

Research Article: Formulation and Evaluation of Mosquito Repellent Incense Dhoop batti From Herbal Material

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ABSTRACT:

Currently the use of synthetic mosquito repellent chemicals has several issues related to environment and human health. This project was formulated and developed to have safer mosquito repellent, which was free from carcinogenic chemicals and are significantly cheaper and simple to develop. Dried powdered herbs like Neem leaves, Eucalyptus oil, camphor, starch, were used to make mosquito repellent formulation. The powdered blend was mixed with binders and additives like charcoal powder. The solid formulation was rolled in the form of dhoop batti. Further to add value, it was later scented with essential oil like lemongrass oil and dried. The dhoop batti when ignited releases vapours with a pleasant fragrance and herbs which repels the mosquitoes. The dhoop batti were tested for its potency by burning near the mosquito net cage with sufficient mosquitoes. The dhoop batti also distributed to random peoples for feedback and were deemed to be very effective in controlling the mosquitos.

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 Ayurveda literature for its contribution in reducing the microbes count in specific areas. There are number of mosquitoes 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-distillated extracts of Neem and Eucalyptus oil. By performing dhoopana, various air borne diseases can be prevented as the product being easily available in remote areas leading to its sterilization.

KEYWORDS: Mosquito repellent, Dhoopana, Dhoop batti and Herbal Material.

Introduction:

Mosquitoes are most disturbing blood sucking insects affects human beings. Several mosquito species belonging to genera Anopheles, Culex and Aedes are vectors for the pathogens of various diseases like Dengue fever, Malaria, Yellow fever, Japanese Encephalitis and several other infections. Mosquitoes alone transmit diseases to more than 700 million people and over one million deaths are reported annually.(1) Therefore, the control of mosquitoes and mosquito

borne diseases is an important public health concern in the society. As many mosquitos' repellent products available in the market but reported to have serious harmful, adverse effects on human beings so the objective of the present study is to develop effective plant-based mosquito repellent products with minimum side effects.(2)

Dengue fever is a mosquito borne disease which is characterized by symptoms like fever, headache, joint and muscle pains etc. The causative organism is arbovirus but it is spread by genus *Aedes* mosquitoes. Some of the infections in Dengue are Fever and Shock Syndrome which can threaten the patient's life and leads to shock. Over the past few years, there has been increase in the frequency of occurrence of Dengue Fever. (3)

MATERIALS AND METHODS:

Sr. No	Ingredients	F1 Formulation	F2 Formulation
1	Neem powder	20 gm	20 gm
2	Cow dung cake	20 gm	20 gm
3	Cow urine	5 ml	5 ml
4	Clove oil	4 ml	4 ml
5	Charcoal	12 gm	12 gm
6	Sandal wood powder	10 gm	10 gm
7	Starch	10 gm	10 gm
8	Camphor	12 gm	12 gm
9	Rose oil	4 ml	4 ml
10	Eucalyptus oil	2ml	4ml

Method of preparation:

1. All the powders were weighed according to the formula and properly mixed in a mortar pestle.
2. Powder the shed dried herbal material. The marigold petals were shed dried and powdered by using domestic grinder and mixed to the above powder mixture.
3. The fine powder of camphor is mixed into it.
4. Starch and charcoal were mixed into water.
5. The mixture is heated and the powder mixture is mixed into it.
6. The mixture was completely cooled and made into thick paste.
7. The mixture was then moulded into the shape of dhoop sticks. (4-5)



Dhoop batti, Mixture of raw material, Mosquito Repellent formulated Dhoop batti.

Evaluation Parameters: The formulated dhoop batti were evaluated for Burning time, odour, Irritation, smoke visibility, ash weight and mosquito repellent activity.

