

Original Research Article

Assessment of Plants Associated with Vedic Practice of *Kumaun Agnihotra*

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Abstract: *Agnihotra* is an important practice of *Vedic* period which is performed for peace, happiness and prosperity. During ancient age, it was performed many times in a day by the *Vedic* people. *Agnihotra* was an important part of their routine life. Fumes of *Yagya* purify the surrounding environment by removing foul odors replaced with various volatile organic compounds. But in the modern time it is performed only on some special occasions like ceremonies, festivals and on other worships. Ancient time people were uses various medicinal plants for curing harmful diseases by performing fumigation method. Present study is focused on the medicinal plants which are applied to perform a very ancient religious practice of the Kumaun Himalaya and effect of their components when offered in *Agnihotra* as *Havan* material or their medicinal uses. A questionnaire-based survey was conducted in major religious places of Almora for collecting the information on plants used in the worship on different occasions. In result a total of 34 medicinal plants are recorded from four major religious spots of Kumaun. Out of which maximum 24 plants are applied in the worship of lord Shiva at Jageshwar shrine. Apart from this, 29 such medicinal plants along with their chemical constituents have also been studied which are mentioned in the *Vedic* text and these are applied in *Agnihotra*. This study will be important in preserving this plant-based *Vedic* practice of Kumaun as well as these important medicinal plants and an attempt has also been made to emphasize the plants which are used in making incense and *Havan* material.

Keywords: Medicinal plants, Vedic rituals (*Agnihotra*), common diseases, volatile component, major religious spots of Kumaun.

Introduction

According to the oldest ancient Indian literature on medicine, *Naysa hi shirsho Dwaram* means the nose is the best point to inhale the medicines to treat diseases of the brain and head. Therefore, daily exposure to *Havan (Agnihotra)* aromatic fumes influences the health of the mind and the body of the person inhaling the fumes (Joshi, 2003) According to ancient Sanskrit text *Sushruta* (800-600BC) based on medicine, fumes emanating from the combustion of mustard, salt, and butter were employed to eliminate microbial pathogens from ambient air (Ayliffe, *et al.*, 2003). In *Yajurveda*, *Agnihotra* is said to be the *Naabhi*

(nucleus) of the entire world. Just like *Naabhi* (navel) has an important place in the human body, so is the role of *Yagya (Agnihotra)* in this world. Since time immemorial, smoke emanating from the combustion of various parts of medicinal plants has been used to cure many diseases (Nautiyal, *et al.*, 2007). The components of *Agnihotra* have several volatile properties that are especially useful for Alzheimer's disease. These oils burn in the sacred fire, high temperature vapors enter the central nervous system through the nasal route (Kaur, *et al.*, 2016). *Havan* fumes not only purify the air but are also

environmentally suitable for physical, mental, intellectual, and spiritual progress (Kaur, *et al.*, 2016). Recently the world had to face a very serious viral disease covid 19. At that time, it became a challenging task to control this disease. When all the countries were trying to treat this disease in their own ways, India tried to prevent this terrible disease by home remedies based on medicinal plants. Therefore, covid period made us realize again about the importance of medicinal plants and their usage in Vedic practices and home remedies.

Agnihotra means healing of diseases by burning medicinal plants in sacred fire. This unique practice of India was developed by our great sage *Rishi Karnav* in Vedic period (1500-1000BC). He has done a lot of work on microbes during that period with his divine knowledge. That is why he is regarded as the father of Vedic microbiology. He gained this divine knowledge by inhaling the aromatic fumes of medicinal plants applied in *Agnihotra*. In the present paper, research work has been done on such medicinal plants having high fragrant and volatile properties and their documentation has been done.

Materials and methods

Study area

Present study was conducted in four major religious spots of Almora region Kumaun Himalaya. The area is located at 29°35'39.0804"N and 79°39'14.0148"E between 1500m-1800m altitude. Almora is one of the historical and cultural cities of the hilly state Uttarakhand. The district Almora is well known for its diverse culture, biodiversity, aesthetic, spiritual, political and tourist point of view. These four religious spots are Jageshwar and Betaleshwar temple dedicated to lord Shiva, folk god Golu temple Chitai (God of Justice) and Nanda Devi temple of local goddess (Fig-1). These significant places are well known for organizing various rituals and ceremonies in which *Agnihotra* is performed on large scale. On these occasions many medicinal and aromatic plants and their ingredients along with other products are applied as oblation during the process of *Agnihotra*.

