



A REVIEW ON *ANETHUM GRAVEOLENS* USED IN DYSMENORRHOEA

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ABSTRACT

Anethum graveolens L. (dill) is an important aromatic annual herb from the Apiaceae family. Seeds and leaves of this plant are the main parts that are being used. The main components of the essential oil obtained from this plant are reported to be carvone, limonene, dihydrocarvone, carvacrol, *p*-cymen, α -phellandrene, and dill apiole. Dill is a medicinal herb, also widely used in the food industry for flavoring foods and beverages due to its pleasant spicy aroma. It has been proven that the essential oil of dill has antimicrobial, antifungal, and antioxidant activity. Studies have shown that this oil can be used widely in the food industry in order to avoid food spoilage, contamination, destruction, oxidation, etc. and to increase the safety of food stuffs in storage and during processing. Also, by replacing synthetic compounds with this oil, the health and the environmental problems caused by synthetic and commercially available preservatives can be reduced.

Keywords: *Anethum Graveolens*, Dysmenorrhoea, Ayurvedic medicines

INTRODUCTION

Anethum graveolens L. (dill) has been used in ayurvedic medicines since ancient times and it is a popular herb widely used as a spice and also yields essential oil. It is an aromatic and annual herb of apiaceae family. Charaka prescribed the paste of Linseed, castor seeds and shatapushpa (*A. graveolens*) pounded with milk for external applications in rheumatic and other

swellings of joints. Kashyapa samhita attributed tonic, rejuvenating and intellect promoting properties to the herb (*A. graveolens*). It is used in Unani medicine in colic, digestive problem and also in gripe water. *Anethum graveolens* L. is used in the preparations of more than 56 ayurvedic preparations, which include Dasmoolarishtam, Dhanwantharishtam,

Mrithasanjeevani, Saraswatharishtam, Gugguluthiktaquatham, Maharasnadi kashayam, Dhanwantharam quatham and so on. *Anethum graveolens* L. (dill) believed to be the native of South-west Asia or South-east Europe [1]. It is indigenous to Mediterranean, southern USSR and Central Asia. Since Egyptian times, *Anethum* has been used as a condiment and also in medicinal purposes. It was used by Egyptian doctors 5000 years ago and traces have been found in Roman ruins in Great Britain. In the Middle Ages it was thought to protect against witchcraft. Greeks covered their heads with dill leaves to induce sleep. The ayurvedic uses of dill seeds are carminative, stomachic and diuretic. International Common Names- English: garden dill, Spanish: anis aleman; Eneldo, French: aneth; aneth odorant; fenouil bâtard; fenouil puant, Chinese: shi luo, Portuguese: endro Local names are Arab Countries: Bisbas, Czech Republic: Kopor

Vonavý; Kopr Vonný, Dominican Republic: Hinojo; Inojo, Estonia: Aedtil, Germany: Dill, Garten-; Gurkenkraut, Greece: Anethon, India: Sowa, Indonesia: Adas Manis; Adas Sowa; Ender, Italy: Aneto Oloroso; Oneto, Laos: Phak S'i, Latvia: Smaržig, Lesser Antilles: Fenouil Bâtard; Lami Dill, Lithuania: Paprastasis Krapas, Malaysia: Adas China; Adas Pudus; Ender, Myanmar: European Dill; Indian Dill; Sameik; Samin, Netherlands: Dille, Panama: Anisillo Dill, Portugal: Anetho; Aneto; Endrão; Endro Maior; Endro Ordinario, Puerto Rico: Dill-Weed, Russian Federation: Ukrop, Spain: Abezón Doméstico; Anega; Anella; Anet Pudent; Anetaverón; Avezón Doméstico; Eneldo Viscoso; Fenoll Bord; Fenoll Pudent; Fonoll Pudent; Hinojo Hediondo; Onet, Thailand: Phakchi Lao; Thian-Khaopluak; Thian-Tatakkatae [2].



