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REVIEW ON THERAPEUTIC AND MEDICINAL USES OF SHATHAPUSHPA

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ABSTRACT

Anethum sowa Roxb is a pharmacologically important aromatic and medicinal plant. Various parts of this plant are used in Ayurveda medicine for carminative, uterine, and colic pain, digestion disorders, flatulence in babies and as a appetite-stimulating agent. It also used to treat mild flu and cough and specially in female infertility. Systematic Literature review was conducted with the objective of updating the knowledge about Anethum sowa by using recent evidence published in the three electronic databases (PubMed, AYUSH Research Portal, and Google Scholar, additional data from books, proceedings, and local prints) searched using relevant keywords and terminologies related to A. sowa for critical analyses. The literature studies demonstrated that A. sowa possesses several ethnopharmacological activities, including pharmaceutical prescriptions, traditional applications, and spice in food preparations. The phytochemical investigation conducted on crude extracts has characterized and identified various classes of compounds, including coumarins, anthraquinone, alkaloid, benzodioxoles, phenolics, polyphenols, phenolic and polyphenols, fatty acids, phthalides and carotenoids. The extracts and compounds from the different parts of A. sowa showed diverse in vitro and in vivo biological activities including antioxidant, antiviral, antibacterial, analgesic and anti-inflammatory, Alzheimer associating neuromodulatory, cytotoxic, anticancer, antidiabetes, insecticidal, and larvicidal. Specially it is indicated to be a sweet, anabolic, strength-providing promoter of nutrition, complexion, and fire (digestive/metabolic fire), Initiator of rhitu (menstruation/ovulation), is virtuous, clarifies yoni (female reproductive organs), and Sukra (sperm / spermatic fluid).This review aims to provide a comprehensive and critical assessment of the reported traditional and pharmaceutical uses and pharmacological activities of the extracts, essential oil, and phytoconstituents with emphasis on its therapeutic potential as well as toxicological evaluation of A. sowa.

Keywords: Anethum sowa Roxb, Shathapushpa, Pharmacological activities, Female infertility, Traditional applications

INTRODUCTION

The medicinal properties of plants have been investigated due to their potent pharmacological activities, low toxicity and economic viability (Chew, Jessica and Sasidharan, 2012). There is an abundance of medicinal plants throughout the world, but only limited numbers have been investigated for its biological and pharmacological properties (Singh et al., 2006). Plant phytochemicals have a significant role in the plants defense mechanism and also important for their

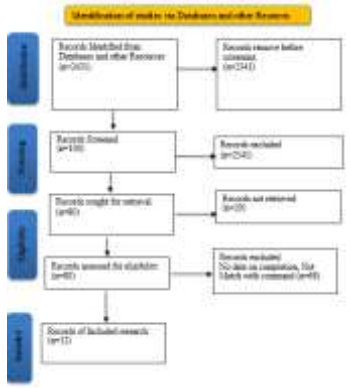
unambiguous physiological action in the human body. Specially the secondary metabolites are becoming a part of the integrated health care system as supportive and alternative medicines because of their therapeutic property (Sahreen, Khan and Khan, 2010). Therefore, it is essential to study the medicinal plants so that the discovery of active natural products ingredient can be identified for healing diseases.

Anethum sowa L. (Bengali-Shulfa) belonging to the family Apiaceae (Umbelliferae), is a common aromatic and spice herb known as Shulfa in Bangladesh and found as a Dill in Europe, Asia-temperate, Africa and Asian-tropical countries. Indigenous people consume it as a spice for a flavouring agent in culinary preparation. The herb grows ordinarily 2–2.5 ft. in height with small feathery leaves, tapped and branched roots (Chopra et al., 2000). The green herb, seeds and its roots are used as folkloric medicine e.g. aromatic, carminative especially useful in flatulence, colic and hiccups of infants and children(Woolf, 2000). The insecticidal, ovicidal and synergistic activity of dill-apiol and essential oil of the seed part are well known (Tomar, Maheshwari and Mukerjee, 1979). Moreover, it was reported that seed essential oils are the potential source of antioxidant and also have antimicrobial and antispasmodic properties (Singh et al., 2005). The present systematic review aims to update the reported traditional and pharmaceutical uses and pharmacological activities of the extracts, essential oil, and phytoconstituents with emphasis on its therapeutic potential evaluation of A. sowa.

