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Abstract:

Concept of disease prevention is becoming a global concern and Ayurveda provides comprehensive understanding for the same. Ayurveda classics have described many preventive methods in context of *Sadvrutta* (Code and conducts), *Rutucharya* (Seasonal regimen), *Dincharya* (Daily regimen). *Dhupana* (Fumigation) is one among such preventive methods, incorporated in *Sutikagar* (Labour room), *Kumaragar* (Pediatric ward), *Vranitagar* (Trauma center) etc. Ancient scholars have mentioned *Dhupana* in scattered manner but Kashyapacharya has given the utmost importance to it and created a separate chapter named *Dhupakalpadhyaya*. In which, *Dhupana Yogas* (Fumigatory preparations) has been listed with its specific effect. In many countries formaldehyde has been used for fumigation, but safety and efficacy concerns have highlighted the need for alternative methods. Even some consider formaldehyde as a potential human carcinogen, hence since 2007 formaldehyde production and sales completely banned in some European countries. Review of *Dhupakalpadhyaya* has been done to find effective, easy to prepare and easy to use *Dhupana Yoga*. In classics, different materials were used for different disease conditions, but all the materials are not easily available in present era. So, a broad spectrum *Dhupana Yoga* has been searched from *Samhita* which can be easily prepared and utilized as per need.

Keywords: *Dhupana*, Fumigation, Kashyapa Samhita

Introduction:

The decontamination of enclosed environments is an important consideration for the control or remediation of pathogens and environmental contaminants in industrial, research and healthcare facilities [1]. One cannot deny that, the chemicals like formaldehyde, which kills microorganisms or insects, are toxic to human beings. So the challenge is always there to find better alternatives, so that the target organisms could be eliminated without adversely affecting human being.

In such condition, information hidden in our ancient Samhita becomes handy. Principle of fumigation was known to ancient Ayurveda and has been described in various classics during the treatment of *Jwara* (fevers) [2], insanity [3], obstructed labor and retention of placenta [4]. Kashyapa Samhita has a separate and detail chapter on fumigation called *Dhupakalpadhyaya*, which is original contribution of Kashyapa. Hence by keeping these things in mind objectives were set to collect various classical *Dhupana Dravya* from Kashyapa Samhita and to search an easy and

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effective *Dhupana Yoga* for present era.

Methods:

Present study is based on information which was collected through various authentic books, journals and research works. A compilation followed by critical review has been done address need of the hour.

Observations:

There are many preventive methods, mentioned in Ayurveda like *Sadvrutta* (Ideal regimen), *Dincharya & Rutucharya* (Seasonal regimen), *Homa Havan*, *Rasayana* (Rejuvenation) and *Dhupana*. Out of all above, *Dhupana* should be specially carried out by healthcare worker to prevent nosocomial diseases to society. As per *Dhupakalpadhyaya*, fumigations are illustrated to give success to physician, progeny to human beings and to cure all diseases [5].

Thus *Aaturagara* (Indoor patient department), Panchakarma procedure room, *Vranitagara* (operation theater), *Kumaragar* (pediatric care unit) and Ayurvedic Pharmacy should also be fumigated time to time, to ensure the zero contamination during procedure and drug preparation. The physician should also fumigate the clothes, bed and sitting-place of the patient [6].

Origin of *Dhupana* is said to be from Fire god Agni, who blessed sages with unique technique of fumigation to get rid of *Rakshasa* (Micro-organisms) [7].

There are three types of fumigations, on the basis of action, i.e. *Dhupa* (Fumigation), *Anudhupa* (Subsequent Fumigation) and *Pratidhupa* (Antifumigation) [8]. Strong fumigation is advocated in some disease condition called as *Dhupa*. Such strong fumigation may cause side effects, so it should be followed by subsequent fumigation known as *Anudhupa* and if any side effect occurs, to counteract Antifumigation *Pratidhupa* should be performed.

The physician should collect the material of fumigation during auspicious day like *Pushya* or *Maitra Nakshatra* (Constellation), from south-east quarter or northward direction with recitation the *Mantras* and performing sacrifice. Specialized worker should pound this fumigation material cautiously and then be fill in new earthen pot and keep in protected place. In this form the material is ready for use for specified conditions. After sanctifying with “*Vidhoorasi*” section, it should be used for protection of children and a special hymn should be recited.