Figure 1: *Anethum graveolens* plant [3]

Morphology

Plant up to c. 1 m tall; stems finely ribbed, leaves up to 20 cm long; petiole up to c. 2 cm long; sheaths with a broad membranous margin, auriculate at the top, the uppermost leaves sometimes reduced to sheaths only, Umbels distinctly pedunculate, at least some of the lateral ones partially male; rays 5–40, 2–10 mm long; flowers 5–30 in each partial umbel, on 2–8 mm long pedicels, Petals c. 0.8 mm long, glabrous, Fruits c. 3–5 x 2–3 mm, the ribs pale, the marginal ones expanded and wing-like; styles strongly deflexed, shorter than the stylopodia [4].

Distribution and Habit

This species is accepted, and its native range is N. Africa to Chad, Iran to Arabian Peninsula. It is used as a medicine, has environmental uses and for food.

Domain: Eukaryota

Kingdom: Plantae

Phylum: Spermatophyta

Subphylum: Angiospermae

Class: Dicotyledonae

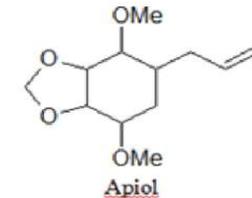
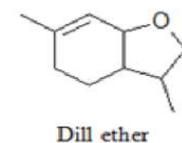
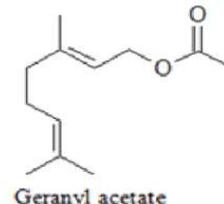
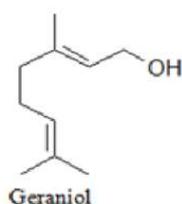
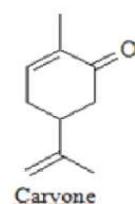
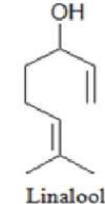
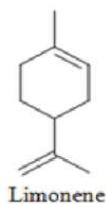
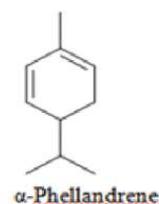
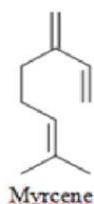
Order: Apiales

Family: Apiaceae

Genus: Anethum

Species: *Anethum graveolens* [5]

Phytochemistry [6]



Medicinal uses

Essential oil of dill exhibited various biological activities such as antimicrobial, antifungal, antioxidant, insecticidal, anti-inflammatory, antispasmodic, antidiabetic, anticancer and anti-hypercholesterolaemic, due to the presence of biologically active compounds [7].

Antimicrobial effects

The essential oil and different extracts of *Anethum graveolens* seeds exerted antimicrobial activity against wide range of microorganisms [8]. The essential oils and acetone extracts shown antimicrobial activity against *Staphylococcus aureus*, *Bacillus cereus*, *Enterococcus faecalis*, *Listeria monocytogenes*, *Escherichia coli*, *Yersinia enterocolitica*, *Salmonella choleraesuis*, *S.typhimurium*, *Shigella flexneri*, *Salmonella typhi*, *Pseudomonas aeruginosa* and *Mycobacterium*. *Anethum graveolens* seed extracts have also been reported to possess antiulceractivity, and have shown moderate activity against *Helicobacter pylori* [9]. Aqueous and organic extracts of seeds have exhibited potent antibacterial activity. The essential oils also active against three fungi (a yeast, *Candida albicans* and two moulds, *Penicillium islandicum* and *Aspergillus flavus*). D-limonene and D-carvone, have exhibited strong antifungal activity against *Aspergillus Niger*, *Saccharomyces cerevisiae* and *Candida albicans*. Many

authors mentioned that the antimicrobial activities could be attributed to furanocoumarin in *Anethum graveolens* [10].

Anti-inflammatory and analgesic effects

The hydro alcoholic extract of the *Anethum graveolens* seed caused significant decrease in the inflammation and pain in rat. *Anethum graveolens* oil and diclofenac-gel showed a significant ($p < 0.001$) decrease in the paw volume in rats compared to the blank group. *Anethum graveolens* oil showed even more decrease in the paw volume compared to the diclofenac [11].

