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SPASMOLYTIC POTENTIAL OF SOME MEDICINAL PLANTS BELONGING TO FAMILY UMBELLIFERAE: A REVIEW

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ABSTRACT

Gastrointestinal spasm is one of the most common gastrointestinal problems in infants. An herbal product is safe and effective gastrointestinal remedy to fight against various gastrointestinal problems. Polyherbal products are in use for the treatment of gastrointestinal problems since ancient time. Current era has witnessed an interest in homemade remedies. A large number of modern drugs have been developed from plants. The objective of this review is to provide a consolidated report on traditional uses and spasmolytic activities of some medicinal plants of umbelliferae family viz. *Anethum graveolens*, *Apium graveolense*, *Foeniculum vulgare*, *Cuminum cyminum*, *Pimpinella anisum*, *Coriandrum sativum* and *Trachyspermum ammi* have been extensively used for various gastrointestinal problems. Gastrointestinal spasm treatment is most common application of these plants oils.

Keywords: Gastrointestinal problems, Spasm, Medicinal plants, Umbelliferae.

INTRODUCTION

Gastrointestinal spasms are sudden violent involuntary muscular contraction or transitory constriction of a passage. Gastrointestinal problems like abdominal pain, flatulence, colic, diarrhoea, constipation, bloating, cramping, IBS are due to abnormalities in motor function disturbance. Majority of the above symptoms are due to spasm^{1,2}. At present no drug has proven to be effective in treating the said critical gastrointestinal problems. Major part of the population in our country and other developing countries remains dependent on medicinal plants for health care. Research teams in pharmaceutical industries are focusing on medicinal plants, because of great potential of these plants fighting against various diseases. Ayurveda is one of the oldest health care systems of India. Large numbers of plants are useful in various gastrointestinal problems without any side effect. Gastrointestinal discomforts are caused by various interrelated reasons. Current study focused on traditional medicinal plants and their unexplored spasmolytic potential. Nature is a biggest source of medicinal agents for thousands of years. Modern pharmaceutical industries highly involve in large scale isolation of herbal active constituents³. Secondary metabolic substances of medicinal plants attracting towards their all-round application in health care systems. India is a well known country for various types of medicinal plants and leading in spices and medicinal plants in the world⁵. Some medicinal plants have great pharmaceutical value and have been traditionally used as home based remedies⁶. The family Apiaceae has a unique place in homemade remedies to treat various gastrointestinal problems. This family is further subdivided into three sub families: Apiodeae, Hydrocotyloideae and Saniculoideae which

contain about 275 genera and 2850 species. The present review is a consolidated review on the current status and unexplored spasmolytic potential of some plants belonging to the family Apiaceae, subfamily Apioideae; namely *Anethum graveolens* L., *Apium graveolense* L., *Foeniculum vulgare* L., *Cuminum cyminum* L., *Pimpinella anisum* L., *Coriandrum sativum* L. and *Trachyspermum ammi* L (Figure 1 and Table 1).

Anethum graveolens L.

