

Antimicrobial activity of Hawan samagri against pathogens

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Abstract- In India majority of people practise's an ancient ritual almost on every occasion in their homes, which is commonly known as 'Havan'. Hawan is a Sanskrit word which refers to any ritual that involves making offerings into a consecrated fire. During the ritual special herbal/plant medicinal preparations (*Hawan samagri*) are offered in the fire of medicinal woods ignited in a specially designed inverted pyramid shaped fire pit or container (called agni-kunda). Fire lead to sublimation, chemical conversion and/or transformation into vapour phase of the herbal/plant medicinal preparation leading to release of medicinal phytochemicals. This ritual is supposed to clean the environment as well as to cleanse the body from the toxins. Hawan fumes are not only used for the disinfection of air but also it can be environmentally oppressed for the physical, mental, intellectual and spiritual development. It is the easiest way, least taxing, least risky and most effective way for administering a medicine so as to reach every single cell of the body. Havansamagri is the key content to perform the havan, which is a mixture of herbs of superior quality like black till, Kapoorkachri, rose petals, long, kulinjan along with dhoop powders, sandalwood powder, lobaan, ghee, jaggery etc. This work aims to evaluate its

antimicrobial potential against *S.aureus*, *E.coli*, and *C.albicans* via well diffusion method and simultaneously evaluates the effect on air quality of the chamber before and after hawan.

Key words: Hawan, Hawan samagri, Ritual, Environment, Ayurvedic, Solvent extraction, Antimicrobial, Well diffusion method etc.

Introduction

Hawan is also known as yagya, yagna, or Agnihotra. It's being used from the Vedic era for preventing and treating various diseases and ailments, and also for refining and maintaining immunity for individuals. Yagya has numerous applications described in Vedic and Ayurvedic literature.

Yajurveda advocates performing of Hawan every day, morning and evening to attain spiritual enlightenment, mental peace, purification of the mind and environment^[6]. From time immemorial, human beings have used smoke of medicinal plants for curing disorders. Smoke produced from natural substances has been used extensively in many cultures and famous ancient physicians have described and recommended such use. Under the Saraswati-Indus civilization

7500 BC^[7], the great Rishis (saints) used to perform agnihotra-yagnas to purify the environment as described in Rigveda-the most ancient compilation of knowledge on earth by sublimating the *Hawan samagri* (mixture of wood with odoriferous and medicinal herbs) in the fire accompanied by the chanting of Vedic mantras described in Rigveda ^[8 & 9]. Smoke produced at high temperatures is considered as a simple way of administering a drug, which exhibits rapid pharmacological activity when inhaled. The sublimated vital elements and herbal medicines inhaled in Yagya first reach the brain, followed by lungs and other subtle components of the body^[10 & 11]. Thus, it has a direct healing effect on brain borne diseases and complexities. Ayurveda also recommended nasal route as a preferred mode of administration of drugs^[1].

Hawan is a scientific experiment in which special herbs (*Hawan samagri*) are offered in the fire of medicinal woods ignited in a specially designed fire pit called agnikunda. Hawan seems to be designed by the ancient scholars to fight with the diseases of the brain^[2-4]. The components of Hawan are having a number of volatile oils that are specifically useful for curing different diseases through one or the other mechanism of action. Due to high temperature of fire the vapours of these oils enter into the central nervous system through nasal route^[5]. A consecrated fire is the central element of every Hawan ritual however the procedure and items offered to the fire vary by occasions/ceremony or by the benefit expected from the ritual. The decomposition and transformation of specific substances in the yagya-fire enter

the human body in a gaseous form through the nose, lungs and the pores of the skin.

Nosocomial infections

Camphor purifies the air in the diffusive atmosphere and achieves various medicinal benefits when we inhale. It acts as a germ killer, mosquito and fly repellent and bounds spreading of the virus in that place. The chief ingredient in Hawan is mango wood (*Mangifera indica*) which when burnt releases formaldehyde a gas which slays harmful bacteria thus purifying the atmosphere. The jaggery burnt in the Hawan also releases the formaldehyde gas^[18].

