



Formulation, composition and therapeutic properties of some plants applied in herbal *havan* material in kumaun himalaya

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Abstract: In India, a variety of medicinal and fragrant plants have been used to perform Havan since the time immemorial. It is believed that organizing Havan or Homa brings happiness, peace and prosperity in the family. Its social and scientific importance has also been mentioned in the Vedas. It is also mentioned in the Vedas that when aromatic plants are burnt in the sacred fire (Havan), different types of aromas are released from it. These aromatic fumes are beneficial in destroying the airborne microorganisms present in the surrounding environment which cause diseases in the human body and animals. Apart from this, the smoke of Havan also destroys many types of plant pathogens. In the present investigation, a total of eight incense plants of Kumaun Himalaya have been studied. These plants were collected during field surveys. Thereafter, herbal Havan material was prepared in the laboratory. A composition and formulation of crushed parts of incense plants was prepared using traditional methods. The need for conservation of these important plants in the area and their cultivation in large quantities was also discussed. Apart from this, the therapeutic uses and chemical properties of these plants were also studied.

Key words: Incense plants, formulation, Havan material, therapeutic uses, study area.

1. INTRODUCTION:

Vedas are repositories of divine knowledge in the form of hymns and verses written in *Devanagari* script Sanskrit between 7500 to 4000 BCE. They reveal truth perceived by our sages through the ages millions of years ago. According to Indian Mythology, *Havan* is a significant practice of the ancient period which was performed many times in a day by the people of Vedic society. It is performed for peace, happiness and prosperity; therefore, it has special significance in Indian rituals. But at present, it is organized during the worship of only a few ceremonies and other occasions. Medicinal plants are also applied to prepare traditional incense in hilly areas of the herbal state Uttarakhand. These plants release aromatic substances used in the preparation of incense. This aromatic substance is burned for its pleasant smell. These plants are valued for their aromatic compounds, which may be present in various parts such as roots, leaves, flowers, seeds etc. During the *Vedic* age fragrant plants of the Himalayan region were offered as sacrifices by our great sages. In this way, through *Havan* practice, they wanted to keep the surrounding environment healthy from harmful aeromicroflora (Dubey, 2021). The aeromicroflora (plant pathogens) cause many diseases like leprosy, intestine disorder, ringworm, cough, cold, phlegm etc. in human as well as animal bodies (Dubey, 2020). Treatment of such various diseases is possible by burning medicinal plants in *Havan* and the fragrant fumes generated from it. Our great sages used to inhale the aroma of such plants in various ways during their penance and meditation. Through this they gained divine knowledge, a healthy and long life.

Pant (2001) studied the medicinal plants of Central Himalaya and suggested some plants for their cultivation including four species of incense yielding plants viz. *Ocimum calimendaskarium* (Kapoor Tulsi), *Artimisia valoris* (Dabana), *Doronicum royali* (Darunaj-Akarbi) and *Valeriana jatamansi* (Tagar/Shamioh). He stated that these incense plants can generate income in hilly areas of Kumaun-Garhwal by conducting aromatic plant development programs.



The hilly state Uttarakhand is blessed with thousands of species of plants, however about 320 species have been identified in terms of their medicinal value. Therefore, the state was declared as a 'Herbal State' during 2003. The forest department claims to have knowledge about 175 species, which are being commercially extracted and traded. These plants contribute to the economy of the region.

Rawat and Pangtey (1987) conducted the ethnobotanical survey in alpine regions of Kumaun and observed that the leaves and inflorescences of *Artemisia edgeworthii* (Pati) mixed with butter used to prepare local incense; aromatic roots of *Juniperus macrocephala* (Dhoop batti/Johar) largely collected for preparing Dhoop; *Nardostachys jatamansi* plant (Mansi), roots and leaves of *Pleurospermum angelicoides* (Gogal); leaves of *Rhododendron anthopogon* (Kulu Kutti) are also used to prepare local incense. Similarly, Singh, et al. (1990) mentioned that the leaves of *Cedrus deodara*, *Cupressus torulosa*, *Juniper communis* (Billa/ Johar), twigs and dried leaves of *J. recurva* (Buch-Ham) are also used as incense in Garhwal and Kumaun region. In addition to this Kumar, et al. (2007) studied the ethnobotany of religious practices of Kumaun *Havan* and described 17 incense plants of the area.

