RESEARCH ARTICLE

Received on: 10-06-2015
Accepted on: 15-06-2015
Published on: 21-06-2015

Corresponding Author
Dr. Joshi P
Vedvidnyan research centre,966/102Gokhale Nagar,Pune 411016
Email: prasadjoshi038@gmail.com

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Conflict of Interest: None Declared !

Role of dhupa as fumigation therapy in intramural environmental cleansing and sustainable conservation: a case study

Joshi P, Jogdand SB, Ingole AC, Laghate JK.
[1] Vedvidnyan research centre,966/102Gokhale Nagar,Pune 411016

ABSTRACT

Dhupa is a form of incense used in Hinduistic worship since times immemorial. During the Vedic period and establishment of Ayurveda ,it was used not only for spiritual purposes but also as a healing tool to cleanse the environment especially for disnfection of labour rooms and houses in that period.The present case study aims to explore the effects of burning a specially formulated Dhupa in the intramural environment.The pre-post changes in the aeromicrospora were studied using standardized devices such as Tilak Air Sampler, Rotorod air sampler and PDA culture media.

The primary investigations demonstrated statistically significant changes in the various types of aeromicropsora after burning the dhupa twice daily for three consecutive days. Similarly exposure of petri plate method revealed that after burning the dhoop there was not a single bacterial colony seen even after 5 days post exposure to Dhupa. From the preliminary study, it can be inferred that burning of the specially formulated dhupa has had significant role in reduction of various types of aeromicrospora within the intramural environment. Such a natural and bio compatible agent can potentially be used as a part of environmental cleansing and disinfection especially in the context of ever rising in house and external air pollution.

These findings of preliminary study have revealed and proved clearly that burning of dhoop have significant decrease in aerobacteriospoa & aeromycospora in the intramural environment at pune & cleaned or purifies the air which may help to design an ideal model for cleaning (sterilization) of environment, purification of air &conservation of sustainable environment. It may also help to develop feasible strategy for prevention of aerobiopollution which is always better than cure.

Keywords: Aeromicrobiota, Air samplers, Air sampling.

INTRODUCTION

Vedas are the soul of Indian culture and the crux of ancient Indian literature. By churning the knowledge of Vedas, the sages of ancient times invented "Dhupa Vidnyan" (Science of Dhupa). "Dhupa" is a form of incense where the incense paste is rolled in the formed of pyramids and logs and then dried. The Dhupa logs do not have the bamboo sticks as the common incense sticks(agarbatthis).For most Indians, incense remains an important part of the daily puja ritual, which is a religious offering performed by Hindus as a token of reverence to their deities. Burning of incense also transcended to China and South East Asia after the rise of Buddhism.[1,2] The smoke created by burning incense is believed to ward off demons and cleanse the surrounding environment. The modern, organized incense-making is strongly associated with the Ayurvedic medical system of India. The oldest source on Dhupa is the "Atharva-veda" and the "Rigveda." Incense-burning was used both to create pleasing aromas and as a healing tool. Its use in medicine is considered paramount in Ayurveda wherein Dhupa is used both as internal and external fumigation therapy known as Dhupana (Dhupa burning).[3,4]

In the current context of fast paced life style, rapid industrialisation and higher urban concentration of population our environment has been hugely deteriorated and contaminated by several pathogenic microrganisms. Hence, there is a rapid increase in the prevalance of air borne diseases such as cold, hay fever, asthma to swine flu over the past few decades. There is also rise in internal house pollution. Thus, it is imperative to think about safer and natural control measures to deal with this intramural air contamination by various microbes.[5]

Ayurvedic principles of Dhupa

The existence of organisms and their role in the cause of several infectious diseases have been well recognized and elaborated in Ayurveda along with modern science. Microbes known as 'Krumi' in Ayurveda includes all organisms covering wide range of infections and infestations. Since ancient era, Dhupana was used for labour rooms, operation theatres as well as wound management. It was part of Rakshoghna Vidhi (Preventive Procedure) for various surgical procedures mentioned elaborately in Sushruta Samhita.[6] In this In this various medicinal plants

were burnt on fire and the smoke generated from it used to make sterilization of different areas where chance of infections are more The classical text of Ayurvedic Paediatrics, Kashyapa Samhita describes in detail the role of Dhupa therapy ,both internal and external for health of the mother and infant post-delivery. The Dhupa not only disinfects the local area and the surrounding environment but also has a beneficial impact on growth, brain and immunity development of the child.[7]