Other health benefits

Medicinal-smoke intake can deliver benefits in curing ailments such as headache, disease related to sensory organs, migraine, hiccups, asthma, goiter, fungal infection, jaundice, cold, sneezing, insomnia, hair fall etc. The inhalation of medicinal-smoke of a specific herbal powder combination of neem leaves, bach, kooth, harad, saraso and googal ends high fever in patients. Inhalation of the medicinal-smoke of a specific herbal-powder combination made using neem leaves, bach, hing, sendhanamak, saraso was seen to destroy worms and pus^[19].

Hawan Samagri

Cow's Ghee

Benefits of burning Cow Ghee in Yagna are

- i) Purification of atmosphere,
- ii) Production of oxygen in environment,
- iii) Disinfects air and cleans environment,

- iv) Heal the respiratory system and clear any blood clots and bacterium affecting the nasal, lungs and veins and
- v) Helps in combustion process^[12 and 13]. The cow's ghee the very important ingredient of havan has been referred as an antidote to the poison in VEDAS.
- vi) Its fragrance purifies the physical atmosphere. Ghee when burnt in fire goes up in the atmosphere and the fat particles get laden on the dust particles in the atmosphere (somewhat similar to the stickiness on the objects in the kitchen) and comes back to the earth in form of rain thus nourishes the vegetation on the mother earth^[1].

Mango wood

The main ingredient in havan is mango wood which when burnt releases **formic aldehyde** a gas which kills harmful bacteria thus purifies the atmosphere. Formaldehyde is sprayed to disinfect walls and ceilings and is also used to preserve the fruits as formic acid which is produced by burning mango wood^[14].

Jaggery

The jaggery burnt in the havan also releases the formic aldehyde gas. Since, the formaldehyde is effective only in the presence of water that is why there is a ritual of sprinkling the water around the Havan-Kund and in the air. The water is also available in form of water vapours found in the atmosphere^[1 and 14].

Black sesame seeds

Black sesame is very rich in minerals and vitamins, often packed more densely than many other foods. Also, the crop is remarkably stable and hardy. Since it is

purported to drive away negative energy, during the funeral rites of ancestors, sesame is used. During the ancestral month (Before Durga Puja), it is used as daily food offering to Pitras^[15 & 16].

Camphor

Camphor, or *cinnamomum camphora*, is extracted from the *Camphor* tree, a close relative of cinnamon. Long considered a very sacred plant with healing powers. Spiritually, *camphor* is very healing. It can give you a sense of liberation from your obligations. *camphor* can also uplift the mood, especially to a higher, more spiritual vibration. As alternative medicine, *camphor* is especially useful for fighting colds and flu. The cool, pungent aroma of *camphor* can instantly clear the sinuses. *Camphor* is also useful for treating aches and pains in the muscles and joints^[1 & 17].

Barley seeds (Jau)

It may not be as popular as wheat or oats, but barley is called the "King of the cereals". Barley contains all nutrients that are vital for maintaining optimum health. It protects the heart against various cardiovascular diseases. It also protects the kidney, urinary tract, liver, bones, joints and ensures their normal functioning^[15 & 17].

Guggal

Antimicrobial herbs like guggal when burnt cause rain and purify the atmosphere. Havan 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^[9 & 17].

Table-1 Effects of various active vaporized constituents of *Hawan samagri* on human body.

