

TRACHYSPERMUM AMMI: ANCIENT UNANI MEDICINE FOR MODERN CURE, A REVIEW OF POTENTIAL THERAPEUTIC APPLICATIONS.

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ABSTRACT

Trachyspermum ammi Linn is commonly known as *Ajwain*, belonging to family Apiaceae. It is well known spice and traditional aromatic herb widely used in Unani System of medicine for various diseases. Medicinally, it has been proven to possess pharmacological activities like emmenagogue, abortifacient, analgesic, antiepileptic, estrogenic, hypolipidemic, antidiarrhoeal, bronchodilatory lithotriptic, anti-inflammatory, anti-bacterial, anti-helminthic, antitussive, antispasmodic, antioxidant, diuretic, galactagogue etc. Unani physicians have used *Ajwain* in various disorders like amenorrhoea, leucorrhoea, pruritus vulvae, renal stone, dyspepsia, obesity, diarrhea, epilepsy, intestinal

worms and asthma in different forms. These multiple therapeutic uses can be explained by multiple compounds. The phytochemical studies on *T.ammi* have revealed the presence of alkaloids, steroids, fixed oils, glycosides, tannins, saponin and flavonoids, cumene, thymene, essential oils like thymol, c-terpinene, p-cymene. The present review summarizes the benefits of *Ajwain* in various diseases mentioned in Unani system of medicine in a scientific manner.

KEY WORDS: *Trachyspermum ammi*, *Ajwain*, Unani system of medicine, Therapeutic uses.

INTRODUCTION

Trachyspermum ammi Linn is an aromatic, grassy, annual plant; derived from Greek word 'Trachy' means 'rough' and 'spermum' means 'seeded' while *ammi* is the name of plant in Latin.^[1] In Unani it is termed as 'Naankhwah' Naan means food and *khwah* means desirous of seeking as it act as appetizer.^[2]



Fig.1: Ajwain: Plant, flowering top & seeds

ETHANOBOTANICAL DESCRIPTIONS (Fig.1)

Erect branched annual herb, up to 90 cm tall, stem is much branched as striated. Inflorescence is compound umbel having 16 umbels each containing up to 16 flowers which are white, corolla 5, petals bilobed, stamen 5, and ovary inferior. Leaves pinnate, upper leaves are smaller and shortly petiolate while lower leaves have long petioles. Fruit is grayish brown, ovoid, consisting of two mericarps with prominent ridges. Fruit is 2 mm long and 1.7 mm wide,^[3] with agreeable odour,^[4] and pungent taste.^[5]

Habitat: It is native to Egypt and cultivated in Mediterranean region and in south-west Asian countries such as Iraq, Iran, Afghanistan, tropical Africa^[6] and Pakistan. *Ajwain* is chiefly produced in India as it is extensively cultivated in Madhya Pradesh, Uttar Pradesh, Gujarat, Rajasthan, Maharashtra, Bihar and West Bengal.^[4,7]

TEMPERAMENT: Hot 3° Dry 3°^[8]

DOSE: 3-5 gm⁸ upto 10.5 gm^[9]

CHEMICAL CONSTITUENTS: Essential oil present in *Ajwain* is (2.5-5%), Thymol is the major constituent (35-60%) of it. The remainder non-thymol fractions called thymine

contains p-cymene (50-55%), terpinene (30-35%), β -pinene (4%-5%), limonene with γ -pinenes and β -pinene (30-35%) and some carvacrol^[6,13] saponins, flavons and mineral matter(7.1%). Seeds contain phenolic glucoside like 2-methyl-3-glucosyloxy-5-isopropyl phenol.^[7] It has been reported that minute amount of camphene, myrcene and D3-carene is also present. A yellow crystalline flavone and steroid like substance have been isolated from the fruit of *Ajwain* and it also contains a glucoside 6-O- β - glucopyranosyloxythymol. The major constituents of *T. ammi* are carvone (48%), limonene (38%) and dillapiole (9%).^[6] Flavour and taste of drug is due to thymol and volatile oil. Seed contains Carbohydrates (25%)^[4,6] Protein (17%), Fat (21%)^[6], Fibre (21%), Vitamins like Thiamine (0.21 mg/100gm), Riboflavin (0.28 mg/100gm), Nicotinic acid (2.1 mg/100g) and Carotene (71 mcg/100g).^[7]

ACTIONS

Literary search of classical and medicinal plant text has shown various activities of *Ajwain* like abortifacient, antibiotic, antidiarrhoeal,^[7] antifungal, antihelminthic, antihypertensive, antilithiasis,^[6] antiseptic, antispasmodic, antioxidant,^[7] antitussive, aphrodisiac, bronchodilator, carminative, diaphoretic, digestive, diuretic, emmenagogue, expectorant, fungicide, galactagogue, hypolipidemic,^[6,7] laxative, litholytic,^[3] parasymphomimetic, stimulant, tonic, anticholinergic etc.^[4,7]

USES: On the basis of above activities Unani physician has used *Ajwain* in various systemic disorders.