Field survey: Questionnaire survey was conducted to collect the information on plants used in the worship on different



Fig. 1. Different medicinal plants associated with Vedic practices: A-*Nelumbo nucifera*; B-*Elaeocarpus angustifolius*; C-*Datura stramonium*; D-*Valeriana jatamasi*; E- *Cannabis sativa*; F- *Tinospora cordifolia*

occasions. A focus was also given to medicinal usage of plants applied in *Agnihotra*, their availability in the region, name of incense in which they are used, related home remedies and their uses etc. were included in the questionnaire.

Assessment of incense plants: During the field study, the waste packets or wrappers of different incense products (popularly known as *Dhoop-Agarbatti*) spread in the selected religious spots were collected to prepare their details. These fragrant products are traded in the region by their different manufacturing companies. After this, a list of incense plants and their ingredients mentioned on these waste wrappers along with their trade names was studied. Among them those plants which also occurred naturally in the study area were studied in detail for their medicinal properties.

Data collection: All these four religious places were visited on different events. Interviews were conducted with the priests of the respective occasions. The questionnaire was filled after discussion with the priests, organizers and other presenters of the event. During the survey total fifty informers were interviewed. Besides information was also collected from the secondary sources such as journals, books and web search.

Result

Medicinal plants applied in the worship at major religious places of the study area

During the study a sum of 34 religious and medicinal plants belonging to 24 families were recorded from the study area (Fig. 1). Family Poaceae contributes maximum four plants followed by Rosaceae with three species. Family Malvaceae, Anacardiaceae, Arecaceae, Zingiberaceae and Moraceae are represented by two species each. Besides these, from other 17 families at least a single species from each family was also recorded. It was analyzed that a highest number of plants and their ingredients of 24 species are worshipped at Jageshwar shrine. Similarly, 12 species from Betaleshwar followed by 11 at Nanda Devi temple are applied during different worships. Both Jageshwar and Betaleshwar temples are dedicated to lord Shiva (Fig 2 & 3). Jageshwar is situated very far from Almora town and surrounded by dense forest areas, therefore, this shrine possesses the highest number of plants applied in the worship. Betaleshwar temple is also situated far from the main town of Almora and less plant-based worship ingredients were recorded from here. However, goddess Nanda Devi temple is located in the center of Almora city and lesser number of plants and their ingredients were recorded from this place (Table 1).

Variety of parts of different plants associated with worship

It was observed that maximum fruits of 10 plants are offered during the worship followed by leaves of 9 plants. Besides, flowers of six plants and seed ingredients of three plants are also used to worship. Likewise, whole plant of *Cynodon dactylon* and root, stem, bark, wood and rhizome of rest every plant are also offered to the respective deity (Table 1).

Discussion

Medicinal properties of plants applied as *Havan* material in *Agnihotra*

During the study, an attempt has also been made to emphasize the plants which are used in making incense and *Havan* material. Therefore, total 29 plants have been recorded

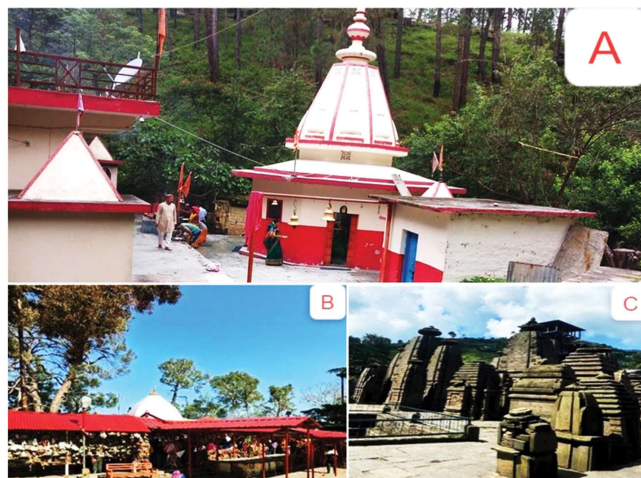


Fig. 2. Important religious places of Almora region A-Betaleshwar temple; B-Chaitai Golu Temple; C-Jageshwar shrine.



