

FORMULATION & EVALUATION OF POLYHERBAL DHOOP (FUMIGATION) FOR ITS ANTIMICROBIAL & DECONGESTIVE ACTIVITY

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ABSTRACT

Dhoop is widely used product in various religious rituals or practices in rural as well as in urban areas. *Dhoopana* is a technique practiced in *Ayurvedic* literature for its contribution in reducing the microbial count in specific areas. There are various types of microbes around us which are mainly responsible for health related problems such as influenza, pertussis, common cold, etc. The patients suffering from swine flu, bronchial spasms, bronchitis, asthma, dyspnoea, rhinitis, bad smell of the nose and mouth can be aided. The current work is focused on modifications in general *dhoop* formulation. Medicated *Dhoop* is prepared by incorporating hydro-distilled extracts of *Eucalyptus*, *Clove*, *Tulsi*, *Mentha*, *Ajwain*, and *Neem*. By performing *dhoopana*, various air borne diseases can be prevented as the product being easily available in remote areas leading to its sterilization.

Keywords: Dhoop, dhoopana, antimicrobial, influenza, polyherbal, fumigation

INTRODUCTION

Today, environment has become a major area of concern. Being a chief source for air borne diseases, it is sterilized by different practices. Disease causing pathogens are transmitted through various means like coughing, sneezing and even talking and laughing which contaminates the environment. Various methods of sterilization are available in market today. But at the same time, it is very necessary to replace hazardous chemical methods used for the sterilization techniques. Thus, *Dhoopana* (Fumigation by various medicinal plants) can be carried out as a substitute for Ultraviolet irradiation and chemical agents like Formalin and Potassium permanganate.

The underlying formulation is focused on the use of essential oils along with the use of other agents like cow dung; cow ghee, etc. Cow dung has been used

since time immemorial as a source of disinfection in different households. Cow dung is having role of bio-fuel and also acts as environment friendly material, with the help of this traditional knowledge, we tried to devise a method to prepare a *dhoop* stick having pharmacopoeial quality using various cow products and plant powders for cleansing the air. This herbal *dhoop* stick is prepared from extremely economical sources and has a pleasant smell. It can serve as an alternative to the usage of chemicals for disinfection of air in various areas such as households, hospitals, washrooms, etc.

MATERIALS & METHODS:

All powders were procured from local market in Nashik and were screened for their purity and sieved

for desired particle size. Cow ghee was used as binder and dried cow dung obtained from local diary which was pulverized in a domestic grinder, acted as biofuel

being one of the base. The essential oils used in the product were extracted from their respective biological source.

Table 1: Ingredients

Sr. No.	Drug Name	Each 5 sticks contain	Active constituent with activity
1	<i>Eucalyptus globulus</i>	10% v/w	Alpha-terpinol: Against <i>E.coli</i> , <i>S.aureus</i> , Decongestive
2	<i>Eugenia caryophyllus</i>	6.6% v/w	Eugenol: Larvicidal agent (combat dengue)
3	<i>Oscimum sanctum</i>	5.6% v/w	Oleanolic acid: Anti-flu, Immunomodulatory
4	<i>Menthapiperita</i>	6.6% v/w	Menthol, menthone: Against <i>C.albicans</i> , Decongestive
5	<i>Trachyspermumammi</i>	2.6% v/w	Thymol: Kills bacteria resistant to 3 rd generation antibiotics
6	<i>Azadirachtaindica</i>	5.6% v/w	Azadirachtin: Antibacterial
7	<i>Balanitesaegyptiaca</i>	2.6% v/w	Balanitin: Insecticidal
8	<i>Cassia fistula</i>	5% w/w	Fistucasidin: Antifungal
9	<i>Camphor</i>	6.6% w/w	Linalool: Biofuel
10	<i>Styrax benzoin</i>	13.3% w/w	Benzoin resin: Perfume fixative
11	<i>Commiphorawightii</i>	6.6% w/w	Qunic acid: Perfume fixative
12	<i>Cow dung</i>	25% w/w	Base: Biofuel
13	<i>Cow ghee</i>	3.3% w/w	Binder