Urogenital disorders

- **Infertility:** Soak *Ajwain* seeds in *Arqe Leemu* so that its level remain above it, leave it for some times so that it gets dry, repeat the procedure for seven times, and this dried *Ajwain* is used in cases of male infertility.^[10] Or If female infertility is due to excessive *ratubate reham* decoction of *Ajwain* is used as sitz bath.^[11]
- **Leucorrhoea:** In the form of *Humool* (Pessary)^[2, 12]
- **Pruritus vulvae:** In the form of *bakhoor/Dhooni* (Fumigation)
- **Mastitis:** Local application of paste prepared from *Ajwain* is useful in mastitis^[10]
- **Dysuria:** It is mixed in diuretic preparation in which *zarareeh* is present to relieve dysuria. It act as tonic for bladder and kidney^[2,10, 13]
- **Hysteria:** It is also used in hysteria.^[2]

- **Others:** In puerpera it is used as appetizer, reduces back pain, helps in digestion, external genitalia is washed with decoction made up of *Ajwain* and also used in the form of *dhooni* (fumigation).^[13]

Digestive system disorders

- **Dyspepsia:** Oil and seeds of *Ajwain* combined with soda forms a nice remedy for acidity, atonic dyspepsia & flatulence.
- **Cholera:** Oil and distilled water from the seeds, known as *Arqe Ajwain* (omum water) in doses of 1-2 ounces are useful in the early stages of cholera to check the vomiting and purging.
- **Flatulence:** It is combined with other aromatics such as eucalyptus, peppermint, gaultheria etc. to make it an efficient carminative.^[2,14]

Respiratory disorders

- **Bronchitis:** Check chronic discharge such as profuse expectoration in bronchitis. In cases of difficult expectorations from dried up phlegm and its tenacity, butter milk with powder of seeds added is taken internally.
- **Asthma:** *Ajwain* seeds are used as dry fomentation to the chest in asthma. A compound decoction made of the seeds, pipli, adhatoda leaves and poppy capsules, is used for internal administration, in doses of 14-28 gm.^[14]

Nervous system disorders: Hysteria, Paralysis, Bell's palsy^[9,10,13]

Liver diseases: It is used in cirrhosis of liver as it possesses *mufatteh sudad* (deobstruant) activity.

Skin diseases

- Topical application of *Ajwain* mixed with honey is used in bruise.^[9,33]
- It is used in vitiligo, pityriasis and acne in the form of liniment as it has cleansing and detergent quality.^[15]
- Antidote: Applied or rubbed over the bites of the poisonous insect.^[9,13,14,15]

Others

- Helps in recovery from drug addiction like *Afiyoon*.^[12,13,15]
- Externally it is applied to relieve rheumatic and neuralgic pain.^[14]

- Compound oil made up of the leaf-juice of *Ajwain*, *Ispand (Henna)* and *Malkangani*. Each one part and three part sweet oil is recommended in *Ilaj-ul-gurba* for diseases of ear and nose.^[9,13,14]

PHARMACOLOGY WITH POTENTIAL THERAPEUTIC USES

Following are list of diseases mentioned by Unani physician which can be scientifically explained by *Ajwain* pharmacological effects.

1. Amenorrhoea

Unani formulation

- Decoction prepared from *Ajwain*, *badiyan* and *waj turki*, each 4 gm mixed with sugar is beneficial in amenorrhoea, as it act as a strong emmenagogue;¹⁶ even simple powder or decoction of *Ajwain* alone is beneficial in it.^[12]
- *Ajwain kofta* is soaked in 250 ml of water over night; Take orally by mixing it with 10gm of *shahed* or *qand siyah kohna*.^[16]
- Decoction prepared from *Ajwain desi*, *tukhme karafs* & *saunf* each 17.5 gm, *poste darakhte mujaiith* 30gm & *tukhme gazar* 20 gm; Use orally with 40ml of honey.^[17]

Unani properties: *Ajwain* possess hot temperament, it has emmenagogue^[2,12,13,18,19] property through which it leads thinning of viscid matter present in blood, causes vasodilation and relieves the obstruction in uterine vessels^[20] responsible for ammenorrhoea. It purifies the uterus and has hepatotonic^[21] and uterotonic^[22] effect thereby helps in menstrual regulation.