METHODOLOGY

Systematic Literature review was conducted with the objective of updating the knowledge about Anethum sowa by using recent evidence published in the three electronic databases (PubMed, AYUSH Research Portal, and Google Scholar, additional data from books, proceedings, and local prints). The literature survey was conducted during the period from 01. 08.2023 to 01.10.2023. The PRISMA model was applied in selecting the relevant publications. Clinical trials, pilot studies, and case reports published in English were included. Preclinical studies, conceptual reviews, and unpublished manuscripts were excluded. The keywords used in PubMed were “Therapeutic and medicinal uses and Anethum sowa”, “Ayurveda and Anethum sowa”, and “Reproductive disorders and Anethum sowa”. Sixty-two articles were obtained, out of which one pilot study and three clinical trials were shortlisted. The filters used in the AYUSH Research Portal were (a) Medical system: Ayurveda, (b) Category: Clinical research, followed by (c) Body system, and (d) Diseases, yielding seventeen articles graded A, B, and C, based on the WHO recommendations. Under Grade A, there were no articles, Grade B had five papers, and Grade C had twelve articles. Two of these studies were found in PubMed. After screening through the title, abstract, and year of publication, eight articles were found to meet our criteria. Finally, twelve eligible articles were shortlisted, i.e., eleven clinical trials and one pilot study.

Prisma model of Present Study



LITERATURE REVIEW

Botanical Review on Anethum sowa
Scientific name - Anethum sowa
Kingdom - Plantae
Division - Magnoliophyta
Class - Magnoliopsida
Order - Apiales
Family - Apiaceae
Genus - Anethum

Synonyms

Sanskrit - Shatapushpa
English - Indian dill
Hindi - Soya, Sowa
Beng. - Suva, Salpha
Urdu - Shibt
Part use - Seed

Anethum sowa L. (Bengali-Shulfa) belonging to the family Apiaceae (Umbelliferae), comes under genus Anethum and it is an annual and winter spice crop in Bangladesh. It is mostly grown in the northern part of Bangladesh. A variant called Indian dill or sowa (Anethum sowa Roxb.) is largely cultivated in Bangladesh, India, Egypt and Japan. Indigenous people consume it as a spice for a flavouring agent in food preparation. The herb grows ordinarily 2–2.5 ft. in height with small feathery leaves, tapped and branched roots (Anonymous, 1985).

Pharmacokinetically Features of Anethum sowa

Macroscopic

Fruit: Dark brown, often stalk attached, broadly oval and compressed dorsally; mericarps usually separate and free,4 mm long,2-3 mm broad and 1 mm thick, glabrous, traversed from base to apex by five lighter colored primary ridges of which three dorsal, slightly raised, brown, filliform and inconspicuous, two lateral prolonged into thin, yellowish membranous wings, odor faintly aromatic resembling that of caraway, and a warm slightly sharp taste.

Microscopic: Transverse section shows pericarp composed of epidermis of polygonal tabular cells having thick outer wall and striated cuticle; mesocarp parenchymatous, some cells lignified and slow reticulate thickening; endocarp consists of tabular cells sometimes with sinuous anticlinal walls; vittae four on the dorsal surface and two on commissuralsurface, extending the length of each mericarp with an endothelium of brown cells and containing volatile oil; dorsal costae three, one larger and two lateral broadly winged, each costae with vascular strands; endosperm much flattened and consists of thick walled, cellulosic, parenchyma containing fixed oil and numerous aleurone grains up-to 5µ in diameter containing micro-rosette crystals of calcium oxalate; carpophore split, passing at the apex into the raphe of each mericarp containing a vascular strand of sclerenchymatous fibres and spiral vessels (Anonymous,1999).

Powder Microscopy: Fruit powder brow in color shows spiral vessels, Micro-rosette crystals of calcium oxalate and oil globules, aleurone grains up to 5 µ in diameter (Anonymous, 1999).

Chemical Constituents

Seed: Contains 1.2-7.7% volatile oil with concentrations varying according to geographical and seasons. The oil contains mainly carvone 35-60%, limonene, phellandrene, which together can account for 90% of the oil. Egyptian Anethum sowa found to contain limonene30.3%, dillapiole 26.8%, carvone 22%, piperitone 8.2%, D-dehydro-p-cymene, camphor, and linalylacetate (Bandopadhyay et al 1972). The main constituents of Anethum sowa are reported to be limonene, terpene, carvone, dillapiole, phellandrene, dihydrocarvone, and isoeugenol, (Tomar and Mukerjee, 1981). The specific gravity of oil of Indian Anethum sowa is 0.946 to 0.970, whereas that of oil of others is

0.900-0.915. The other variety of oil contains less carvone than Indian oil and substitution would be revealed by the lowered specific gravity and by estimation of carvone.