A. Plant ingredient used during *Paarthiv puja* at Jageshwar shrine
B. *Havan* performed at home of Mr. Sandeep Joshi, Almora (UK)
C. *Shivalinga* in Jageshwar is covered with lotus flowers and twigs
D. Plant based *Havan* material used in *Harela Festival*

Fig. 3. Different plant ingredients applied in Agnihotra in Kumaun Himalaya.

from the available texts which are medicinally potential (Fig. 2 & 3). Out of which maximum 20 plants were reported as used in *Agnihotra*. These plants are also studied by different researchers for their chemical constituents (Table 2). But during the field visit it was observed that only 15 species out of 29 are used as worship ingredients as well as burnt as *Havan* material in the respective sacred places (Table 1). Therefore, a focus should be made on the remaining 14 plants which also possess high value medicinal properties and applied for *Agnihotra*

Table 1. An account of plants worshipped in different religious places of the study area.

S. No.	Plant name	Common name	Family	Part used	Betaleshaw	Chitai	Jageshwar	Nanda Devi
1.	<i>Abelmoschus moschatus</i>	Kastoori	Malvaceae	Seed	+	-	+	-
2.	<i>Aegle marmelos</i>	Bael	Rutaceae	Leaves	+	+	+	+
3.	<i>Anacardium occidentale</i>	Cashew	Anacardiaceae	Fruit	+	+	+	+
4.	<i>Colchicum autumnale</i>	Saffron	Iridaceae	Flower	+	+	+	+
5.	<i>Cinnamomum camphora</i>	Kapoor	Lauraceae	Bark	+	+	+	+
6.	<i>Cannabis sativa</i>	Bhang	Cannabanaceae	Leaves	+	-	+	-
7.	* <i>Cocos nucifera</i>	Nariyal	Arecaceae	Fruit	+	+	+	+
8.	* <i>Commiphora wightii</i>	Guggul	Burseraceae	Bark	+	+	+	+
9.	<i>Curcuma longa</i>	Haldi	Zingiberaceae	Rhizome	+	-	+	+
10.	* <i>Cynodon dactylon</i>	Doob	Poaceae	Whole plant	+	+	+	+
11.	<i>Datura stramonium</i>	Dhatura	Solanaceae	Flower, leaf	+	-	+	-
12.	* <i>Elettaria cardamomum</i>	Elaichi	Zingiberaceae	Fruit	+	+	+	+
13.	* <i>Ficus auriculata</i>	Timul	Moraceae	Leaves	+	-	+	-
14.	* <i>Ficus religiosa</i>	Peepal	Moraceae	Wood	+	-	+	-
15.	<i>Gossypium arboretum</i>	Cotton	Malvaceae	Fruit	+	+	+	+
16.	* <i>Hordeum vulgare</i>	Barley	Poaceae	Seed	+	+	+	+
17.	<i>Jasminum officinale</i>	Chameli	Oleaceae	Flower	+	-	+	-
18.	* <i>Mangifera indica</i>	Mango	Anacardiaceae	Fruit, leaf, wood	+	+	+	+
19.	<i>Musa paradisiaca</i>	Banana	Musaceae	Fruit, leaf	+	+	+	+
20.	* <i>Myristica fragrans</i>	Nutmeg (Jaiphal)	Myristicaceae	Fruit	+	-	+	-
21.	* <i>Nardostachys jatamansi</i>	Jatamasi	Caprifoliaceae	Root	+	+	+	+
22.	<i>Nelumbo nucifera</i>	Kamal	Nelumbonaceae	Flower	+	-	+	-
23..	<i>Oryza sativa</i>	Rice	Poaceae	Seeds	+	+	+	+
24.	<i>Piper cubeba</i>	Black pepper	Peperaceae	Fruit	+	-	+	-
25.	<i>Piper betle</i>	Paan	Arecaceae	Leaf	+	+	+	+
26.	<i>Prunus cerasoides</i>	Padam	Rosaceae	Leaf	+	+	+	+
27.	* <i>Prunus dulcis</i>	Almond	Rosaceae	Fruit	+	+	+	+
28.	* <i>Rosa indica</i>	Rose (Gulab)	Rosaceae	Flower	+	+	+	+
29.	<i>Sugarcane</i>	Batasha	Poaceae	Stem	+	+	+	+
30.	* <i>Santalum album</i>	Chandan	Santalaceae	Wood	+	+	+	+
31.	* <i>Tinospora cordifolia</i>	Giloy	Menispermaceae	Stem	+	+	+	+
32.	* <i>Trifolium repens</i>	Laung	Facbaceae	Leaf	+	-	+	-
33.	<i>Vitis negundo</i>	Nirgundui	Verbenaceae	Flower	+	-	+	-
34.	<i>Vitis vinifera</i>	Kishmish	Vitaceae	Fruit	+	+	+	+