Estrogenic activity: Recent scientific studies have shown that *T.ammi* possesses estrogenic activity due to presence of phytoestrogen, thereby helps in amenorrhoea.^[23]

2. Obesity

Unani formulation: Powder prepared from *Ajwain desi*, *badiyan*, *zeera* each one part, *borah Armani* 4th part, *luk* 2 part, 4.5 g powder is taken orally for weight reduction.^[12]

Unani properties: Diaphoretic,^[24] desiccant,^[12,19,13] resolvent,^[10,12,13,19] calorific,^[13,19] diuretic.^[2,12,13,19]

Hypolipidemic activity

Methanol and petroleum extract of *T.ammi* powder reported hypolipidemic effect^[3] on in vivo study in albino rabbits, evidenced by decreased total cholesterol, LDL-cholesterol, triglycerides and total lipid and significantly increased HDL-cholesterol.^[25] It also possess significant amount of fibers which effects fat metabolism by reducing its absorption from intestine.^[26]

2. Diarrhoea

Unani formulation: Powder made up of burn walnut and *Ajwain* is useful in diarrhea.^[2,12]

Unani properties: *Mujaffif*,^[12,13,19] *Mudirre bawl*,^[2,12,13,19] and *mu'arriq*^[10]

Anti diarrhoeal activity: Anti diarrhoeal activity of 95% total alcoholic extract and total aqueous extract of *T.ammi* seeds was reported in male wistar rats due to the presence of tannins, flavonoids, saponins, alkaloids and sterols.^[26]

3. Asthma

Unani formulation: Powder of *Ajwain* is used orally or as fumes for inhalation.^[10,13]

Unani properties: *Mukhrije balgham*^[28] *Dafe' tashannuj*^[2,8,13,15]

Bronchodilatory effect: A clinical trial on extract of *T.ammi* seed on asthmatic patients has shown bronchodilatory effect due to presence of carvacrol.^[23]

4. Renal stone

Unani formulation: Oral use of *Ajwain* with alcohol^[16]

Unani properties: *Mudirre bawl*^[2,12,13,19] *mufattih sudad*, *mukhrije hissar*^[30]

Lithotriptic effect: In vivo study on human has shown lithotriptic effect on calcium oxalate and uric acid stone due to presence of anticalcifying protein in seeds of *T.ammi*.^[26]

5. Cough

Unani formulation: *Ajwain*, *dare fil*, *namake lahari*, *namake siyah*, *suhaga* each 3.5gm, *barge adusa* 11 leaves; Powder is prepared as per the method mentioned in classical literature (Dose: 0.5gm orally).^[16]

Unani properties: *Muhallil*^[27-29,113], *Mukhrije balgham*^[12,13,19]

Antitussive activity: A clinical trial on aqueous extract of *T.ammi* has shown antitussive effect due to presence of carvacol and codein.^[26]

6. Intestinal worms

Unani formulation

Ajwain mixed with honey is used orally as antihelmintic (*Qatile Deedane Shikam*).^[2,13,27]

Unani properties: *Qatile wa mukhrije deedan shikam*^[12,15,19]

Antihelmintic effect: A clinical trial on human has shown antihelmintic activity of *T.ammi* due to presence of carvacrol and thymol. It also possesses cholinergic activity with peristaltic movement of gut, which help in expulsion of parasites.^[23]

7. Colic

Unani formulation: *Ajwain* 12 gm mixed with *namake seendha* 3gms is useful in *qulanj* (colic).^[2]

Unani properties: *Mufattih sudad*,^[12,19] *muhallil*,^[12,13,19] *dafe' tashannuj* ^[2,8,12,13,15]

Spasmolytic activity

In vivo studies has revealed that *T.ammi* possess spasmolytic activity by blocking calcium channel. This observation supports the traditional use in colic.^[27]

8. Gastroprotective

Unani formulation: Oil and seeds of *Ajwain* combined with soda forms a nice remedy for acidity, atonic dyspepsia & flatulence^[2, 14]

Unani properties: *Muqawwie meda*^[13] *Mushtahi* ^[2,8,15,19] *Hazim* ^[2,13] *Kasire Riyah* ^[2,12,13,15]

Gastroprotective: In vivo study on Extract of *T.ammi* at the dose of 100 mg/kg and 200 mg/kg showed significant protection reducing ulcerative lesions in group of animals by increasing the secretion from mucous neck cells. This serves as first line of defense against ulcerogens and covers the gastric mucosa preventing its physical damage and back diffusion of hydrogen ions.^[17]

9. Leucorrhoea

Unani formulation: Powder of *Ajwain* is used in the form of *Humool* (Pessary).^[2,12] *Dhooni* (fumigation) of *Ajwain* is used in pruritus vulvae associated with leucorrhoea.