The present study focused on such common medicinal and incense plants which are found in Kumaun region of Uttarakhand. These plants are traditionally used by the local inhabitants for preparing herbal *Havan* material. A detailed account of their composition and formulation of traditional *Havan* material has also been discussed.

2. MATERIALS AND METHODS:

Collection of plant material: The fresh specimens of incense plants were collected during September to November 2023 in five different areas of Kumaun Himalaya. These collection localities are Botanical-garden, SSJ University campus Almora, Dabar Ghatti (Ranikhet), Sangar (Bageshwar), Milam (Pithoragarh). All the samples were collected from shady places of forest as well as cultivated land. Collected samples were kept in cotton bags and brought to the laboratory for further study (Fig. 1).

Identification and herbarium preparation: All the specimens were identified through available literature and their herbarium was prepared. The voucher specimens were preserved at Biodiversity and Conservation Laboratory, Department of Botany, SSJ University Campus Almora (Uttarakhand). Literature was also consulted for medicinal properties of each selected plant.

Screening and cleaning: Visually inspect the plant material, checking for any signs of contaminants. Cleaning roots-containing plants by thorough washing to eliminate the soil particles and dust (Fig. 2).

Fresh weight: Weigh each plant material individually to note their fresh weight using a weighing machine (Fig. 2).

Drying: Spread all materials on a flat surface and subject them to shade drying at room temperature for a duration of two weeks (Fig. 3).

Grinding: Utilize a mortar and pestle for individual grinding of each plant material post-drying.

Dry weight: Estimate the powdered plant material individually as dry weight using a weighing machine (Fig. 2).

Packing and labeling: Pack the processed plant materials securely. Label each package with accurate identification including plant name, date of collection and dry weight (Fig. 4 & 5).

Composition of Herbal *Havan* material: All the powdered material was mixed as per the ratio of their availability in the field. For formulation and composition of all the material, their dry weight was considered (Fig. 4 & 5).

Study of chemical compounds present in selected incense plants: The chemical composition of selected incense plants was also studied through secondary sources of information.

3. RESULT AND DISCUSSION:

An account of indigenous plants for preparing herbal *Havan* material and their therapeutic uses: During the study total eight incense plant species were identified. These species are considered for preparing traditional *Havan* material in the region (Table 1; Fig. 1 to 5). All these plants were collected from different places of Kumaun. Out of eight, maximum five species such as *Tinospora cordifolia*, *Citrosa geranium* (Geranium), *Artemisia vulgaris*, *Tagetes erecta* and *Rosa indica* were collected from the Botanical Garden of SSJ University Campus Almora. These plants are abundantly grown in this botanical garden. Therefore, fresh samples of these five plants were collected from the botanical garden to prepare herbal *Havan* material. Besides, incense ingredients *Valeriana jatamansi* were also collected from sidewalls of agricultural fields at Dabhar Ghatti (Ranikhet) region while fresh leaves of *Skimmia laureola* were collected from Sangar region situated at 520m altitude of Bageshwar district. In addition to this, fresh seeds (berries) of *Juniperus indica* were also collected from Milam village of Pithoragarh district. In Kumaun, this evergreen aromatic plant of family Cupressaceae is distributed in forest areas between 1700-4200m altitude (Adams, 2004).

Among these *Tinospora cordifolia* is a highly medicinal plant. Fresh stem of this herbaceous climber was collected for preparing local incense. It is cultivated through cuttings of its mature stem. It has been used as a Ayurvedic



medicine to cure fever, jaundice, diarrhea, cancer, dysentery, bone fracture, pain, asthma, skin disease, poisonous insect, snake bite, eye disorders (Parthipan, et al., 2011). During the study its stem crushed powder was applied for making *Havan* material.