Botanical name	Active component	Effects on human body
Coconut (<i>Cocosnucifera</i>)	Monounsaturated fatty acids, Saponins	Inhibit convulsions, increase GABA and, serotonin level
Sesame seeds (<i>Sesamumindicum</i>)	1-(5-methyl-2-furanyl)-1- propanone	Antioxidant, antimicrobial, anti- inflammatory, anticancer
Clove (<i>Eugenia caryophyllus</i>)	Eugenol, β -caryophyllene	Analgesic, antioxidant, anti- inflammatory, anxiolytic, anticonvulsant.
Nutmeg (<i>Myristicafragrans</i>)	Myristicin and macelignan	Reduce severity of seizures.
Mango wood (<i>Mangiferaindica</i>)	PGG, polyphenolics, flavonoids	Increase GABA levels, anticonvulsant action.
Kulinjan (<i>Alpiniagalanga</i>)	1,8-cineole , α -fenchyl acetate.	Antioxidant,anti-bacterial ,expectorant ,anti-fungal
Ashwagandha (<i>Withaniasomnifera</i>)	Withaferin, withanone(withanolides) ,Saponins,sitoinosides, acylsteryl- glucosides	Anti-stress agents, Neuroprotective agent
Cardamom (<i>Elettariacardamomum</i>)	1,8-cineole, flavonoids, esters,terpenes	Antiseptic, anti-stress agent

Material and Methods

Collection of the material

Herbs used in making the *hawan samagri* were provided by Himalaya wellness company.

Mixing of the *hawan samagri*

List of the ingredients used are mixed in the ratio as mentioned (Table-2).

Table-2 Ingredients used

Content	Per 500g
Kala til	250g
Jau	75g
Coconut powder	45g
<i>Camphor</i>	5g
Long	15g
Green cardamom	10g
Guggal gum	35g
Nutmeg (<i>Myristicafragranus</i> +taizpatta+ misri	15g
Kulinjan + Ashwagandha	50g

Other additives used- Mango wood, cow's ghee

Methodology

i) *Hawan* experiments was performed using experimental chamber setup to determine its impact of medicinal fumes on air quality

ii) Anti-bacterial activity of the herbal mixusing well-diffusion method.

Experimental chamber to perform the experiment.

1. Hawan chamber of space 6.5ft x 5ft x 7ft, the whole setup was designed within a brick and cement walled room.
2. Nutrient agar plates were prepared and openly exposed plates placed at the four corners of the chamber for 4 hours before hawan.
3. Hawan was performed inside the chamber, the fumes were retained in the chamber for 1 hour.
4. After completion of 1 hour of hawan nutrient plates were placed exposed in same four corners positions for 4 hours.
5. Plates were incubated for 12-24 hours at 30-35°C in incubator.

Determination of anti-microbial activity-

The sample mix was dried and coarsely powdered in the grinder. After that solvent extraction method was used for preparing the extract. 50g mixture was added in 250 ml of solvent and conical was kept on shaker for 6-7 hours. After completion, the extract was filtered using filter paper. The collected extract was then concentrated on water bath for making up the final volume. Three extracts was prepared using methanol, hexane and aqueous

Well-Diffusion method

Pre-inoculated nutrient agar media was poured in petridishes, the plates were allowed to cool and settle inside the laminar air flow. After the plates get solidified well was made using a well cutter. And 100µl sample was loaded in the well. The inoculated plates were incubated in incubator at 30-35°C for 12-24 hrs.

Results and discussion

Laboratory tests were directed by exposing petriplates having agar media in a closed room before and after fumigating 'Hawansamagree'. Results displayed substantial decrease in concentration of microbial load. This method can be successfully applied at actual work places like small flour mills, ginneries, cobbler shops etc.

The fumes lead to purification of air by oxidizing the carbonic compounds and along with that they have antimicrobial properties which benefit the people around.