Unani properties: *Muhallil*,^[10,13,15,19] *dafe' ta'fun*^[2,8,12,13,15] *tahleel awram*^[10] *mujaffife ratubat*.^[2,19]

Anti-bacterial activity

Thymol and carvacol obtained from the seeds of *T. ammi* demonstrated bactericidal or bacteriostatic properties on in vitro study. It is used in 4th generation antibiotic formulation for control of drug resistant bacteria. Hence it is a plant based 4th generation herbal antibiotic.^[26]

Anti-inflammatory activity

Aqueous extract of *T. ammi* reported anti-inflammatory activity^[3] evidenced by decreased reactive oxygen species and other reactive nitrogen species on in vivo study on wistar rats, which is credited to the presence of flavonoids and glycosides involved in inhibition of prostaglandin synthetase.^[26,28]

10. Galactagogue

Unani formulaion: Powder of *Ajwain* 5gm mixed with honey (orally).^[11]

Unani properties: *Mudirre labn*

Estrogenic activivty: *T.ammi* is the second highest herb in the list of plants tested for total phytoestrogen content. It has been traditionally used as a galactagogue.^[27]

11. Epilepsy

Unani formulation: Powder of *Ajwain* (Dose: 3-5 gm)^[2,8,13,15]

Unani properties: *Dafe' tashannuj*^[2,8,12,13,15]

Antiepileptic Activity

In vivo methanol extract of *Trachyspermum ammi* (L.) showed antiepileptic activity, by exciting GABA receptors in human, which may be due to the presence of thymol.^[29]

12. Neuralgic pain

Unani formulation: Extract of *Ajwain* mixed with cinnamon & borage.^[23]

Unani properties *Musakkin*^[13,15,19] *Tahleele awram*^[10]

Analgesic effect

Experimental clinical trial on ethanolic extract of *T.ammi* has shown analgesic effect due to its parasympathomimetic action.^[26]

13. Dental carries

Unani formulation: *Ajwain, baqla, angoor* and *afyoon* is used orally at night time.^[11]

Unani properties: *Musakkin*,^[13,15,19] *Tahleel awram*,^[10] *dafe' ta'fun*^{2, [12, 13, 32]}

A novel compound against dental caries

5, 8a-di-1-propyloctahydro naphthalen- 1-(2H)-one, a novel compound reported for the first time from the seeds of *T. ammi*, was examined for its activity against cariogenic properties of *Streptococcus mutans*.^[26]

CONCLUSION

In classisical literature of Unani medicine physicians had used *Ajwain* in various systemic disorders. Recent scientific studies conducted on human and animal has proven its efficacy in some properties of the drug. However, there are many new indications mentioned in Unani system of medicine whose efficacy is yet to be proved. Hence, there is need of further clinical trial to establish the efficacy of other indications mentioned in Unani system of medicine.