*Plants associated with Agnihotra

due to their high fragrant (Table 2). A detailed account of their chemical properties and medicinal uses to cure different kinds of diseases, most of the cured mental diseases have been given in table 2.

All these plants possess with a large number of chemical constituents and having high medicinal properties

(Kumar, 2011; Papandreou, *et al.*, 2011; Nam, *et al.*, 2013). In the present investigate it was found that a highest number of plants about 16 out of 29 are applied in the treatment of maximum six common diseases of the region (Table 2). Medicinal plants like *Acorus calamus*, *Aquilana malaccensis*, *Bauchanania lanzan*, *Cedrus deodara*, *Crocus sativus*, *Eugenia*

Table 2. Medicinal uses of plants associated with *Agnihotra*

S. No.	Botanical name	Common name	Sanskrit name	Chemical properties	Medicinal uses
1	<i>Acorus calamus</i> L.	Bach	Vaca	Psychoactive chemicals	Its drug is used to improve the memory power and intellect. Rhizomes are used to cure epilepsy, mental ailments, chronic diarrhea, dysentery, fever, abdominal tumors, kidney and liver troubles, and rheumatism (Sharma, <i>et al.</i> 2014).
2	<i>Aquilaria malaccensis</i>	Agar	Aguru	Sesquiterpenes	It helpful to cure Alzheimer's disease; its wood smoke functions as endocrine disruptor (Bansal, <i>et al.</i> , 2016).
3	<i>Azadirachta indica</i>	Neem	Nimba	Azadirachtin	Its wood fumes reduce the concentration of fungal load (Chaube, <i>et al.</i> , 2020).
4	<i>Bauchanania lanzan</i>	Chirongi	Akhatth	α-pinene, sabinene, β-myrcene, limonene, 1, 8 cineole, α-terpinene, terpinolene, linalol, linalyl acetate, terpinen-4-ol, α-terpinylacetate, β-terpineol, geraniol, geranial, β-caryophyllene, cis-trans farnesol, cis-cis farnesol	Useful in memory enhancement (Neelakanth, <i>et al.</i> , 2015).
5	<i>Elettaria Cardamom</i> L.	Elaichi	Ela	α-pinene, sabinene, β-myrcene, limonene, 1, 8 cineole, α-terpinene, terpinolene, linalol, linalyl acetate, terpinen-4-ol, α-terpinylacetate, β-terpineol, geraniol, geranial, β-caryophyllene, cis-trans farnesol, cis-cis farnesol	Its extract has improving hyperactivity (Makhija, <i>et al.</i> , 2011).
6	<i>Cedrus deodara</i>	Deodar	Amara	Cedrin, himachalol, himachalene and atlantone	Its bioactive compounds are used as pharmacological activities of its tree (Bisht, <i>et al.</i> , 2021). Its wood pieces are applied in <i>Agnihotra</i>
7	<i>Cinnamomum camphora</i> L.	Camphor (K Kapoor)	Karpura	Camphor, linalool, 1, 8-cineole, nerolidol, safrole, orborneol (Saxena, <i>et al.</i> , 2007).	Burn as <i>Havan</i> material to clear body's breathing system quickly and person will feeling positive (elevated) feeling (Kaur, <i>et al.</i> , 2016).
8	<i>Coccus nucifera</i>	Coconut (Nariyal)	Narikela	Monounsaturated fatty acids	It potentially useful in scavenging free-radicals, helpful in preventing the pathogen of disease (Saxena, <i>et al.</i> , 2007).
9	<i>Commiphora wightii</i> Arn.	Guggul (Bdellium-tree)	Gugglu	Terpenes, sesquiterpenoids, cuminic aldehyde, eugenol and the ketone steroids Z and E, guggalsterone and guggulsterols I, II, III, ferulic acids, phenols and other non-phenolic aromatic acids (Saxena, <i>et al.</i> , 2007).	When burnt cause rain and purify the atmosphere. <i>Havan</i> ritual is like giving back to the atmosphere what we have taken from the atmosphere. The aromatic herbs when burnt remove the foul odour in the atmosphere by their fragrance (Nicoll, 2007).
10	<i>Crocus sativus</i> L.	Saffron (kesar)	Kumkuma	Crocetin (Chaube, <i>et al.</i> , 2020).	It prevents the impairment of learning and memory (Papandreou, <i>et al.</i> , 2011).
11	<i>Cyperus rotundus</i> L.	Nagarmotha (Motha)	Varida	Cyperone (Chaube, <i>et al.</i> , 2020).	Antioxidant activities present in plant extract (Kalim, <i>et al.</i> , 2010).
12	<i>Eugenia caryophyllus</i> L.	Clove (Laung)	Lavanga	Eugenol, β-caryophyllene (Chaube, <i>et al.</i> , 2020).	Stimulates the circulatory system, reduces mental exhaustion, used to aid (Kaur, <i>et al.</i> , 2016).