Plant: Plant contains less carvone than seed oil.it mainly consists of phellandrene, eugenol, thymol, isoeugenol, linalyl acetate, phellandral. The plant also reported to have carvone, phellandrene, benzodipyrangraveolone, phthalides, glucopyranosides and 8-hydroxy geraniol, biphenyl derivatives, D-6,7 octadecenoic acid, D-5,6 isomer and d-8 isomer, alkaloid- piperine, beta –sitosterol and its glycosides, di hydro carvone, flavonols, quercetin, kaempferols, dillapiole, isodillapiole, dihydrodillapiole, 1-cyclopropyl-2, 3-dimethoxy-4, 5-methylene dioxybenzene, dillaldehyde, dihydroxyisidillapiole, dillapionic acid, 1-2,3 dimethoxy-4,5-methylene dioxyphenyl, but 1-en-3-one, and 1,4-dic 2,3-dimethoxy 4, 5-methylenedioxyphenol, (Walia et al 1985).

Fruits: aromatic, glycosides as shashenoside, vecinin,, syringin, icariside-F2, Benzyl beta D glucopyranosides, 4-hydroxy benzyl beta D gluopyranoside, ethyl beta D glucopyranoside, glycerol 2-o-alpha-l-fucopyranoside, 2-c-methyl-d-irythritol, 2-hydroxy methyl butane 1,2,3,4 –tetrol, 1 deoxyl d xylitol-1, deoxyl d ribitol, 1 deoxyl d glucitol, erythritol, dthreitol, 2 deoxy D ribono 1,4- lactone, glycerol, d-glucose, d fructose, thymidines, uridine, two mono terpenoidketodiols as 8,9- dilydroxy-8,9-dihydrocarvone, 8,9-dihydroxy tetra hydro carvone, 6 mono terpenoid glycosides 3,7-dimethyl oct-3-ene-1,2,6,7-tetrol, betulalbuside, 3,7- dimethyl oct-5-ene-1,2,6,7 tetrol 7-o-beta-d-glucopyranoside, 3,7-dimethyl oct-3-ene-1,2,6,7 tetrol 2-o-beta-d-glucopyranoside, 3,7- dimethyl oct-1-ene-3,8-diol, 8-o-beta-d glucopyranoside, 10 hydroxy trans-linalyl-oxide 7-o- o-beta-d glucopyranoside, etc were reported from the reports of plant.

Seeds: piperine, sitosterol and its glucosides etc.

Roots: glyceryl, esters of saturated and unsaturated fatty acids etc.

Essential oil: carvacrol, safrole, thymol,sabinene, linalool etc.

Table No. 1: Classifications in various Nighantus and text

Nighantu	Varga /Gana	References
Dhanvantri Nighantu	Shatpushpadi varga	1 – 3
Raja Nighantu	Shatavahavyadi Varga	10 – 13
Kaiydev Nighantu	Aushadi Varga	1186 – 1191
Bhava prakasha Nighantu	Haritkyadi varga	89 – 91
Madanpal Nighantu	Shuthyadi Varga	24-25
Shodal nighantu	Shatpushpadi varga	259,289
Astanga Nighantu	Shaymadi varga	266
Adarsh Nighantu	Jeerkayadi Varga	Pg.N.688-690
Charaka Samhita	Aasthapanopag Anuovashanopag	25-26
Sushruta Samhita	Kapha Shanshaman	9

Table No. 2: Synonyms – According To Various Nighantus

S.N.	Synonyms	Dhan. Nig.	Raj Nig.	Kaiydev Nig.	Bhav. Nig.	Madanpal Nig.	Shodal nig.	Astang nig.
1	Misi	+	+	-	+	+	+	+
2	Ghosa	+	+	+	-	-	+	+
3	Peetika	+	-	-	-	-	-	-
4	Madhvi	+	+	-	-	-	+	-
5	Shipha	+	+	-	-	-	-	-
6	Atichchatra	+	+	-	-	+	-	-
7	Avakpushpi	+	+	+	-	+	+	-
8	Sataha	+	+	+	+	+	+	+
9	Carvi	+	+	+	+	+	+	-
10	Pothika	-	+	-	-	-	-	-
11	Ahichatra	-	+	-	-	-	-	-
12	Shanghatptrika	-	+	-	-	-	-	-
13	Chatra	-	+	-	-	-	+	-
14	Vajrapushpa	-	+	-	-	-	-	-
15	Shupushpik	-	+	-	-	-	-	-
16	Shatprashuna	-	+	-	-	-	-	-
17	Bahla	-	+	-	-	-	-	-
18	Pushpahva	-	+	-	-	-	-	-
19	Shatpatrika	-	+	-	-	-	-	-
20	Vanpushpa	-	+	-	-	-	-	-
21	Bhuripushpa	-	+	-	-	-	-	-
22	Shugandha	-	+	-	-	-	-	-
23	Shukshmpatrika	-	+	-	-	-	-	-
24	Gandharika	-	+	-	-	-	-	-
25	Sithchtra	-	-	+	-	-	-	-
26	Atichchatrika	-	-	+	-	-	-	-
27	Ghosavati	-	-	+	-	-	-	-
28	Shiphapra	-	-	+	-	-	-	-
29	Satikta	-	-	+	-	-	-	-
30	Yonishoolghani	-	-	+	-	-	-	-
31	Madhura	-	-	+	+	-	-	-
32	Shathii	-	-	+	-	-	-	-
33	Magadhi	-	-	+	-	+	-	-
34	Rathi	-	-	+	-	-	-	-
35	Atilambi	-	-	-	+	-	-	-