Therapeutic uses and spasmolytic activities

Anethum belongs to family Apiaceae/Umbelliferae. Two species of the genus *Anethum* yield dill oil, which is presently under use in various pharmaceutical preparations. *Anethum sowa*, the Indian species is sometimes regarded as a variety of *Anethum graveolens*. *Anethum graveolens* Linn. (Syn. *Peucedanum graveolens* Linn.) which is indigenous to South Europe and is cultivated in England, Germany, Rumania and the Mediterranean region⁸⁻¹⁰. The purpose of this study was to determine the spasmolytic potential of *Anethum graveolens* seeds essential oil. Dill (*Anethum graveolens*) is popular aromatic herb and spice¹¹. Its fruits have been used for medicinal purposes in the relief of digestive problems and to stimulate milk for nursing mothers¹². In Iran, it is given to babies to relieve hiccups and colic¹². Moreover, it is reported that dill fruit extract has a significant mucosal protective and anti secretory effect on mice gastric mucosa¹³. The smooth muscles relaxant effect of dill fruits hydroalcoholic extract on the ileum may be due to blockage of voltage dependant calcium channels¹⁴ (Figure 2). 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. Dill is also a galactagogue that is known to increase the flow of milk in nursing mothers and then taken by the baby in the milk to help prevent colic. Chewing the seeds reduce bad breath. Dill has been reported to possess anti hyperlipidaemic and antihypercholesterolaemic activity^{15,16}, while on the contrary, did not find any hypolipidaemic effects of *A. Graveolens*¹⁷. However, in another study, dill powder and its essential oils have shown hypolipidaemic activity in rats, suggesting its possible use as a cardio protective agent¹⁸. Dill has also been reported as anticancer¹⁹, antidiabetic¹⁶, anti oxidant²⁰⁻²², anti secretory¹³, antispasmodic²⁴, cytotoxic to human lymphocytes²⁵, insecticidal²⁶⁻²⁸, and diuretic²⁹. In a study female rats were used to assess the effect of *A. graveolens* on female reproductive system, it has been found that dill can be used as a regulatory agent of the menstrual cycle³⁰.

***Apium graveolans* L.**

Therapeutic uses and spasmolytic activities

Celery (*Apium graveolens* Linn.) is an alimentary herb belongs to family Apiaceae is an important drug of Unani system of medicine as mentioned in classical Unani literature. *Apium graveolens* L. (Apiaceae), celery, is a native of Eurasia and is grown mainly in coastal regions. Celery is widely cultivated in the temperate zones as an important garden crop³¹. *Apium graveolens* is one of the ingredients in 8 of the 33 Indian polyherbal formulations with reputed life protecting activity³². The characteristic odour of celery essential oil is due to a series of phthalide derivatives. The applicable parts of celery are the fruit and seed. Sedative, diuretic, and antispasmodic effects of celery seed may be due to phthalide constituents (d-limonene, selinene, and related phthalides). Essential oil obtained from this plant is reported to have a calming effect on the central nervous system. Some of its constituents showed antispasmodic, sedative and anti-convulsant actions^{33,34}. The first treatment of celery appears in the Caraka Samhita and Sushruta Samhita. Various herbs have been identified and used as antispasmodics; one of them is *Apium graveolens*. Considering pain relief as an important factor in the management of colicky pain, herbal antispasmodic constituting *Curcuma zedoaria*, *Zingiber officinale* and *Apium graveolens* was developed in the form of soft capsules and subjected for multi centric clinical trials. These trials included the evaluation of new herbal antispasmodic in patients with colicky disorders like nonspecific abdominal colic, irritable bowel syndrome, infective diarrhoea, acute amoebic colitis, pain associated with lower urinary tract infection and painful menstruation³⁵⁻³⁷. SJ-200 (Himcospaz), an herbal preparation contains *Zingiber officinale* Roscoe, Zingiberaceae (Rhizome), *Apium graveolens* L., Apiaceae (Fruit) and *Foeniculum vulgare* Mill., Apiaceae (Fruit)³⁸. All these plants have been used to treat various gastrointestinal disorders like abdominal pain, flatulence and colic³⁹⁻⁴¹. Celery leaf extract inhibited the ileum contractions dose dependently. It seems that voltage dependent calcium channels and receptor-operated calcium channels are involved in this activity, but β -