Weight of 1 stick: 6 gm

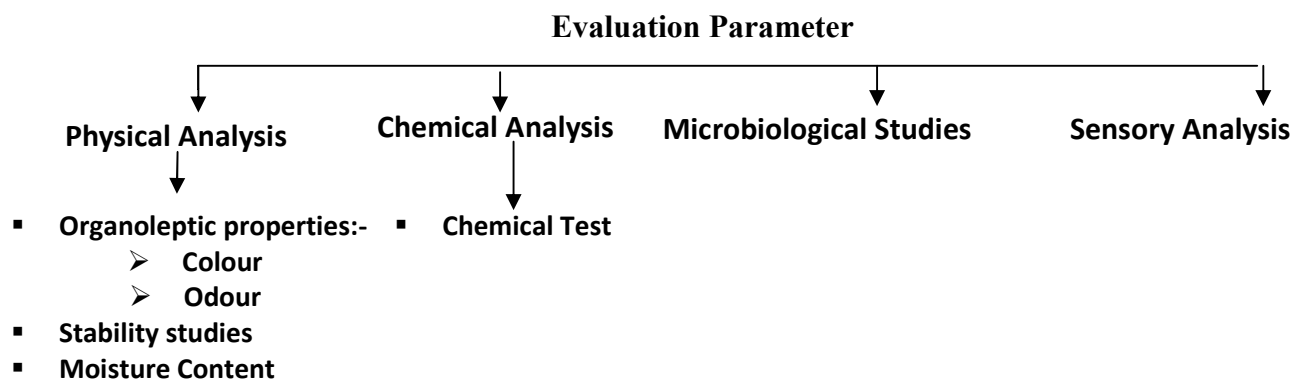
Weight of 5 sticks: 30 gm

METHOD OF PREPARATION:

All the plant powders and cow dung were taken in a clean, dry mortar and pestle and grinded finely. Cow ghee was added as a binder and was mixed well to form a wet mass. A plastic syringe was cut from the apical side so as to open the mouth of the syringe completely. *Dhoop* sticks were made using the opened syringe and a plunger. The long extrudates so formed

were cut into desired sizes. These *dhoop* sticks were kept intact for 24 hours to dry them completely and then stored in an air tight container. The sticks were put in a container filled with essential oils. The stick being porous by its capillary action rapidly absorbs the oils. Later, these sticks were dipped in neem oil which fixes the previously used volatile oils. These sticks were used for evaluation of cleansing activity.

Experimental Work:



Stability Studies: Table No.2

Sr. No.	Duration (hr)	Temperature (°C)	Colour	Odour
1.	24 hr	4°C	Dark Brown	Minty
2.		Room Temperature	Dark Brown	Minty
3.		60°C	Dark Brown	Minty

PHYSICAL ANALYSIS:

- Color : Dark Brown
- Odour : Minty

MOISTURE CONTENT:

- For Base
- Initial wt. : 3.00 gm
- Final wt. : 2.98 gm

$$M. C. = \frac{I.W. - F.W.}{I.W.} \times 100 = 0.6\%$$

CHEMICAL ANALYSIS:**1. Eucalyptus**

Petroleum benzene test \longrightarrow Crystals of Phellandrene nitrate

2. Mentha

Nitric acid test \longrightarrow Blue color, on heating becomes golden yellow

3. TLC OF Eugenol

Sample preparation : 1mg eugenol dissolved in 1ml ethanol

Plate : Silica gel G

Solvent System : Benzene

Spraying reagent : 1% anisaldehyde-sulphuric acid

R_f Value : 0.40 Green spot

4. TLC OF Menthol

Sample preparation : 1mg of menthol dissolved in 1ml methanol

Plate : Silica Gel G

Solvent system : Chloroform

Spraying reagent : 1% vanillin-sulphuric acid

R_f Value : 0.50

5. Chemical Test of Neem

Aq. Extract + FeCl₃ \longrightarrow Dark coloration

6. TLC of Thymol

Sample Preparation: 1.5mg of thymol dissolved in 1ml methanol

Plate : Silica Gel G

Solvent System : Toluene-ethyl acetate (93:7)

Spraying reagent : Vanillin-sulphuric acid

R_f Value : 0.52

7. TLC of Alpha Terpinol

Sample preparation : 1 mg of Eucalyptol dissolved in 1ml ethanol

Plate : Silica Gel G
 Solvent system : Toluene-ethyl acetate (93:7)
 Spraying Reagent : Vanillin-sulphuric acid
 R_f Value : 0.60

8. TLC of Oleanolic acid:

Sample preparation : 1mgTulsi oil dissolved in 1ml methanol
 Plate : Silica Gel G
 Solvent system : Toluene-ethyl acetate (93:7)
 Spraying reagent : 1% anisaldehyde-sulphuric acid
 R_f Value : 0.60

MICROBIOLOGICAL STUDIES:

The evaluation of antimicrobial activity was carried out by preparing Nutrient Agar plates in duplicates (2

set of plates exposed in same area) which were exposed to different areas as follows: Table No. 3

Sr.no.	Area	Time of exposure
1	Kitchen	10 mins
2	Washroom	
3	Laboratory	
4	Garbage area	

One set from each area was exposed to *dhoop* for one hour in closed and sterile chamber (Dimensions: 400x400x605mm). Later, these plates along with

those set of plates not exposed to *dhoop* were incubated at 37°C for 24 hours in an incubator. Following results were obtained (Figure)

Sensory Analysis:

A survey was also carried out in order to evaluate the acceptability of the herbal *dhoop* among 35 people. Various parameters such as smell, appearance and smoke were evaluated.

