy. [2, 3]
- The entire fennel plant can be used medicinally in a number of ways to treat a range of illnesses. Throughout history, fennel has been used to cure a wide range of illnesses, including cancer, fever, stomachaches, mouth ulcers, gastritis, flatulence, gastralgia, sleeplessness, and

Fennel fruit is effective in treating gastrointestinal issues like diarrhea, flatulence, and indigestion, according to a prior ethnobotanical study. [4] Another gastrointestinal ailment that is thought to be chronic is peptic ulcer, which affects the proximal duodenum. *F. vulgare* stomach extract has been shown to function as an antiulcerogenic agent, and a fennel extract pretreatment significantly inhibited the ethanol-induced mucosal lesion in rats.

The pre-treatment of 300 mg/kg fennel extract showed the highest percentage of inhibition of mucosal lesions. A different study revealed the strong gastroprotective properties of extracts from polyherbs like betel, clove, fennel, and black catechu. [5, 6]

An anti-ulcer protection test conducted on mice with ulcers caused by ethanol and aspirin demonstrated this. In comparison to omeprazole medications (98%) the results showed that liquid fennel extract (250 and 500 mg/kg) exhibited gastro-protective efficacy, effectively preventing stomach lesions and ulcers by 65 and 75%, respectively. A recent study by Das et al. (2022) showed that fennel extract produced from seeds had a protective effect on the transepithelial electrical resistance on T84 colonic cells.

The study revealed that fennel extract attenuates the activation of STAT, a transcription factor that is highly correlated with inflammatory responses. It is interesting to note that mice given fennel extract had more signs of ulceration. [7]

Metastasis is a complicated process that results in the acquisition of metastatic qualities along with changes in certain genes. [8] Elevated expression of each of the HSPs promotes metastasis strongly. [9]

Table 1 Parts of Fennel used Against Various Diseases

Specified Disease Type	Specific Plant Parts Used	Method of Preparation
Diarrhea	Seeds, roots, and fresh leaves	-
	Seeds	Paste and mixed with <i>Hemidesmus indicus</i>
	Bulbs	Raw or infusion
Constipation	Seed of fennel	Decoction
		Combined with sugar
		Infusion or directly consumed
		Decoction, oral/topical infusion
Gastralgia	Leaves	Decoction
Irritable Bowel Syndrome	Leaves and Seeds	Infusion
Dyspepsia	Fruits	Infusion
	Fruits	Pills, powders, oiling agent, stewing granules, and ointment
	Fruits, leaves, roots, and root Barks	Tablets and granules

#### IV. CONCLUSION

*Foeniculum vulgare* has been demonstrated to be a useful source for conventional medicine. It provides a strong basis for pharmaceutical research and development efforts focused on novel drugs and their possible therapeutic uses. It is very important, particularly for the food industry. However, a few of the bioactive substances and activities include antimicrobial and antiviral, anti-inflammatory, antioxidant, gastro-protective, anti-anxiety, estrogen-like activity, cardiovascular protection and lipid, anti-diabetic, anti-mutagenic, anti-cancer, hepatoprotective, and memory-protective qualities. This study also shown how fennel's gastrointestinal properties could lessen G.I. tract-related issues. However, additional investigation and biological studies about the potential advantages of fennel remain imperative, especially with regard to the creation of novel drugs derived from fennel bioactives and other applications that will prove advantageous to humankind.

#### REFERENCES

- [1]. Kokate C.K, Purohit,A.P, Gokhale S.B., Pharmacognosy Nirali Prakashan, 55th edition 2018;14.44
- [2]. Rahimi R, Ardekani MRS. (2013) ‘Medicinal properties of *Foeniculum vulgare* Mill. in traditional Iranian medicine and modern phytotherapy’-Chin J Integr Med, vol.19, pp.73– 9.
- [3]. R. Di Novella, N. Di Novella, L. De Martino, E. Mancini, and V. De Feo. (2013) “Traditional plant use in the National Park of Cilento and Vallo di Diano, Campania, Southern, Italy”-Journal of Ethnopharmacology, vol. 145, no. 1, pp. 328–342.
- [4]. Mitra, S., Mukherjee, S.K., (2010). ‘Ethnomedicinal usages of some wild plants of North Bengal plain for gastrointestinal problems.’-Indian J. Trad. Knowl. Vol.9, pp.705–712.
- [5]. Birdane, F.M., Cemek, M., Birdane, Y.O., Gu'lcin, I., Bu'yu'kokur-og'lu, M.E., (2007). ‘Beneficial effects of *Foeniculum vulgare* on ethanol-induced acute gastric mucosal injury in rats.’-World J. Gastroenterol. Vol.13, pp.607–611.
- [6]. Reddy, G.R.S., Mohiuddin, M., Deepak, S.K., Pranav, K., Krishna,S., Potbhare, M.S., (2013). ‘Investigation of poly-herbal aqueous extract for potential antiulcer activity.’- Int. J. Pharmacol. Res.vol.3, pp.53–58.
- [7]. Das, B., Rabalais, J., Kozan, P., Lu, T., Durali, N., Okamoto, K.,McGeough, M.D., Lee, B.J., Barrett, K.E., Marchelletta, R., Sivagnanam, M., (2022). ‘The effect of a fennel seed extract on the STAT signaling and intestinal barrier function.’-PLoS One vol. 17, pp.27- 045.
- [8]. Prensner JR, Zhao S, Erho N, et al (2014). ‘RNA biomarkers associated with metastatic progression in prostate cancer: a multi-institutional high-throughput analysis of SChLAP1.’- Lancet Oncol, vol.15, pp.1469-80.
- [9]. Calderwood SK, Gong J (2016). ‘Heat Shock Proteins Promote Cancer: It’s a Protection Racket.’- Trends Biochem Sci, vol.41, pp.311-23.