Table 1 show that *Sarshapa*, *Vacha*, *Laksha*, *Hingu*, *Nimba*, *Guggulu*, *Vrihi*, *Tagara*, *Devadaru* and *Akshata* were used three or more times in the chapter. It shows the importance of these drugs in the formation of *Dhupana Yoga*. Most of the drugs are easily available in market and possess volatile oil as their active principles. Table 2 depicts that all the animal excretory products. Material mentioned in Table 3 might be used to increase the fumes and as a vehicle for main drug compound. In current time, it could be replaced with cow dung or coal. *Dhupana Yoga* mentioned in Table 4 can be utilized to achieve specific benefit in certain medical condition. But currently it is very tough to avail all the mentioned raw material and this could be the main reason that why *Dhupana* in not in daily practice now a day.

Discussion:

The concept of *Rakshasa* and *Bhuta* are closely linked with Hindu mythology. In modern view, this can be compared with infectious agents who have impact on health due to known and unknown cause. The mythological origin of *Dhupana* and importance given to *Rakshoghna Vidhi* (like fumigations) in classics reveals the scientific sense of ancient scholars regarding the infections.

After observing the repeated use of certain drugs in the *Dhupakalpa*, a broad spectrum product could be prepared by the combination of those drugs. Anti infective property of the fumes of those drugs should also be confirmed by enough researches. As per shown in Table 2, many of *Jangama* material could be collected without hampering the rules and regulations of animal rights. But due to rapid decline in animal kingdom, some materials could not be collected easily. So in present era, certain *Jangama* materials like ghee, honey, goat milk, eggs of hen could be used due to easy availability and rest of material can be exempted from the pharmaceutical preparation of fumigation. Hair (including wool), nails, horns, scales, claws, shells, feathers and beak contains Keratin as a key structural component [9]. Keratins have intra- and intermolecular hydrogen bonds and large amounts of the sulfur-containing amino acid cysteine. Human hair is approximately 14% cysteine. The pungent smells of burning hair are due to the sulfur compounds. This sulfur might play the key role in the disinfection.

Table 1. <i>Sthavara</i> material used for fumigation in <i>Dhupakalpadhyaya</i> of <i>Kashyapa Samhita</i>	
Materials	Frequency of utilization
<i>Sarshapa</i> (<i>Brassica campestris</i> var. <i>sarson</i> Prain)	16
<i>Vacha</i> (<i>Acorus calamus</i> Linn.)	11
<i>Laksha</i> (<i>Laccifer lacca</i> (Kerr)	6
<i>Hingu</i> (<i>Ferula narthex</i> Boiss.), <i>Nimba</i> (<i>Azadirachta indica</i> A. Juss.), <i>Gugglu</i> (<i>Commiphoramukul</i> Hook.), <i>Akshata</i> (<i>Oryza sativa</i> Linn.),	4
<i>Tagara</i> (<i>Valeriana wallichii</i> Dc.), <i>Devadaru</i> (<i>Cedrus deodara</i> Roxb. Loud.), <i>Balaka</i> (<i>Pavonia odorata</i> Willd.), <i>Kushtha</i> (<i>Saussurea lappa</i> C.B. Clarke), <i>Surasa</i> (<i>Ocimum sanctum</i> Linn.)	3
<i>Pippali</i> (<i>Piper longum</i> Linn.), <i>Bhallataka</i> (<i>Semecarpus anacardium</i> Linn.f.), <i>Bilva</i> (<i>Aegle marmelos</i> Corr.), Both <i>Haridra</i> (<i>Curcuma longa</i> Linn. & <i>Berberis species</i>), <i>Padmaka</i> (<i>Prunus puddum</i> Roxb.), <i>Nameru</i> (<i>Ochrocarpus longifolius</i> Benth & Hook. F.), <i>Yava</i> (<i>Hordeum vulgare</i> Linn.), <i>Paripelava</i> (<i>Cyperus platystilis</i> Br.), <i>Jati</i> (<i>Myristica fragrans</i> Houtt), <i>Ela</i> (<i>Elletaria cardamomum</i> Maton.), <i>Ushira</i> (<i>Vetiveria zizanioides</i> Linn.), <i>Jatamasi</i> (<i>Nardostachys jatamansi</i> DC.), <i>Sarjarasa</i> (<i>Resina of Shorea robusta</i> Gaertn.)	2
<i>Vidanga</i> (<i>Embelia ribes</i> Burm. F.), <i>Patra</i> (<i>Cinnamomum tamala</i> Nees & Eberm), <i>Shileyaka</i> (<i>Parmelia perlata</i> Ach.), <i>Bhurjavarta</i> (<i>Betula utilis</i> D. Don.), <i>Choraka</i> (<i>Angelica glauca</i> Edgw), <i>Sukari</i> (<i>Dioscorea bulbifera</i>), <i>Shriveshtaka</i> (Oleo resin of <i>Pinus longifolia</i>), <i>Chandana</i> (<i>Santalum album</i> Linn.), <i>Shala</i> (<i>Shorea robusta</i> Gaertn.), <i>Musta</i> (<i>Cyperus rotundus</i>), <i>Shatapushpa</i> (<i>Anethum graveolens</i> Linn.), <i>Harenuka</i> (<i>Amomum subulatum</i> ROXB.), <i>Laja</i> (<i>Lathyrus japonicus</i> Willd.), <i>Kusha</i> (<i>Eragrostis cynosuroides</i> Beauv.), <i>Brahmi</i> (<i>Bacopa monniera</i> Linn.), <i>Vasuka</i> (<i>Calotropis gigantea</i> Linn.), <i>Svadamshttra</i> (<i>Tribulus Terrestris</i> Linn.), <i>Bhargi</i> (<i>Clerodendrum serratum</i>), <i>Keshara</i> (<i>Hibiscus abelmoschus</i> Linn.), <i>Shallaki</i> (<i>Boswellia serrata</i> Roxb.), <i>Putika</i> (<i>Pongamia glabra</i> Vent), <i>Aswagandha</i> (<i>Withania somnifera</i> Dunal), <i>Shirish</i> (<i>Albizia lebbek</i> Benth.), <i>Trunamula</i> (roots of <i>Panchatruna</i>), <i>Kalaguru</i> (<i>Aquilaria agallocha</i> Roxb), <i>Haratal</i> (Orpiment), <i>Manahshila</i> (Realgar)	1