13	<i>Ficus racemosa</i> L.	Fig (Anjeer)	Udumbara	Sterols, triterpenoids (Lanosterol), alkaloids, tannins, flavonoids, gluanol acetate, b-sitosterol	Useful in Alzheimer's disease, it also acts as memory enhancer and can be used in the treatment of dementia (Pravin, <i>et. al.</i> , 2012).
14	<i>Ficus religiosa</i> L.	Peepal (Bodhi tree)	Pippala, Aswatha	Eugenol, itaconic anhydride, 3-methyl-cyclopetane-1,2-dione, 2-phenylethyl alcohol, and benzyl alcohol	Methanolic extract of stem bark acts as an acetylcholinesterase enzyme inhibitor (Makhija, <i>et. al.</i> , 2010).
15	<i>Hedychium spicatum</i> Sm.	Kapur-Kachri	Shathi	Sesquiterpene alcohol (Romana, <i>et. al.</i> , 2020).	Used to treat swelling (Romana, <i>et. al.</i> , 2020).
16	<i>Mangifera indica</i> L.	Mango (Aam)	Aamra	PGG, polyphenolics, flavonoids (Chaube, <i>et. al.</i> , 2020).	When burnt releases formic aldehyde a gas which kills harmful bacteria's and purifies the atmosphere (Viswanatha, <i>et. al.</i> , 2013).
17	<i>Mesua serrea</i>	Nagkesar	Nagakesara	Sesquiterpene (Chaube, <i>et. al.</i> , 2020).	Its flower helpful to reduce the duration of seizures (overrunning) by electroconvulsive shock (Tiwari, <i>et. al.</i> , 2012).
18	<i>Myristica fragrans</i>	Nutmeg (Jaiphal)	Jatipatra	Myristic in and mace lignan	Helpful in dementia or Alzheimer's disease (Kaur, <i>et. al.</i> , 2016).
19	<i>Nardostachys jatamansi</i>	Jatamasi (Muskroot)	Tapasvini	Valerian, Valipotriates and GABA (Nam, <i>et. al.</i> , 2013).	Helpful in the treatment of many disorders or several activities including brain's hyperactivity, Parkinson's activity (Rao, <i>et. al.</i> , 2005).
20	<i>Nelumbo nucifera</i>	Phool m Makhana	Kalamam, Padma	N-nornuciferine (Chaube, <i>et. al.</i> , 2020).	It reduces the toxic extensor convulsion (Chowdary, 2013).
21	<i>Ocimum tenuiflorum</i> L.	Tulsi	Tulasi	Hyperlipidaemia, atherosclerosis	It is used as Ayurvedic medicine, to cure cough and cold, it possesses anti-diabetic properties (Verma, 2016). Its leaves are considered as sacred and also used as <i>Havan</i> ingredients.
22	<i>Prunus amygdalus</i>	Almond (Badaam)	Vatada	Aldehydes, ketones, alcohols, a pyrazine	It protects the skin from environmental disorders and boosts the natural repair mechanisms in skin, in Ayurveda it considered as nutritive for the brain and nervous system (Jazayeri, <i>et al.</i> , 2014).
23	<i>Pterocarpus santalinus</i> L.	Red sandal (Laal chandan)	Rakta-chandana	Pterocarpol, santalins AandB, pterocarptriol, ispterocarpolone, pterocarpodiolones with α -eudeslol and cryptomeridol	Paste of sandal acts as a cooling agent for treating inflammations and headache, mental abnormalities and ulcers (Kumar, 2011).
24	<i>Rosa indica</i> L.	Rose (Gulab)	Taruni	Rose water	Used to treat eye disease
25	<i>Santalum album</i> L.	White Sandal (Chandan)	Chandanam	$\acute{\alpha}$ and $\grave{\alpha}$ santalol (Biradar, <i>et al.</i> , 2009).	It improves memory and induces concentration, keeps brain cool and relaxed and saves from undue stress, anxiety (Kaur, <i>et al.</i> , 2016).
26	<i>Sesamum indicum</i>	Sesame seed (till)	Tila	1-(5-methyl-2-furanyl)-1-propanone (Chaube, <i>et al.</i> , 2020).	Important part of <i>Havan Samagri</i> effective on the neuro-physiological processes i.e., learning and memory processes (Zare, <i>et. al.</i> , 2011).
27	<i>Tinospora cordifolia</i>	Giloy/ Amrita	Guduchi	Alkaloid, terpenoids, lignans, steroids	It is an essential herbal plant of Indian system medicine to cure fever, urinary, leprosy, diabetes related problems (Sharma, <i>et al.</i> , 2019).
28	<i>Valeriana wallichii</i>	Tagar (Jatamasi)	Valerian	Valerian (Chaube, <i>et al.</i> , 2020).	Helpful in improving learning power as well as memory and in Alzheimer's disease (Nam, <i>et al.</i> , 2013).