adrenoceptors, opioid receptors, NO, and potassium channels are not involved in this effect. It is possible that apigenin as the celery flavonoid is responsible for this activity²⁴. Celery has the ideal quantities of iron and magnesium to stop oncological diseases from progressing. The juice extracted from the petioles can be used for oedema, rheumatic tendencies, gout, flatulence, chronic pulmonary catarrh, tendencies toward overweight and lack of appetite. It is a strong diuretic⁴², and is used as a urinary antiseptic, mainly because of the volatile oil apiol. Celery can be helpful in treating skin problems, when it is used raw, or prepared as tea (Figure 3). Epidemiological evidence supports a relationship between ingestion of *A. graveolens* Linn. and a myriad of beneficial health effects, ranging from cardio protective to anticancer properties⁴³. Celery seed has been found to help regulate nervous system by producing a combing effect. Celery is also known as marsh water parsley. It stimulates sees drives and produce sedative effect⁴⁴. Antioxidants or molecules with radical scavenging capacity are thought to exert a potential protective effect against free radical damage⁴⁵. These bio molecules contribute to prevention of coronary and vascular diseases and tumor formation by inhibiting oxidative reactions^{46,47}. Certain bioactive compounds derived from *A. graveolens* seeds have been proven to possess nematocidal activity against *Caenorhabditis elegans* and *Panagrellus redivivus*, antifungal activity against *Candida albican*, *C. Kruseii* and *C. parapsilasis*, and mosquitocidal effects against *Ae. aegypti* fourth-instar larvae. The literature, however, offers no data about the adulticidal and repellent activities of this plant against mosquito vectors⁴⁸.

***Foeniculum vulgare* L.**

Therapeutic uses and spasmolytic activities

Foeniculum vulgare Mill. is a small group of annual, biennial or perennial herb⁴⁹. It is widely cultivated throughout India and sometimes found wild^{50,51}. Fennel has been investigated extensively for several medicinal and therapeutic activities and has been reported for possessing carminative, flavouring, antioxidant, antibacterial, antifungal and mosquito repellent properties⁵²⁻⁵⁴. Fennel volatile oil is a mixture of at least a dozen of different chemicals and the main ingredients are: anethole (40-70 %), fenchone (1-20 %) and estragole (2-9 %)⁵⁵⁻⁵⁷. Anethole is responsible for the carminative action⁵⁸. On account of its carminative properties, fennel is chiefly used medicinally with purgatives to allay their side effects, and for this purpose forms 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 the flatulence of infants. Volatile oil of fennel has these properties in concentration. Commercial preparations of fennel are widely available as alternative treatment for baby colic. Fennel tea, also employed as a carminative, is made by pouring boiling water on a teaspoonful of bruised fennel seeds^{59,60}. Herbal drugs and essential oil of fennel have antispasmodic, diuretic, anti-inflammatory, analgesic and antioxidant effects⁶¹⁻⁶³. They are active for dyspeptic

complaints, flatulence and bloating. The volatile oil showed antioxidant, antimicrobial and hepatoprotective activity^{64,65} (Figure 4). Fennel oil (*Foeniculum vulgare* Mill L.) and its alcoholic extract has demonstrated a significant antispasmodic activity in several *in vitro* models using isolated smooth muscle^{66,67}. This action appears to be due to an effect on calcium metabolism in the smooth muscle cells⁶⁸, Fennel oil was confirmed in an *in vivo* model by injection⁶⁹. Tone and amplitude of peristalsis decreased in the stomach after approximately 2-8 minutes in animals receiving fennel water. Fennel is commonly used as household remedy for various medicinal applications. In a study carried out on rats, *Foeniculum vulgare* Mill has shown a protective effect against ethanol induced gastric mucosal lesions⁷⁰. Fennel has shown large numbers of pharmaceutical application like antioxidant⁷¹, anti platelet and antithrombotic⁷², antispasmodic activities⁷³, colic⁷⁴, diuretic⁷⁵, insecticidal, mosquito repellent activities⁷⁶⁻⁷⁹, nematocidal⁸⁰ etc. Anethole has similar chemical structure like dopamine. Dopamine naturally present in the body. It has relaxing effect on the intestine and explains why fennel has a beneficial effect on infantile colic.