Roots of *Valeriana jatamansi* herb also possess various aromatic substances and powder of its whole plant was considered for incense. In the study area, it occurred naturally mainly at shady places in forests as well as in cultivated land in temperate regions. It has multiple medicinal uses including insect repelling and anthelmintic properties (Jugran, et al., 2019).

The herbal shrub *Skimmia laureola* is also used as *Havan* material in the region. It is locally known as *Kedarpati*, *Nair-Thuner*, *Nair* or *Dhoopa* plant. Its leaves are crushed for making local *Dhoop*. Different parts of *S. laureola* are also used in the remedy of many diseases including stomach and body pain, dysentery, nausea, small fox, flu and diabetes (Muhammad, et al., 2013; Bhalla, et al., 2021).

Extract of *Juniper* berries has traditionally been employed as diuretic, anti-arthritis, anti-diabetes and antiseptic, purpose Raina, et al. (2019). During the study, powder of seed-berries of *J. indica* was also mixed to prepare *Havan* material.

Leaves of *Citrosa geranium* plant were also collected from the Botanical Garden of SSJ University Campus Almora. Geranium plant is grown by some of the locals in their gardens and flower pots. The ferny fragrant leaves of this perennial sub shrub are also applied to prepare *Havan* material in the region. It is also known as the Mosquito plant. This plant is helpful in aromatherapy as a relaxant, reducing blood pressure in vivo, for stress released conditions like dermatitis, asthma, intestinal problems and headaches.

Artemisia vulgaris is also found in domestic areas. The leaves of this plant are applied in the preparation of traditional *Havan* material in the region. Locally the plant is known as Paati or Kurnj. *A. vulgaris* is also used in traditional Chinese medicines as an analgesic, in acupuncture therapy, in neonatal jaundice, in gastric ulcers, in hepatitis and convulsive crisis (Eluz and Ozer, 2023). It also has an immunomodulatory effect. It also possesses antitumoral components.

Both *Tagetes erecta* and *Rosa indica* are two important flowering plants of the region. Their flowers are considered very auspicious and offered to the deity on different occasions. The fresh petals of their flowers were collected during the study and their powder was applied with the incense ingredients. Its marigold flowers are applied in folk medicine to cure cardiovascular and renal disease, there is no study about its diuretic effect (Zanovello, et al., 2021).

The flowers of the rose plant are the symbol of love and beauty. Besides incense, it is also used medicinally to treat diarrhoea, asthma, leucoderma and inflammation of the mouth. Its creams of essential oil are used to take care of dry skin. Rose oil is extensively used in the cosmetic industry (Chahar, 2016).

Formulation of traditional *Havan* material

In rural areas of Kumaun, people collect various fragrant plants found in the area to prepare *Havan* material. After this, various aromatic parts of the plants are cleaned and kept in a vessel or basket and dried in the shade. Later on, these dried aromatic parts are crushed and the powder is prepared (Fig. 4 & 5). While using it in *Havan*, ghee, barley and sesame seeds are also used together to make it more fragrant (Fig. 5).

Composition of *Havan* material in the laboratory

During the study, the traditional method of Kumaun was applied to prepare herbal *Havan* material. For this purpose, eight selected aromatic plant species were used traditionally (Table 1; Fig 1 to 6). Dry part of each plant was used as raw material and crushed separately in the Vedic Microbiology Laboratory, Department of Botany, SSJ University Campus Almora. The raw material of the plants was considered as per their availability in the region. The crushed powder of each plant was kept in separate petri plates (Fig. 1-6). Aromatic parts of *T. cordifolia* and *J. indica* were found in high quantities in the field represented by 1000g fresh weight of each. Hence proportion of their dry weight was kept high in the incense composition also and represented by 28.89 and 26.62g/100g incense. Thus, the share of these two major species in the preparation of whole *Havan* material was higher about 28.89% and 26.62% (Table 1; Fig. 6). In earlier studies it was observed that *T. cordifolia* possesses phenolic and flavonoids content and inositol, 1-deoxy-, trans-sinapyl alcohol, n-hexadecenoic acid (Modi, et al., 2021) whereas *J. indica* contains sabinene, terpinen-4-ol, α -pinene and γ -terpinene (Lohani, et al., 2010).