36	Shitchatra	-	-	-	+	-	-	-
37	Sahitchatrika	-	-	-	+	-	-	-
38	Shatgosa	-	-	-	-	+	-	-
39	Shethika	-	-	-	-	+	-	-
40	Vajrapushpi	-	-	-	-	-	+	-
41	Lata	-	-	-	-	-	+	-
42	Atichtra	-	-	-	-	-	+	-
43	Samhatptrika	-	-	-	-	-	+	-
44	Shatchchatra	-	-	-	-	-	-	+

Table No. 3: Rasa Panchaka in Various Nighantu

Pro.	**D.N.**	**Raj N**	**B.N.**	**K.N.**	**M.N.**	**Adarsha N.**	**Shodal Nig.**
Rasa	Katu Tikta	Katu Tikta	Katu	Katu Tikta	Katu	Katu Tikta	-
Guna	Snighdha	Snighdha	Laghu Tikshna	Laghu Snighdha Tikshna	Laghu Tikshna	-	Tikshna
Virya	Ushna	-	Ushna	Ushna	Ushna	Ushna	Ushna
Vipaka	-	-	-	-	-	Katu	Katu

The term Raspanchaka refers to Rasa, Guna, Virya, Vipaka and Prabhava. Acharya Charaka states that action of a drug may be in accordance with its Rasa, Guna, Virya, Vipaka and Prabhava.

Table No. 4: Dosha Shamaka in various Nighantu

Doshshamaka	Dhan. Nig.	Raj Nig.	Kaiydev Nig.	Bhav. Nig.	Madanpal Nig.	Nighantu Adarsh	hodal nig
Vata Vardhaka	-	-	-	-	-	-	-
Pitta Vardhaka	+	-	+	+	+	-	+
Kapha Vardhaka	-	-	-	-	-	-	-
Vata Shamaka	+	-	+	+	+	+	+
Pitta Shamaka	-	-	-	-	-	-	-
Kapha shamaka	+	+	+	+	+	+	+

Acharya Sushruta has stated that the decrease, increase and equllibrium of the doshas are dependent on Rasapanchaka.

Table No. 5: Therapeutic uses in various Nighantu

Karma	D.N.	K.N.	B.N.	M.N.	Sho. N.	Raj Nig.
Agnivardhaka	+	-	+	-	+	-
Dhughadhvardhaka	+	-	+	-	-	-
Medhya	-	+	-	-	-	-
Deepana	+	+	+	+	-	-
Pachana	-	-	+	-	-	-
Vata- anulomaka	-	-	+	-	-	-
Ruchya	+	-	-	-	+	-
Vrishya	+	-	-	-	-	-
Vasti karma	+	-	-	-	-	+

Table No. 6: Therapeutic indications in various Nighantu

Indication	Dhan. Nig.	Raj Nig.	Kaiydev Nig.	Bhav. Nig.	Madanpal Nig.	Shodal nig.	Astang nig.
Jawara	+	+	+	+	+	-	
Vrana	+	+	+	+	+	-	
Netra roga	+	+	+	+	+	-	
Udarshoola	-	-	-	-	-	-	
Aadhmana	-	-	-	-	-	+	
Atisara	-	+	-	-	-	-	
Shoola	-	-	+	+	+	+	
Daha	-	-	+	-	-	-	
Trishna	-	-	+	-	-	-	
Vamana	-	-	+	-	-	-	
Yonishoola	-	-	-	-	+	-	
Arsha	-	-	-	-	-	+	
Aama	-	-	-	-	-	+	

Therapeutic Uses

Disorders of female genital tract: Shatapushpa fruits powder in a dose of 3 g is used in disorders of female genital tract and it provides healthy progeny. It is extremely helpful in regulation of menstrual flow. It is effective for people who complain of spasmodic pain.