Evaluation burning on users: Test was done by simply selecting mosquitoes from surrounding areas in the evening and night period. The public remarks were noted down after allowing them to investigate mosquito repellent activity of prepared dhoop batti. The prepared dhoop batti F1 and F2 formulations were checked for causal effects such as irritation, coughing, and tears were observed and recorded. (6-8)

Smoke toxicity test: Smoke toxicity test was conducted in a chamber measuring 34.5x24x0.95 cm. Then adult mosquitoes were released into the chamber and they were exposed to the smoke of burning dhoop batti for 45 minutes. The mortality data were recorded after every 15minutes. Total number of mosquitoes used was 25. (9-10)

Feedback from 20 volunteers: The feedback of mosquito repellent dhoop batti was taken from 20 people and requested to use and evaluate the formulation (F1 and F2) containing poly herbs. (11)

Result and discussion: Evaluation Parameters of Herbal Mosquito Repellent Dhoop. Table no 1.

Sr. No	Parameters	Herbal Dhoop batti
1	Burning time	10 min
2	Odour	Satisfactory
3	Irritation	No Irritation
4	Smoke Visibility	High
5	Ash weight (g)	0.867 gm.
6	Mosquito repellent activity	8 min
7	Colour	Black.

Evaluation of burning on users: Smoke from the herbal mosquito repellent dhoop batti produces no toxic effect to humans and also act as germicidal. Dhoop batti prepared are cost effective and easily portable. The Prepared dhoop batti were given to the 10 houses, hostel and canteen for getting feedback about the product depending on the duration of time, illness, and allergic reactions. The peoples from houses, hostel and canteen have replied that less irritation, no allergic reactions and coughing. The mosquitoes also repelled after burning of the dhoop batti. (12)

Smoke toxicity test: Observation is done regarding time taken to burn the dhoop batti, fragrance of sticks, and duration of repellent activity. It is very safe to use and is nontoxic in nature. This mosquito repellent dhoops can be used regular in houses, hotels, canteens and laboratories. The formulation F2 containing poly herb was found to have more mosquitoes repelled in short period than F1 formulation. Feedback from 20 people and from the smoke toxicity test it was concluded F2 will be the best formulation than F1 formulation as it produces the smoke for a long period and kill the mosquitoes. The feedback of mosquito repellent dhoop batti was taken from 20 people and requested to use and evaluate the formulation (F1 and F2) containing poly herbs.(13, 14)

Discussion: In the present study, an attempt is made to prepare herbal based mosquito repellent dhoop batti using cow dung as fillers along with herbal powder of neem and eucalyptus oil. Also supporting excipients are added to the preparation. Here, the herbal powder is tested as mosquito repellent dhoop. Evaluation parameters of herbal mosquito repellent dhoop are shown in Table 1. It contains burning time (minute), smoke visibility, odour, irritation test, ash weight (g.) and mosquito repellent activity. Smoke visibility shows the volume of smoke released from the mosquito repellent dhoop and gives an idea that natural mosquito repellent and natural pesticides is always better than synthetic preparations. The formulation is also tested in mosquito affected areas. At burning time, it was observed that up to 70% of mosquito number was greatly decreased. Formulation containing Eucalyptus oil along with Neem powder and cow dung shows maximum effectiveness in reducing mosquito number. Also aroma of this formulation was satisfactory. That's why use of natural mosquito repellent dhoop is more holistic and better option than synthetic mosquito repellent as it is more effective as well as environmental friendly also.

Conclusion: The mosquito repellent dhoop batti were prepared using herbals show excellent mosquito repellent action without side effects. The dhoop batti were eco-friendly, cost effective and safe to use. It is easily portable and can be easily used by all the age groups. The herbal dhoop batti give a pleasant smell and repel mosquitoes, so the herbals are highly recommended for the formulation of mosquito repellent dhoop batti. The lemon grass oil used in the formulation gives pleasant odour during ignition of the sticks. The F2 formulation containing poly herbs shows more mosquito repellent action than F1 formulation which contains eucalyptus oil 2ml only.

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