Dhupa is prepared using prescribed guidelines and contains various liquid herbal extracts, dried powders as well as oils with potent bacteriostatic and bacteriocidal action. Considering the potential role of Dhupa therapy in cleansing the indoor environment, the present study was conducted to explore the effect of specially formulated Dhupa on aeromicrobiota.

Aims and objectives

The principal aim of the study was to assess the effect of burning Dhupa on aeromicrobiota using Rotarod , Tilak Air sampler and PDA culture sampling.

Materials and Methods.

For the purpose of the study, specially formulated 'RashiNakshaktra Yukta Vastu Dhupa' was used. A patented formulation by Ved Vidnyan research centre, this Dhupa contains 120 various herbs in the form of powders, oils and extracts such as *Commiphora, Ficus religiosa, Santalum album, Calotropis gigantea* etc having proven antimicrobial properties. One of the standpoints of this Dhupa is that it is a combination of principles of Ayurveda Herbology, Indian Astrology and Vedic Science. The Dhupa was prepared using powers of full moon, new moon, 7 days of week, 30 tithis(lunar days) of a month, 27 lunar mansions, 9 planets, 12 zodiac signs and their deities along with the herbal elements.

This was a detailed case study of a house located in the suburban area of Pune done for a period of 3 days. Ved Vidnyan Dhupa was burnt for 45 minutes continuously in the house in the morning and evening. Air sampling was done using Volumetric Tilak air sampler (Tilak and Kulkarni, 1970) Rotorod air sampler (Perkins (1951) modified by Harrington1957) and petri plate culture method using PDA media. Tilak air sampler was continuously used for 3 days and Rotorod sampler was used during three consecutive days for 15min each (before & after the burning Dhupa) in these aerobiological investigations. Petroleum jelly coated cello tape were fixed on rotating drum of Tilak air sampler and two brass rods of Rotorod air sampler for trapping the aerobiocomponents. Culture plates containing PDA media were exposed before & after burning the Dhupa.

Descriptive statistical measures were used to measure the reduction in aeromicrobial counts and colonies pre and post intervention.

Figure 1: Medicinal Plants and Ingredients in Dhupa

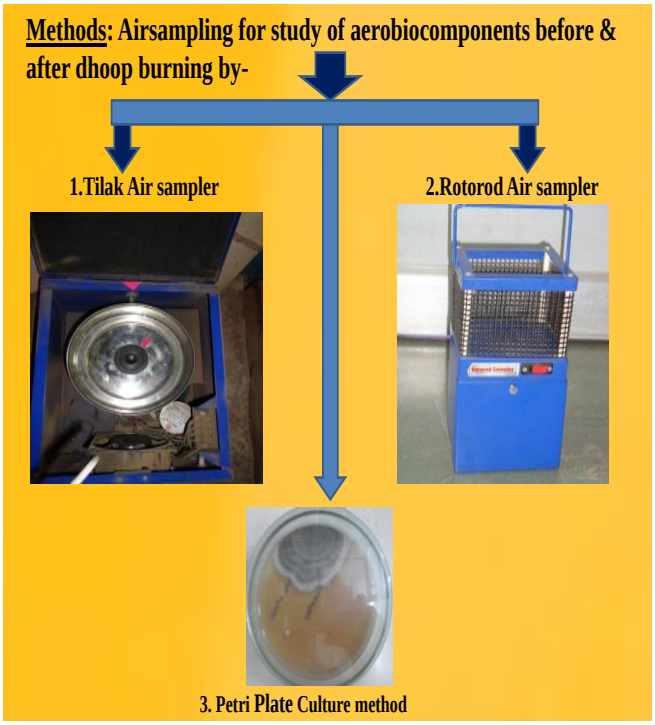

Figure 2: Air sampling Apparatus

Results

The various types of aeromicrospora that were observed during the study were as follows. Highest percentage of microspora were species like Cladosporium (38%), Fungal hyphae (20.7%), Aspergillus (9.33%), Nigropora (5.54%) and Cellulose fibres (5.25%)