1- Air monitoring results

Table-3 Plate count data

Sno	Before hawan	After hawan
1	80	42
2	110	60
3	90	45
4	115	80
5	109	75
6	100	50

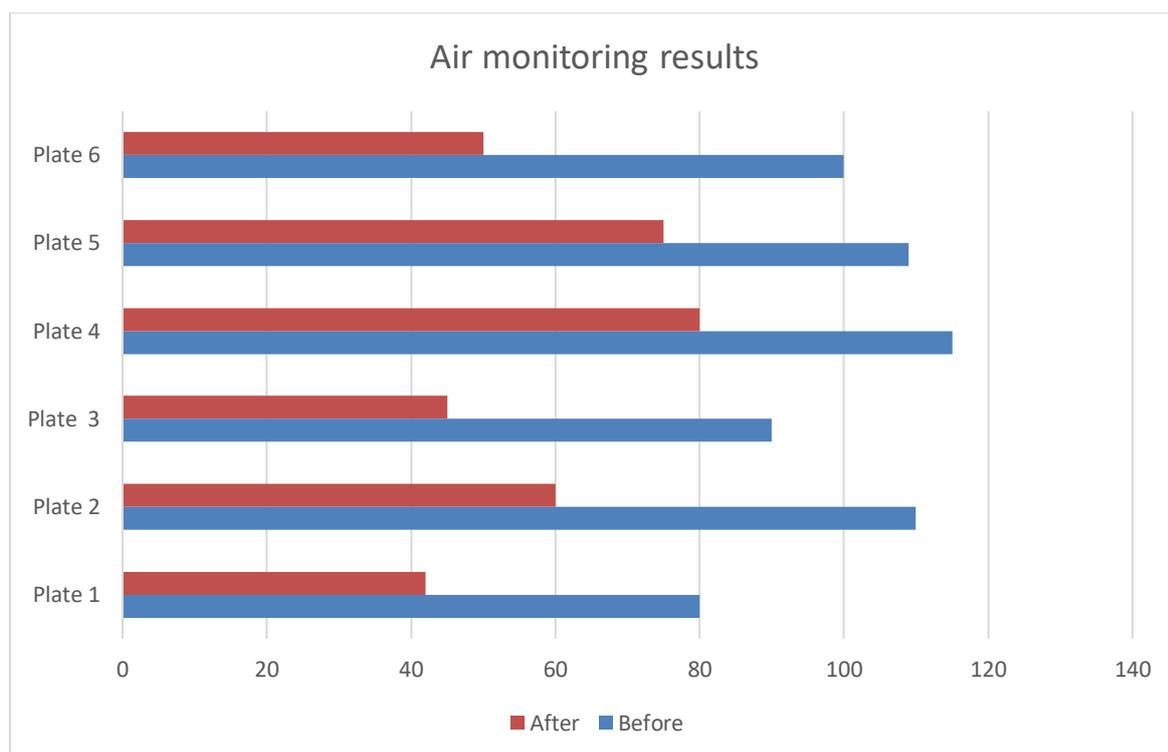


Figure-1 As the this can be seen from the above data (fig-1), decrement of at atleast 50-60% was observed in the microbial load of the air in the chamber after hawan

Table-4 Antimicrobial activity results.

Solvent	<i>S.aureus</i>	<i>E.coli</i>	<i>C.albicans</i>
Methanol	26mm	22mm	16mm
Hexane	NA	18mm	11mm
Aqueous	28mm	23mm	10mm
Ash methanol	10mm	20mm	17mm
Ash aqueous	16mm	10mm	NA
Positive Control	31mm	32mm	30mm

Conclusion

From our study and the results, we can conclude, that this mixture have so much potential including health benefits. The mix was found active against tested pathogen, as the extracts showed zone of inhibition against, *S.aureus*, *E.coli*, and *C.albicans*. Even after burning completely the hawan samagri ash do possess antimicrobial activity against the pathogens. This herbal mixture can be used as a

replacement of our chemically prepared antibacterial room freshener sprays if it is used on a regular basis. Therefore, the development of therapeutic agents from indigenous resources will be of great help and further exploration in this direction is needed.

Disclaimer Statement

Authors declare that no competing interest exists. The products used for this research are commonly used products in research.

There is no conflict of interest between authors and producers of the products.

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