However, *V. jatamansi* also contribute next major proportion about 12.55% but its dry weight was found lower or approximately half (165g) as compared to dry weight of first two major contributors i.e. *T. cordifolia* and *J. indica* (Table 1; Fig. 6). An important compound valerian is derived from *V. jatamansi* (Chaube, et. al., 2020). This medicinal agent is used to treat neuropsychiatric disorders (Krystal, 2001).



Besides, *T. erecta* and *S. laureola* also share medium quantities of dry incense material about 14.44% and 8.37% respectively. Study of Laosinwattana, et al. (2018) reported that monoterpenes, piperitenone and ocimine are found in *T. erecta*. Monoterpenes are relevant for the pharmaceutical, cosmetics, agricultural and food industry (Eberhard, 2006) whereas piperitenone shows antioxidant activity (Jurner, et al., 1980) and ocimene is responsible for fragrance formulation and also used as synthesis material. Similarly, *S. laureola* contains linalyl acetate, linalool, α -terpinyl acetate, α -terpineol, geranyl aceta, dictamnol, myrcene, neryl acetate, neoiso-dihydrocarveol acetate and farnesyl acetate (Pandey, et al., 2015).

In comparison to higher and medium contributors, rest of the three species of incense plants i.e. *Citrosa geranium*, *Artemisia vulgaris* and *Rosa indica* share lower dry weight and represent about 5.32%, 1.91% and 1.90% respectively. Their dry weight was recorded as less than 100g, therefore these added in lower quantities in the composition of per 100g *Havan* material (Table 1; Fig.6). Geranium contains geraniol, citronellol, isomenthone, and linalool (Tucker, et al., 1996) whereas *A. vulgaris* possesses monoterpenes and sesquiterpenes (Zhigzhitzhapova, et al., 2016). However, *R. indica* also essential for acetic acid, mercaptohexyl ester, butanoic acid, 2-methyl-5-oxo-1-cyclopentene-1-yl ester, artemiseole, methyl santonilate, isosteviol, caryophyllene oxide, pentyl phenyl acetate, dihydromyrcene, 1,5-octadecadien, octadecanoic acid, ethyl ester, palmitic acid (Rasheed, et al., 2015).

Conservation and domestication of medicinal and aromatic plants

Medicinal and aromatic plants, particularly herbs, are very delicate and weak. They require a suitable environment and high-quality care to grow. Recently, due to diseases like Covid-19 pandemic, the need for these plants with medicinal properties has increased further. Therefore, this is the opportunity to conserve these plants. Through the present study people will become aware of cultivating them. It will support their livelihood by preparing traditional incense and medicines. People understand the importance of these medicinal plants and can conserve them by cultivating them. In this context, five species of incense plants have been propagated to some extent by the Department of Botany, SSJ University Campus Almora. Apart from this, the domestication of *Juniperus indica* is being carried out by the villagers of Milam region of Pithoragarh district.

4. CONCLUSION:

It is concluded that local inhabitants can contribute to conserving these high-value medicinal plants through their domestication. Medicinal plants such as *Taraxacum officinale*, *Verbascum*, *Artemisia vulgaris* and *Anaphalis nubigena* are some of the high value species which are found abundantly in the high-altitude regions. Therefore, domestication of such plants is also important. Study concluded that a collaborative approach with the local communities is required. There is an urgent need for documentation of indigenous knowledge and also the people should be made aware about the ethical guidelines of medicinal plants. Domestication of these important medicinal and aromatic plants will improve the economy of the inhabitants and these valuable resources can be utilized appropriately.