***Cuminum cyminum* L.**

Therapeutic uses and spasmolytic activities

Cuminum cyminum L. is an annual plant of the family Apiaceae (Figure 5). The medicinal component of the plant is Cumin oil extracted from the ripe fruit. Cumin is used as stomachic, diuretic, carminative, stimulant, astringent, emmenagogic, antispasmodic and antifungal⁸¹. In Algeria it is now used mainly in veterinary medicine, as a carminative, but it remains a traditional herbal remedy. It is supposed to increase lactation and reduce nausea in pregnancy. Used in a poultice, it relieves swelling of the breast or the testicles⁸². Cumin is a popular spice that is used as a flavouring agent, is widely used in food. The cumin seeds *Cuminum cyminum* L. are consumed in large quantities by Indians. Cumin is widely used in medicine for the treatment of dyspepsia, diarrhoea, and jaundice, as it has stomachic, diuretic, carminative, and antispasmodic properties⁸³. China is an important exporter of this commodity and also uses it in traditional medicine. The use of natural antimicrobial compounds is important in the control of human and plant diseases of microbial origin⁸⁴. In traditional practice medicinal plants have been used to control diabetes mellitus in many countries. The hypoglycaemic effect of several plants, used as anti-diabetic remedies, has been confirmed. *Cuminum* seed has an inhibitory effect *in vitro* against rat lens aldose reductase and α -glucosidase and thus confirms its potential utility as an anti-diabetic⁸⁵. Antioxidant activity of cumin ethanol and aqueous extracts was measured in DPPH and ABTS radical scavenging reaction systems and depended on extract concentration. *In-vitro* studies on antioxidant activity of the aqueous extracts of cumin indicate that less amount of cumin was needed for scavenging of superoxide radicals, inhibition of lipid peroxide and hydroxyl as compared to ascorbic acid⁸⁶.

***Pimpinella anisum* L.**

Therapeutic uses and spasmolytic activities

Pimpinella anisum L., a plant belonging to the Umbelliferae family, is one of the oldest medicinal plants. It is an annual herb, white flowers, and small green to yellow seeds. *P. anisum* is primarily grown for its fruits (aniseeds) that harvested in August and September. Aniseeds contain 1.5-4.5 % essential oil and used as flavouring, digestive, carminative, and relief of gastrointestinal spasms. Consumption of aniseed in lactating women increases milk and also relieves their infants from gastrointestinal problems⁸⁷. In the food industry, anise is used as flavouring and aromatic agent for fish products, ice cream, sweets, and gums^{88,89}. Antispasmodic and relaxant effects of three hydroalcoholic extracts of the aerial parts of *Pimpinella anisum* (ethanol: water; 40 : 60, 60 : 40, and 80 : 20) were investigated on rat anococcygeus smooth muscle⁹⁰ (Figure 6). The laxative efficacy of a phytotherapeutic compound containing *Pimpinella anisum* L., *Foeniculum vulgare* Miller, *Sambucus nigra* L., and *Cassia augustifolia* was studied in a randomized clinical trial included 20 patients presenting with chronic constipation⁹¹. Essential oil of *Pimpinella anisum* showed significant analgesic effect similar to morphine and aspirin⁹². Also fixed oil of anise was investigated for anti-inflammatory and analgesic activity in mice⁹³.

***Coriandrum sativum* L.**

Therapeutic uses and spasmolytic activity

Coriandrum sativum (Coriander) is an herb in the family Apiaceae (Figure 7). Although, all parts of the plant are edible, its fresh leaves and dried seeds are most frequently used⁹⁴, which contain an essential oil and the monoterpenoid-linalool¹⁰⁹. In traditional medicine, *Coriandrum sativum* was used in the preparation of many household medicines to relief anxiety and insomnia, and may have potential sedative, hypotensive, and muscle relaxant effects. Carmint contains total extracts of *Melissa officinalis*, *Mentha spicata* and *Coriandrum sativum*, which have antispasmodic, carminative, and sedative effects. The *Coriandrum sativum* L. (Umbelliferae) were found to possess bactericidal activity against *Salmonella choleraesuis*⁹⁵. *Coriandrum sativum* has antimicrobial potential and were active against *Pseudomonas aeruginosa* selectively, while oil was ineffective against *Proteus vulgaris*⁹⁶. The volatile oils of some aromatic plants, viz. *Coriandrum sativum* L, *Eucalyptus citridora* Hook etc. as potent antimicrobial agents against human pathogenic bacteria⁹⁷. The aqueous extract of *Coriandrum sativum* was also investigated for *in-vivo* anthelmintic activity in sheep infected with *Haemonchus contortus*. Both extract types of *Coriandrum sativum* inhibited hatching of eggs completely at a concentration less than 0.5 mg/ml⁹⁸. Coriander (*C. sativum*) essential oil and their components appear to be useful as natural nematocides for *B. xylophilus*⁹⁹. A poly herbal Ayurvedic formulation (aqueous extract) was evaluated for its activity against inflammatory bowel disease. The study investigated the anti-inflammatory potency of coriander oil in the ultraviolet (UV) erythema test *in-vivo*. Coriander seed extract could minimize the drug induced oxidative stress