Table No.4

Sr.no.	Questions	Yes	No
1	Is the smell appreciable?	34	1
2	Smoke is irritating?	3	32
3	Use the product at home?	34	1
4	Will you recommend the product?	35	0
5	Resinous smell?	33	2
6	Minty smell?	34	1
7	Relief from nasal congestion?	15	20

RESULT & DISCUSSION

From the chart below and the above figures, it can be well understood that the *Dhoop* successfully shows

intended antimicrobial activity. It was prepared by above mentioned procedure and was evaluated by observing its inhibitory action on aero micro-flora

Table 5: Statistics of Microbiological studies:

	Area	No. of colonies before exposure to dhoop	No. of colonies after exposure to dhoop	No. of colonies after exposure to Standard Disinfectant: Formalin (40%) and Potassium Permanganate (10%)
1	Kitchen	15	5	6
2	Washroom	Uncountable	12	10
3	Laboratory	7	1	3
4	Garbage	Uncountable	21	20

Thus all the exposed plates, were almost clear with negligible count of colonies. This can help us in predicting the antimicrobial activity of this herbal *dhoop* stick. During the survey, most of the volunteers found the smell of the dhoop appreciable. Majority of them found the smell woody and resinous and a few found it minty and peppermint (camphor) like. 80% of them did not experience any irritation in their eyes. All of them found the appearance acceptable and accepted that they would like to use/ recommend the *dhoop*, if it has proven to have anti-microbial activity.

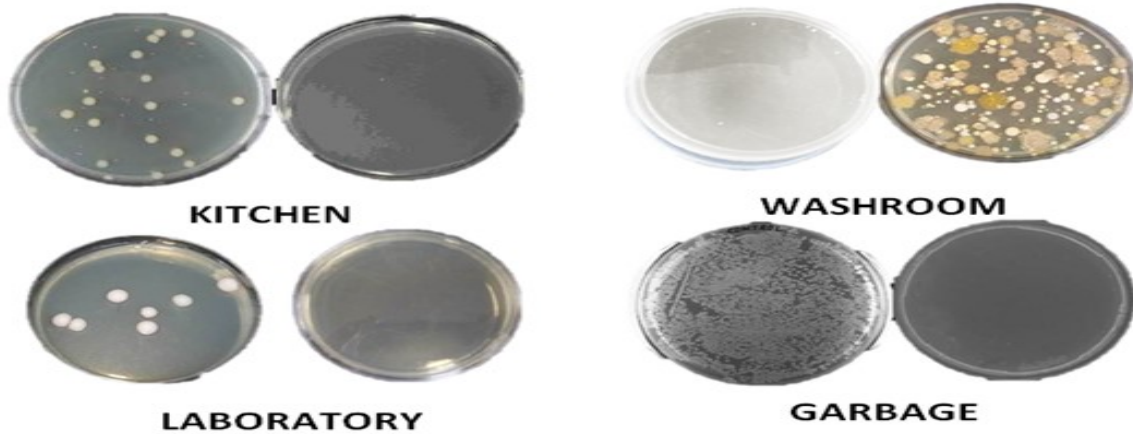
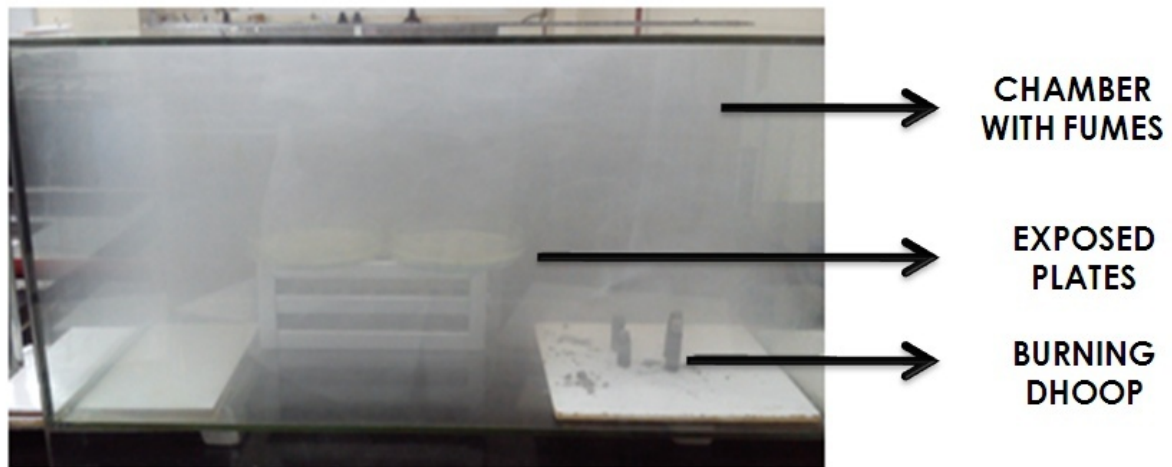
CONCLUSION

Further research in this direction with other organisms to assess their sensitivity can be done.

This paper was aimed at reviewing the anti-bacterial and anti-infective activity of various Ayurveda drugs mentioned in fumigation therapy for preventive and curative aspects among children. Above medicated plants possess potent anti-bacterial activity and therefore can be successfully used in fumigation therapy both as main line treatment and for prophylaxis with minimal adverse effects. With the help of this paper the drugs which are quoted will prove to be beneficial for the researcher planning clinical trial with them and they can be used in neonatal wards also and Operation Theater as an effective, safe alternative to present day disinfectants used in fumigation's.

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