REFERENCES

1. Dwivedi SN, Mishra RP, Alava S. Phytochemistry, Pharmacological studies and Traditional benefits of *Trachyspermum ammi* (Linn.) Sprague. *Int. J. of Pharm. & Life Sci.* May 2012; 3(5): 1705-09.
2. Ibn Baitar ZBA. *Al Jame ul Mufradat al Advia wal Aghziya* (Urdu translation). Vol IV. New Delhi: CCRUM; 2003; 51-4, 139-41, 144, 379-80.
3. Jan SA, Shinwari ZK, Zeb A, Khalil AT, Shah SH. Ethnobotany and Research Trends in *Trachyspermum ammi* L. (Ajowan): A Popular Folklore Remedy. *American-Eurasian J. Agric. & Environ. Sci.* 2015; 15(1): 68-73.
4. Anonymous. *The Wealth of India Raw Materials*. Vol VIII. New Delhi: NISCIR, CSIR; 2003; 60-1, 267-71, 424-6.
5. Sahu S, Ray K, Kumar Y, Gupta S, Kauser H, Kumar S, et al. *Valeriana wallichii* root extract improves sleep quality and modulates brain monoamine level in rats. *Phytomedicine* 2012 Jul; 19(10): 924-9.
6. Boskabady MH, Alitaneh S, Alavinezhad A. *Carum copticum* L.: A Herbal Medicine with Various Pharmacological Effects. Hindawi Publishing Corporation, *Bio Med Research International* 2014; 1-11.
7. Khare C.P. *Indian medicinal plants- An illustrated dictionary*. New Delhi: Springer; 2007; 56-7, 486-7, 665, 674, 694.
8. Rafeequddin M. *Kanzul Advia Mufridah*. Aligarh: Muslim University Press; 1985; 73-4, 83-4.
9. Ghani HN. *Khazainul Advia*. 2nd ed. New Delhi: Idarae Kitabul Shifa; 2011; 202-3, 206-7, 226, 293.
10. Abdul HM. *Bustanul Mufradat*. New Delhi: Idarae Kitabul Shifa; 2002; 56-8, 66.
11. Qumari AMH. *Ghana Mana* (Urdu translation). New Delhi: CCRUM; 2008; 103, 369, 372-3, 386, 388-9, 391-2, 394-6, 410-13, 417, 423.
12. Tariq AHN. *Tajul Mufradat*. New Delhi: Idarae Kitabul Shifa; 2010; 36-7, 100-01, 242-3, 550.
13. Kirtikar KR, Basu BD. *Indian Medicinal Plants*. 2nd ed. Vol II. Dehradun: International book distributors; 2006; 1199-1200, 1206, 1311-12.
14. Kabeeruddin M. *Ilmul Advia Nafeesi*. New Delhi: Ejaz publishing house; 2007; 59, 72-3, 235-6.
15. Khan AA. *Akseere Azam*. New Delhi: Idarae Kitabul Shifa; 2011; 798-801, 806, 819-20.

16. Jurjani AH. Zakheerae Khawarzaam Shahi (Urdu translation by Khan HH). New Delhi: Idarae Kitabul Shifa; 2010; 24, 27-8, 113, 372, 376, 601, 606-9.
17. Kabeeruddin M. Bayaze Kabeer. New Delhi: Idarae Kitabul Shifa; 2010; 207-8.
18. Khan HMA. Muheete Azam (Urdu translation). Vol I. New Delhi: CCRUM; 2012; 255, 290-1, 481-3.
19. Ibn Rushd. Kitabul Kulliyat. 2nd ed. New Delhi: CCRUM; 1987; 35-36, 81-82, 114-5, 226, 265, 361.
20. Ibn Sina. Al Qanoon Fil Tibb (Urdu translation by Kantoori GH). New Delhi: Idarae Kitabul Shifa; 2010; 40, 155, 337, 534, 538-9, 1065-66, 1069-70, 1088-89, 1095-98, 1445-47.
21. Chandpuri K. Maujjizul Qanoon. New Delhi: Qawmi Council Barae Farogh Urdu Zaban; 1998; 382, 384, 391, 459-60.
22. Zarshenas MM, Moein M, Samani SM, Petranfa P. An overview of Ajwain (*Trachyspermum ammi*) pharmacological effects, modern and traditional. *Journal of natural remedies* 2014 Jan; 14(1): 98-105.
23. Abdul HM. Bustanul Mufradat. New Delhi: Idarae Kitabul Shifa; 2002; 56-8, 66.
24. Javed I, Iqbal Z, Rahman ZU, Khan FH, Muhammad F, Aslam B, et al. Comparative antihyperlipidemic efficacy of *Trachyspermum Ammi* extracts in albino rabbits. *Pakistan Vet. J.* 2006; 26 (1): 23-29.
25. Asif HM, Sultana S, Akhtar N. A Panoramic view on Phytochemical, nutritional, ethanobotanical uses and pharmacological values of *Trachyspermum ammi* Linn. *Asian Pac J Trop Biomed.* 2014; 4 (Suppl 2): 545-53.
26. Jeet K, Devi N, Narender T, Sunil T, Lalit S, Raneev T. *Trachyspermum ammi* (Ajwain): A Comprehensive Review. *IRJP* 2012 May; 3(5): 133-6.
27. Umar S, Asif M, Sajad M, Ansari MM, Hussain U. Anti-inflammatory and antioxidant activity of *Trachyspermum ammi* seeds in collagen induced arthritis in rats. *Int. J. Drug Dev & Res.* 2012 Jan-Mar; 4(1): 210-19.
28. Rajput MA, Khan RA, Feroz Z. Evaluation on antiepileptic activity of the methanolic extract of *trachyspermum ammi* (L). *Arch.Biol. Sci.*, 2013; 65(3): 815-819.