29	<i>Ziziphus mauritiana</i>	Indian plum (Ber)	kola, badara, kol?	Flavonoids, saponins, tannins, vitamin A, vitamin B (Chaube, <i>et al.</i> , 2020).	Helpful for enhancing hyperactivity of brain as well as in improving the memory and concentration (Pahuja, <i>et al.</i> , 2011).
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caryophyllus, *Ficus racemosa*, *Hedychium spicatum*, *Myristica fragrans*, *Ocimum tenuiflorum*, *Pterocarpus santalinus*, *Santalum album*, *Sesamum indicum*, *Tinospora cordifolia*, *Valeriana wallichii* and *Ziziphus mauritiana* are used to cure diarrhea, fever, liver disorder, kidney problem, rheumatism and Alzheimer's diseases (Sharma, *et al.* 2014; Verma, 2016; Zare, *et al.*, 2019; Romana, *et al.*, 2020).

Medicinal smoke released at high temperatures has been considered to be the simplest way to control a drug as a rapid pharmacological action can be detected upon inhalation (Nautiyal, *et al.*, 2007). More ever another study has detailed the beneficial effects of medicinal smoke emanating from single and multi-herbal formulations from 50 countries (Mohagheghzadeh, *et al.*, 2006). *Yagya* (Agnihotra) which includes medicinal herbs known as *BheshajYagya* (Verma, *et al.* 2018). It is a healing process-heal the atmosphere, and the healed atmosphere will heal you (Limaye, 2019).

Yajurveda promoters perform *Havan* every day, morning and evening to achieve divine illumination, mental peace, and purification of the mind and environment (Tewary and Mishra, 1997). This practice was losing its virtue in the society but after the pandemic happened it started to gain the limelight again. During the time of COVID-19 many people used it, for curing disease. In Germany, the *Agnihotra* experiment counted for microbial count, blood pressure, asthma, diabetes, stress, and anxiety relief as a result a smaller number of microbes were found and it can help to reduce these pre-existing conditions.

Conclusion

The study has concluded that this region of the Himalaya is full of many medicinal plants which are used in various home remedies and religious rituals since the Vedic period. Along with highlighting these through research, employment measures can also be taken through their cultivation by

creating awareness in the local communities. In this way these plants can be preserved and can also be used traditionally.

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