Types of Spores	D1M	D1E	D2M	D2E	D3M	D3E	D4m	D4E	Total	Mult 14	%
BASIDIOMYCOTINA											
Basidiospores	0	0	0	1	0	0	0	0	1	14	0.29
Ganoderma	1	0	0	0	0	0	0	0	1	14	0.29
Smut spores											
DEUTROMYCOTINA											
Alternaria	1	1	0	0	2	0	3	1	8	112	2.33
Aspergillus	23	0	0	0	8	0	1	0	32	448	9.33
Bispora	0	0	0	1	0	1	0	0	2	28	0.58
Cercospora	0	2	0	0	0	0	1	0	3	42	0.87
Cladosporium	23	9	26	0	9	33	13	19	132	1848	38.5
Cordana	0	0	0	0	1	1	0	0	2	28	0.58
Curvularia	0	1	2	0	4	4	4	0	15	210	4.37
Dictyoarthrinium	0	1	0	0	0	0	0	0	1	14	0.29
Helminthosporium	0	0	0	0	1	0	0	0	1	14	0.29
Nigrospora	5	3	3	0	1	3	1	3	19	266	5.54
Periconia	0	4	4	2	1	0	0	0	11	154	3.21
Pithomyces	2	0	2	2	0	2	0	0	8	112	2.33
Spegazzinia	0	1	0	0	0	0	0	1	2	28	0.58
Tetraploa	1	0	0	0	0	0	0	0	1	14	0.29
Torula	0	0	0	0	0	0	1	0	1	14	0.29
OTHER TYPES											
Cellulose fibers	4	0	2	3	1	6	0	2	18	252	5.25
Fungal hypha	13	8	8	7	7	14	6	8	71	994	20.7
Insect wings	0	2	0	1	1	0	0	1	5	70	1.46
Pollen grain	0	0	0	0	0	5	1	1	7	98	2.04
Protozoan cyst	0	0	0	2	0	0	0	0	2	28	0.58
	73	32	47	19	36	69	31	36	343	4802	100

Table 1: Frequencies of Aeromicrobiota

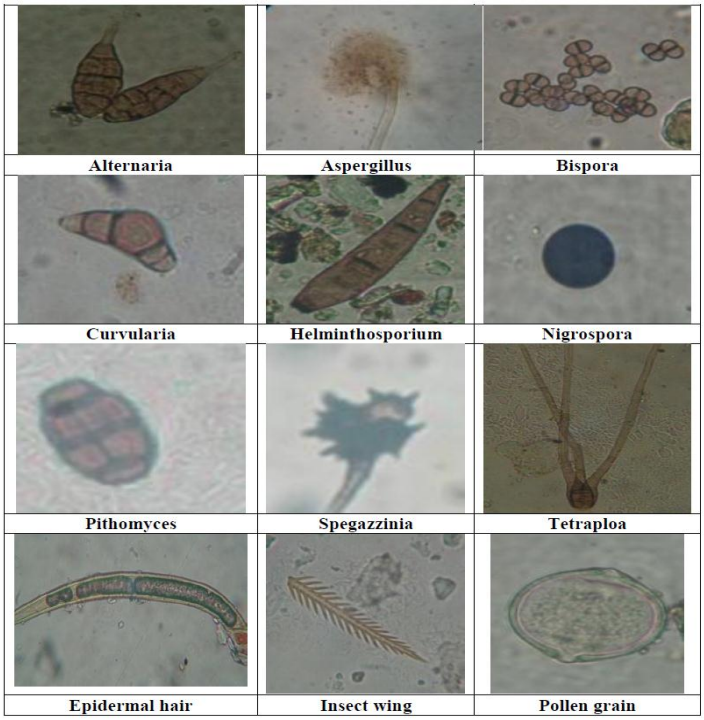

Figure 3: Types of Aeromicrobiota

The study demonstrated considerable reduction in the Aerospora before and after burning the Dhupa twice daily for the three consecutive days. Rotorod sampler and Tilak Rod sampler were both used to estimate the difference in before after counts in Aeromicrospora.