Effects on reproductive system

The effects of *Anethum graveolens* L. (dill) extract on female reproductive system were studied in female rats [12]. The experimental groups were fed 0.045 g/kg and 0.45 g/kg of aqueous extract and 0.5 g/kg and 5 g/kg of ethanol extract for 10 days. Treatment with high dose of the extract resulted in a significant increase in duration of the estrous cycle and diestrus phase. Smooth endoplasmic reticulum (SER), rough endoplasmic reticulum (RER) and mitochondria were increased in granulosa lutein cells in high dose groups. There were no significant statistical differences in amount of serum estradiole between experimental, control and sham groups but the serum progesterone concentration increased significantly in high dose

treatment group compared with control and sham groups. Dill seed possessed contractive effects on myometrium, enhanced releasing of oxytocin which is an effective hormone in uterus contractions. [13]. A dose of 6-7 gm of dill seed extract after delivery decreases postpartum haemorrhage due to its contractive characteristic. Limonene and anethole showed contractive effect on uterine myometrium. Zagamil *et al.*, carried out a clinical study to evaluate the effect of Dill seed on uterus contractions in active phase of labor. 40 women used Dill seed infusion (one tablespoon of whole dill seed seeped in a half or whole cup boiling water for 3-4 min before going to the hospital at the beginning of uterus contractions), and 60 women used nothing in the control group. Interpretable electronic foetal monitoring was obtained for half an hour at the beginning of the active phase. The Fall: Rise ratio was calculated by measuring the duration of time for a contraction to return to its baseline from its peak (fall) divided to the duration of its rise time to its peak (rise) [14]. The number of contractions in the treated group was significantly more than the control group. The ratio of contraction's fall time to its rise time in the treated group was shorter than the control group. The study showed that dill

seed shortens duration of the first stage of labour [15].

PHARMACOLOGICAL ACTIVITIES

Previous studies showed that *Anethum graveolens* induced antimicrobial, anti-inflammatory, analgesic, gastric mucosal protective and antisecretory effects, smooth muscle relaxant effect, hyperlipidemic, increased progesterone concentration, and many other effects [16].

The essential oil and different extracts of *Anethum graveolens* seeds exerted antimicrobial activity against wide range of microorganisms. Antimicrobial activities could be attributed to furanocoumarin in *Anethum graveolens* hydro alcoholic extract of the *Anethum graveolens* seed caused significant decrease in the inflammation and pain in rats. *A. graveolens* seed extracts possessed significant mucosal protective and antisecretory effects in the gastric mucosa lesions induced in mice by oral administration of HCl (1 N) and absolute ethanol. The acidity and total acid content were reduced by the orally or intraperitoneally administration of the extracts. Dill seeds have been used as household remedy to relief digestive problems such as stomachache, indigestion and flatulence. Dill water is believed to have a soothing effect and is given to babies to treat gripe, relieve hiccups and colic. The crude extract of *Anethum*

graveolens L showed anti-hypercholesterolemia and anti-hyperlipidemic activities. The crude extracts of *A. graveolens* L. besides having strong anti-hyperlipidemic effects, it improved the biological antioxidant status by reducing lipid peroxidation in liver and modulating the activities of antioxidant enzymes [17]. Dill seed possessed contractive effects on myometrium, enhanced releasing of oxytocin which is an effective hormone in uterus contractions. A dose of 6-7 gm of dill seed extract after delivery decreases postpartum hemorrhage due to its contractive characteristic [18]. Limonene and anethole showed contractive effect on uterine myometrium [19].

CONCLUSION AND DISCUSSION [20]

Anethum graveolens is a plant with wide range of chemical constituents which exerted many pharmacological effects. There is a great promise for development of novel drugs from *Anethum graveolens* to treat human diseases mainly in dysmenorrhea as a result of its effectiveness and safety.

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