and protected the system against its toxicity¹⁰⁰. The methanolic crude extracts of *Coriandrum sativum* was screened for their free radical scavenging properties using ascorbic acid as standard antioxidant¹⁰¹. The biochemical effect of coriander seeds on lipid parameters in 1, 2-dimethyl hydrazine (DMH) induced colon cancer in rats were studied. The biochemical effect of coriander seeds on lipid parameters in 1, 2-dimethyl hydrazine (DMH) induced colon cancer in rats were studied¹⁰². Diethyl ether extract of seeds of *Coriandrum sativum* showed more significant antidepressant effect than that of aqueous extract through interaction with adrenergic system, dopaminergic system and GABAergic system¹⁰³. An ethanol extract of the seeds was investigated for effects on insulin release from the pancreatic beta cells in streptozotocin-induced diabetic rats¹⁰⁴. Coriander fruit exhibits gut stimulatory, inhibitory and hypotensive effects mediating possibly through cholinergic, Ca²⁺ antagonist and the combination of these mechanisms respectively¹⁰⁵. The aqueous extract of *Coriandrum sativum* seed has anxiolytic effect and may have potential sedative and muscle relaxant effects¹⁰⁶. *Coriandrum sativum* fruits powder mixed diet significantly reduced plasma lipids profile in Wistar albino rats when given at a dose of 8 % for one month¹⁰⁷. The crude aqueous extract of coriander seeds increased diuresis, excretion of electrolytes, and glomerular filtration rate in a dose-dependent way. Seed possesses diuretic and saluretic activity. The mean values of total serum protein in the serum of the broiler chickens were significantly ($p < 0.05$) influenced by coriander seed supplementation¹⁰⁸. Ethanolic extract (2 %) of coriander does not improve learning within a short period of time after training; however, learning after coriander administration can be improved in the long term. The aqueous extract of *Coriandrum sativum* seed has anxiolytic effect and may have potential sedative and muscle relaxant effects. The extracts and essential oil of coriander seeds possess sedative-hypnotic activity. The major active component(s)

responsible for the hypnotic effect is mainly present in the aqueous extract^{109,110}.