Morning	Before	After
Day1	18.2	2.96
Day2	14.3	3.45
Day3	8.87	2.46
Mean	13.75	2.95
p value	0.05	Significant

Table 2: Rotorod Sampler: Before and After Morning Samples

There was statistically significant difference in mean % of aeromicrospora in the morning session after burning Dhupa. (p=0.05)Mean % before burning dhupa was 13.75% in the morning whereas it considerably reduced to 2.95% after burning the dhupa .

Evening	Before	After
Day1	16.7	2.96
Day2	15.8	3.45
Day3	7.88	3
Mean	13.46	3.136667
p value	0.06	Borderline signficance

Table 3: Rotorod Sampler: Before and After Evening Samples

There was no statistically significant difference in mean % of aeromicrospora in the evening session after burning Dhupa. (p=0.051)Mean % before burning dhupa was 13.46% in the morning whereas it considerably reduced to 3.13 % after burning the dhupa.

Morning	Before	After
Day1	14.2	6.6
Day2	5.66	1.6
Day3	9.43	4.71
Mean	9.76	4.3
pvalue	0.04	Significant

Table 4: Tilak Sampler Before and After Morning Samples

Using the Tilak Sampler it was observed that there was statistically significant difference in mean % of aeromicrospora in the morning session after burning Dhupa.(p=0.051)Mean % before burning dhupa was 9.76% in the morning whereas it considerably reduced to 4.3 % after burning the dhupa .

Evening	Before	After
Day1	9.43	7.55
Day2	7.55	0.96
Day3	15.1	2.8
Mean	10.69333	3.77
p value	0.14	

Table 5: Tilak Sampler Before and After Evening Samples

The PDA culture plates revealed considerable reduction in colony counts pre and post exposure.

DISCUSSION

The present case study taken inhouse demonstrated statistically significant reduction in aeromicrospora after burning Dhupa for 1 hour continuously twice daily for 3 consecutive days. Both Rotorod and Tilak Sampler readings revealed considerably reduction in microbial count pre and post exposure.

Similarly exposure of culture plate revealed very interesting similar findings i.e. exposure of plate culture after burning the Dhupa there was not a single bacterial colony seen even after 5 days after exposure. While culture plate exposed for aeromycological investigations revealed significant growth of fungal colonies before burning the Dhupa and there was significant decrease in the colony count after burning the Dhupa.

Burning of dhoop for three consecutive days and two random days revealed progressive decrease in aerospora before as well as after the experiment. Effect of burning the Dhupa in the morning was long lasting till evening. On the last day three Dhupas were burnt at a time which resulted more pronounced decrease in the biocomponents in the air.

The sensitivity of Dhupa may be attributed due to certain elements such as Agni and Vayu of the Panchamahabhutas. Agni and Vayu Mahabhuta Pradhan dravyas are used for this procedure. The mahabhut is laghu, shit, ruksha, vishad in nature. It promotes the roughness, erosion, movement, vishadatva and lightness wherever it presents. The Dhupa may dry up the intracellular fluid matrix in a bacterial cell by its Panchbhautika concentration and by properties of mahabhutas.

Conclusion

The present study throws light on the potential role of Ved Vidnyan Rashinakshatra yukta dhup in controlling the number of aeromicrospora in the intramural environment. Natural and biocompatible measures like this can potentially aid in internal environment cleansing and sustainable conservation. In the future, a larger study could be planned to study in-depth the role of this formulation in residential zones with higher air pollution.

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Cite this article as:

Jogdand SB, Ingole AC, Joshi P, Laghate JK. Role of dhupa as fumigation therapy in intramural environmental cleansing and sustainable conservation: a case study. Asian Journal of Complementary and Alternative Medicine, 03 (08); 2015; 5-8.