Table 1: Composition of *Havan* material using different parts of the herbal plants cultivated in the study area

Medicinal Plant	Part used	Fresh weight (g)	Dry weight (g) at room temperature	Crushed powder for composition of <i>Havan</i> material per 100g
<i>Tinospora cordifolia</i> (Willd.) Hook.f. & Thomson	Stem	1000.00	380.00	28.89
<i>Valeriana jatamansi</i> (D. Don) Wall.	Root	900.00	165.00	12.55
<i>Skimmia laureola</i> (DC.) Decne.	Leaves	250.00	110.00	8.37
<i>Juniperus indica</i> Bertol.	Seeds	1000.00	350.00	26.62
<i>Citrosa geranium</i> (<i>Pelargonium citrosium</i> Voigt ex Breiter)	Leaves	200.00	70.00	5.32
<i>Artemisia vulgaris</i> L.	Leaves	100.00	70.00	1.91



<i>Tagetes erecta</i> L.	Flowers	600.00	190.00	14.44
<i>Rosa indica</i> L.	Flowers	250.00	25.00	1.90

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Valeriana jatamansi



Juniper indica



Rosa indica



Tinospora cordifolia



Artemisia vulgaris



Tagetes erecta

Figure 1, Collection of different medicinal and incense plants



Figure 2, Screening, cleaning and weighing of plant material



Figure 3, Drying of plant material at room temperature



Figure 4, Crushed material of different medicinal plants



Figure 5, Herbal Havan material ready to use

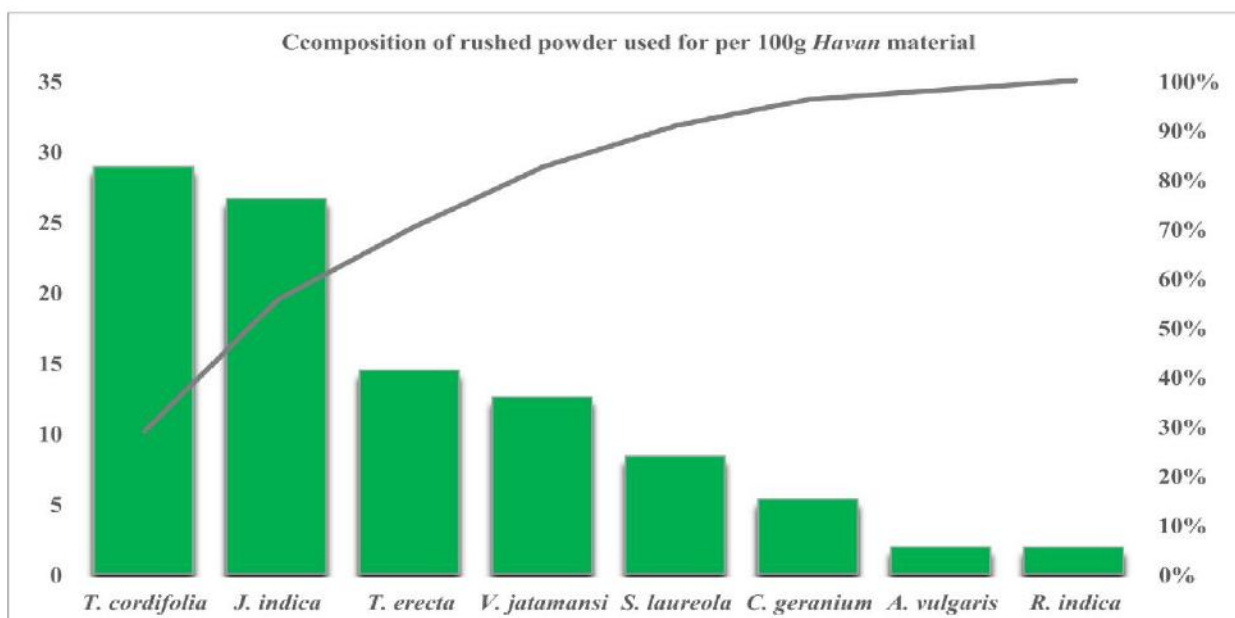


Figure 6, Graph showing composition of crushed powder of different incense plants

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