***Trachyspermum ammi* L.**

Therapeutic uses and spasmolytic activities

Trachyspermum ammi Linn. Sprague syn. *Carum copticum* Benth. and Hook. (Fam. Umbelliferae) commonly known as ajwain or Bishop's weeds is an annual, erect herb, aromatic, with striate stem, white flowers and small brownish fruit, up to 90 cm tall (Figure 8). It is an indigenous to Egypt and Middle East, cultivated almost throughout India, uprooted and thrashed for collecting the fruits^{111,112}. The calcium channel blockade has been found to mediate the spasmolytic effects and this property proved that this mechanism contributed to their hyperactive disease states of the gut such as colic and diarrhoea as well as in hypertension¹¹³. The seeds oil shows characteristic aromatic odour and pungent taste, used as antispasmodic, stimulant, tonic, carminative, flatulence, diarrhoea and pile¹¹⁴. Ajwan-karak (aqueous extract) is popular preparation for diarrhoea. It also cures abdominal tumour, abdominal pains and piles¹¹⁵. Decoction of Ajwain seeds is used for treatments of abdominal discomfort, diarrhoea, cough and stomach troubles¹¹⁶. In Ajwain, the major phenolic compound Thymol is present and has been reported to be an antispasmodic, germicide, antifilarial, antihyperlipidemic, antiaggregatory and antifungal agent. Ajwain oil due to its characteristic aromatic smell and pungent taste is widely used in food products. Its seeds are used as flavouring agent in numerous foods. Volatile extracts of ajwain used in perfumery¹¹⁷. India is well known country that shows *T. ammi* medicinal application as a household remedy for gastrointestinal disorders, a paste of fruits is applied externally for relieving colic pains and dry fomentation of the fruits applied on chest is used as a common remedy for asthma. *T. ammi* has been shown to possess antifilarial^{118,119}, anti-aggregatory¹²⁰, nematocidal activity¹²¹, antihyperlipidaemic¹²², insecticide¹²³ and molluscicidal^{124,125}.

Table 1: Vernacular Names of Plants

S. No	Plant Name	Sanskrit	Hindi	Punjabi	English	Bengali	Telugu	Urdu	Tamil
1.	<i>Anethum graveolens</i> L.	Shatpushpi	Sova	Soya	Indian Dill Fruit	Sowa	Sabasiege	Shibt	Sathakuppi (Sompa)
2.	<i>Apium graveolense</i> L.	Ajmoda	Ajmud	Ajowan	Celery	Chanu	Ashu magada	Ajmod	Asham (Tagam)
3.	<i>Foeniculum vulgare</i> L.	Madhurika	Bari Saunf	Saunf	Fennel Fruit	Pan Muhiri	Sopu	Saunf	Shombu
4.	<i>Cuminum cyminum</i> L.	Jiraka	Jira	Ziru	Cumin Seed	Jira, Sadajira	Jilakarra	Zirah	Jeerakam
5.	<i>Pimpinella anisum</i> L.	Shatpusapa	Pali Saunf	Valiti Saunf	Sweet Cumin	Muhuri	Kuppi Soptu	Anisum	Shombu
6.	<i>Coriandrum sativum</i> L.	Dhanayaka	Dhania	Dhania	Coriander	Dhane	Dhaniyalu	Dhania	Kotnamali
7.	<i>Trachyspermum ammi</i> L.	Dipyaka	Ajwain	Lodhar	Bishop's weed	Yamini	Vamu	Ajowan	Omam