Shatapushpa mentioned in Kashyapa Samhita is a Vata Kapha shamaka and Pitta vardhaka drug due to its Katu -Tikta Rasa, Tikshna –Snigdha guna and Ushna Veerya. Satapushpa on reducing ovarian volume seems to confirm the possibility of an interaction between the drug and ovarian morphology (Sharma, 1994). Satapushpa is indicated to be a sweet, anabolic, strength-providing promoter of nutrition, complexion, and fire (digestive/metabolic fire), Initiator of rhitu (menstruation/ovulation), is virtuous, clarifies yoni (female reproductive organs)

and Sukra (sperm / spermatic fluid), is hot, suppresses vata, is auspicious, eradicates effect of evil deeds, gives progeny and increases virya (virility). Shathapushpa has stimulated menstruation with ovulation (Rhithu pravardhanai, Pashyanthi).

Shushka Arsha: Shushka Arsha /hemorrhoids should be fomented with lumps of Vacha and Shatapushpa mixed with unctuous substances.(Kurupa et al., 2012).

Vata Rakta: Paste of linseed, castor seeds and Shatapushpa seeds pounded with milk is used for local application to remove Shoola in Vata predominant Vata Rakta Local application with Oil prepared with decoction of Shatapushpa, Kushtha and Madhuka alleviates pain in Vata Rakta..(Kurupa et al., 2012).

Rasayana: Shatapushpa promotes intellect with-in a month when given with honey and Ghee..(Kurupa et al., 2012).

Vishahara: Paste of Shatpushpa mixed with rock salt and Ghee is used for local application to counteract bees poison (Bhela Samhita Visha 216).

Digestive disorder – It helps in severe conditions of constipation. One to two spoons of fresh leaves can be given to babies. It is also effective to relive flatulent, colic, hyperacidity and diarrhea..(Kurupa et al., 2012).

Bad breath – The seeds are chewed to relieve the problem of bad breath. Lactation – It stimulates milk flow in lactating mother..(Kurupa et al., 2012).

High blood pressure – Take equal quantities of anthum seed and foeniculum seed and powder them. Take 2 tsf of powder twice a day with a glass of water.

Insomnia – It soothes stomach and relives insomnia..(Kurupa et al., 2012).

Respiratory disorder – Anethum seeds are effective in respiratory disorder like-cold, bronchitis and influenza. About 60 grams of seed powder mixed with honey should be taken thrice a day..(Kurupa et al., 2012).

DISCUSSION

According to the conducted literature survey Anethum sowa is an annual herb of Apiaceae family that contains 1.2-7.7% volatile oil with concentrations varying according to geographical and seasons. Saponins, Flavonoids and Alkaloids were mostly presented phytochemicals in this plant. The oil contains mainly carvone 35-60%, limonene, phellandrene, which together can account for 90% of the oil. It is attributed with deepaniya, ruchya, stanyavardhak, jwaraghna, vrishya, vranaropak karmas . Shatapushpa mentioned in Kashyapa Samhita is a Vata Kapha shamaka and Pitta vardhaka drug due to its Katu -Tikta Rasa, Tikshna – Snigdha guna and Ushna Veerya. Satapushpa on reducing ovarian volume seems to confirm the possibility of an interaction between the drug and ovarian morphology (Sharma, 1994). Satapushpa is indicated to be a sweet, anabolic, strength-providing promoter of nutrition, complexion, and fire (digestive/metabolic fire), Initiator of rhitu (menstruation/ovulation), is virtuous, clarifies yoni (female reproductive organs) and Sukra (sperm / spermatic fluid), is hot, suppresses vata, is auspicious, eradicates effect of evil deeds, gives progeny and increases virya (virility). Shathapushpa has stimulated menstruation with ovulation (Rhithu pravardhanai, Pashyanthi).

CONCLUSION

Anethum sowa is an annual herb of Apiaceae family known as Shatpushpa in Ayurveda due to have many flower arranged in umbeliform. It is commonly known as Dill. Apiol, carvone and limonene are main chemical contituents of

Dill which are responsible for its pharmacological properties like such as diuretic, carminative antibacterial, antiseptic, antispasmodic, cardio depressant, digestive, blood sugar lowering, blood pressure lowing, breast milk stimulating, galactogogue, and laxative. Dill seed oil is known for their carminative property that soothes the digestive system. A more detailed and systematic study with large number of articles is required for identification and medicinal uses of this plant for increasing our traditional knowledge.

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