Table 2. <i>Jangama</i> material used for fumigation in <i>Dhupakalpadhyaya</i>	
Materials	Frequency of utilization
Ghee	32 times
Slough of snake, Body hair of monkey, Hair of cow	3 time
Honey, Body-hair of goat, sheep and goat, Horn of sheep	2 time
Body hair of peacock, Hair of horse, donkey and camel, Urine and hair of donkey, Feces, body hair and hide of <i>Tarakshu</i> (bear), Scalp-hair of women, Feces of <i>Prasaha</i> Feces of <i>Bhasa</i> (a kind of vulture) and owl, Urine and feces of dog, Urine of donkey, Feces of <i>Grudhra</i> (vulture) and <i>Kaushika</i> (owl), Horn of cow, Hoofs of horse and elephant, <i>Shalyaka</i> (specific deer), Mongoose, Available nails of quadrupeds, Marrow, Fat, Milk of goat, Ivory, Egg of hen	1 time

Table No. 3 Other Materials used for fumigation in <i>Dhupakalpadhyaya</i>	
Materials	Frequency of utilization in this chapter
<i>Samghati</i> (a piece of monk's robe), Garland left-over from sacrificed for god	1 time

Table no. 4 Special Dhupana Yoga mentioned in Dhupakalpadhyaya		
Name of Dhupa	Dhupana Dravya	Benefit
Kaumara	Ghee, Sarjarasa, Krishnaa, Bhallataka, Shileyaka, both Haridras, Jatu, Usheera, Sarshapa, flowers of Arjaka, Vidanga, Tagara, Patra, Vachaa, Hingu and Balaka,	Increases progeny
Maheshwara	Ghee, Guggulu, Bilva, Devadaru and Nameru mixed with Yava	Eradicates <i>Grahas</i>
Agneya	Body-hair of cows mixed with Ghee	All the diseases specially of <i>Brahamana</i>
Rakshoghna	Ghee, Siddharthaka, Hingu, garland left-over from sacrificed for God, pieces of rice, slough of snake, a piece of monk's robe	Capable of killing the demons
Uttama	Ghee, Siddharthaka, honey, horn of sheep, milk of goat, urine and hair of donkey and Soma	Eradication of <i>Preta</i> and <i>Putana</i>
Dashanga	Ghee, white Siddharthaka, Kushtha, Bhallataka, Vacha, body-hair of goat, Tagara, bark of Bhoorja tree and Guggulu	In all the diseases specially in epilepsy, <i>Grahas</i> and <i>Upagrahas</i>
Moha	Ghee, white Siddharthaka, Choraka, Palamkasha, Sukari and Jatila	Unconsciousness
Varuna	Shriveshtaka, Laksha, Padmaka, Chandana along, Devadaru, Surasa and Shalaja	Beneficial during summer season, (and also in seizure of) <i>Shakuni</i> , <i>Pundarika</i> , <i>Revati</i> and in aggravation of <i>Kapha</i>
Chaturangika	Ghee, marrow, fat and Laksha	Used in the less vitiation of <i>Doshas</i> , in emaciated person, in child and in disease caused by <i>Graha</i>
Nandaka	Ghee, Vacha, feces, body hair and hide of bear, feces of the birds of prey	Provides pleasure
Kana	Ghee, Kana, husk of <i>Vrihi</i> , body hair and hide of monkey, Vacha, Sarshapa, Kushtha and Ela	Eradicates <i>Grahas</i>
Shridhupa	Ghee, slough of snake, Bilva, Sara, Siddharthaka and Jatu	Used in desire of glory and luster
Grahaghna	Urine and feces of dog, body hair of peacock, Vacha, Ghee and Sarshapa	Eradicates <i>Graha</i>
Virtuous (Punya)	Ghee, ivory, body hair of goat and sheep and horn of cow	For virtuous persons