Table 2: Plants Description

S. No	Plant Name	Habitat	Phytoconstituents	Botanical
1.	<i>Anethum graveolens</i> L.	Europe, central Southern Asia, Mediterranean region, Punjab, Uttar Pradesh, Gujarat, Maharashtra, Assam, West Bengal	Carvone (30-60 %) Limonene (33 %) α - phellandrene (20.61 %), Pinene etc.	Annual, 50-150 cm tall, Branched Stem, Multipinnate, Feathery Leaves, Yellowish Flowers, Compound Terminal Umbels, Brown Coloured Fruit
2.	<i>Apium graveolense</i> L.	Europe, North western Himalaya, Punjab, Himachal Pradesh, Uttar Pradesh, Asia, Africa	Limonene (60 %), Selenine (10-15 %), Sesquiterpene Alcohols (1-3 %) etc.	Annual or Biennial Herb, Roots-succulent, Stem- branches are Angular or Fistular, Conspicuously Jointed, Leaves-oblong to Obovate, Pinnate or Trifoliolate, Flowers- white or Greenish white, Schizocarp
3.	<i>Foeniculum vulgare</i> L.	Europe, Assam, Maharashtra, Punjab, Gujarat	Anethole (40-70 %), Fenchone (1-20 %) Ergosterole (2-9 %) etc.	Biennial, Short lived Perennial Herb, Height 2 m, Stem Erect, Branched, Flowers Terminal Compound Umbels, Seeds Oval, Ribbed, 5-10 mm long
4.	<i>Cuminum cyminum</i> L.	Egypt, Latin America, North Africa, Rajasthan, Gujarat, West Bengal, Assam	Cuminaldehyde (25 %), Cuminy alcohol (30 %), p-cymene (18 %), β -pinene (16 %)	Annual 25 cm Herb, Flower- Small Compound Umbels, Flower Hermaphrodite (have both Male and Female Organs)
5.	<i>Pimpinella anisum</i> L.	Egypt, Spain, Mexico, Middle East, Asia	Trans-anethole, Methylchavicol, Anisaldehyde, Estragole, Coumarins, Umbeliferone	Annual Grassy 30-50 cm, Flower-White Seeds- Small Green to Yellow
6.	<i>Coriandrum sativum</i> L.	Morocco, Canada, Pakistan, Sri Lanka, Rajasthan Madhya Pradesh, Gujarat, Andhra Pradesh, Karnataka, Orissa,	Linalool (67 %), α -pinene (10 %), r-terpinene (9 %), Geranylacetate (4 %), Camphore (3 %), Geraniol (1.9 %) etc.	Annual, Branched 50 cm, Stem- Fine, Round Shaped, Seed-Hollow, Flower- Compound Umbel, Leaves- Green, Shiny Waxy, Alternate, Fruit- Globular, Ovate, Diameter up to 6mm
7.	<i>Trachyspermum ammi</i> L.	Egypt, South-West Asia, Iraq, Madhya Pradesh, Gujarat, Maharashtra, Uttar Pradesh, Punjab, Haryana Rajasthan, Bihar, West Bengal	Thymol (35-60 %), Carvacrol (11 %), p-cymene (50-55 %), beta-pinene (4-5 %), Limonene etc.	Annual or Biennial Herb, Root- succulent Stem-angular, Leaves- Oblong, obovate, pinnate, Fruit- Schizocarp

Figure 1: Some Umbelliferae plants *Anethum graveolens* L., *Apium graveolense* L., *Foeniculum vulgare* L., *Cuminum cyminum* L., *Pimpinella anisum* L., *Coriandrum sativum* L. and *Trachyspermum ammi* L.

Figure 2: (a) Seed (b) Dried Dill Umbel and (c) Plant Herbarium of Dill (*Anethum graveolens* L.)

Figure 3: (a) Seed (b) Cross Section of Celery rib (c) Plant Herbarium of Celery (*Apium graveolens* L.)

Figure 4: (a) Fruit, (b) Plant and (c) Herbarium (*Foeniculum vulgare* Mill L.)

Figure 5: (a) Fruit (b) Flower and (c) Plant Herbarium of Cumin (*Cuminum cyminum* Linn.)

Figure 6: (a) Fruit (b) Flower and (c) Plant Herbarium of Anise (*Pimpinella anisum* L.)

Figure 7: (a) Fruit (b) Leaves and (c) Plant Herbarium of coriander (*Coriandrum sativum* L.)

Figure 8: (a) Seed (b) Plant and (c) Ajwain (*Trachyspermum ammi* L.)

CONCLUSION

The traditional medicines in different health care systems are precious natural gift to fight against various diseases. Gastrointestinal spasm is very common problem in infants since ancient time. Spasm is a sudden violent involuntary muscular contraction. It can be accompanied by various gastrointestinal disorders like abdominal pain, colic, diarrhoea and constipation. At present no single drug has proven to be effective in treating these conditions. Therefore scientists are giving attention in natural antispasmodics to prevention and treatment of complex gastrointestinal disorders. Some plants *Trachyspermum ammi* Linn. Apiaceae, *Cuminum cyminum* Linn. Apiaceae, *Anethum graveolens* Linn., Apiaceae and *Foeniculum vulgare* Mill., Apiaceae has proved as antispasmodic. All these plants are used in traditional medicine to alleviate gastrointestinal disorders and

various biological activities have been accredited to these plants. Spasmolytic potential by these plants further warrant their exploration for the development of novel effective chemotherapeutic agents.

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