Shishuka	Ghee, Siddharthaka, Jatamansi, Tagara, Paripelava, Hribera, Shatapushpa, Haritala, Manahshila, Musta, Harenuka and Ela	All the diseases and <i>Grahas</i> . This should be used in the form of principal, associated and subsequent fumigation.
Brahma	Ghee, Siddharthaka, Laja, Kusha, Brahmi	In all the diseases of <i>Brahmana</i> , <i>Kshatriya</i> and <i>Vaishya</i>
Subsequent (Prati)	Ghee, Padmaka, Ushira, Balaka, Keshara and Rasa	Beneficial in all the diseases
Arishta	Ghee, leaves-roots-flowers-fruits and bark of <i>Nimba</i>	It brings good fortune immediately
Ganadhoopa	Ghee, Akshata, flower of <i>Jati</i> , honey, Siddharthaka and Vacha	It removes pain of all living beings

As per Table 3, some additive materials should also be there to work as vehicle, anti infective material and fumigator. Cow dung could be the option for this purpose. Research work shows that cow dung extract possess potential antibacterial activity against some of the tested bacteria like Cyanobacteria, *Staphylococcus aureus*, *Bacillus subtilis* and *Escherichia coli* [10].

Out of all *Dhupana* material, *Ghee* could be the identical component of all *Dhupana Yoga*. *Ghee* helps in rapid combustion of cellulose of herbs and keeps the fire alight. Fatty acids volatilize easily. The combustion of glycerol portion gives acetone bodies, pyruvic aldehyde and glyoxal etc. The hydrocarbons produced in the reactions again undergo slow combustion and as a result methyl and ethyl alcohols, formaldehyde, acetaldehyde, formic acid and acetic acids are formed [11]. Along with above mentioned classical *Dhupana Yoga*, *Guggulu* is widely used in folklore practices in India. *Guggulu* is an oleogum resin that exudes spontaneously as a result of injury from the bark of *Commiphora Mukul* Hook. *Guggulu* is described as *Agni Sthana* and used for *Dhupa* in *Vedas*. In *Atharva Veda*, it is mentioned that *Yakshma* and other diseases will not spread to the areas fumigated by *Guggulu*. Sayana introduced it as a well-known *Dhupana Dravya* [12]. It was used for the treatment of diseases of cattle [13][14]. The materials used for *Dhupana* are not easily available in present era. So, a broad spectrum *Dhupana Yoga* has been found from *Samhita* for easy to prepare and easy to use purpose. Universal *Dhupana Dravyas* could be *Ghee*, *Sarshapa*, *Vacha*, *Laksha*, *Hingu*, *Nimba*, *Guggulu*, *Vrihi*, *Tagara*, *Devadaru* and *Akshata*, as these drugs were repeatedly used in *Dhupakalpadhyaya*. Along with these classical herbs, some binding agent and fragrance can be added for its pleasant smell along with effective action.

Conclusion:

Dhupana is very helpful to prevent diseases by disinfection of desired place. Universal *Dhupana Dravyas* are *Ghee*, *Sarshapa*, *Vacha*, *Laksha*, *Hingu*, *Nimba*, *Guggulu*, *Vrihi*, *Tagara*, *Devadaru* and *Akshata*. Binding agent and aroma can be added for its pleasant smell along with effective action.

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