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Preparation Of Mosquito Repellent Dhoop From Orange Peels

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Abstract:
Mosquito-borne illnesses are still a concern to world health, particularly in tropical and subtropical areas. An efficient defense against mosquito bites and the spread of these diseases is the use of mosquito repellents. Chemical-based mosquito repellents can be harmful to human health, especially to children and pregnant women. The use of natural plant-based components is a potential approach in the development of sustainable and eco-friendly mosquito repellents, which has gained popularity in recent years. In this study, we prepared a mosquito repellent dhoop using orange peels, as orange peels are a rich source of essential oils including limonene, which has been found to have mosquito-repelling qualities. This research article describes how orange peels can be used to make mosquito-repelling dhoop (incense) which is used to ward off mosquito. The orange peels are dried and ground into a powder, then they are combined with various ingredients like charcoal, camphor, turmeric and essential oils to make dough. After shaping the dough into cones or sticks, it is allowed to dry. It has been demonstrated that the resulting dhoop has substantial anti-mosquito capabilities and can offer protection for up to two hours. There are many benefits to using orange peels as a raw material for mosquito repellent dhoop, including its availability, affordability and environmental friendliness. Additionally, using organic materials from plants lessens exposure to synthetic chemicals and their possible health risks. Overall, our study demonstrates the potential of orange peels as a natural source of mosquito repellent and provides a simple and effective method for preparing a mosquito repellent dhoop.

Keywords: limonene oil, camphor, activated charcoal, turmeric.

Introduction:

The majority of plants possess substances that they use to protect themselves from phytophagaus (plant-eating) insects. These substances can be classified as poisons, growth regulators, repellents, and feeding inhibitors. Plant-based repellents are easily biodegradable and present no toxicity risks to domestic animals or humans. When compared to manufactured substances, natural products are safer for humans.

As a result, the time has come to start a through investigation into biological materials that are environmentally safe and can be used to manage insect infestations. Different researchers have discovered deterrent properties of the phytochemials obtained from plant resources, which can function as larvicidal, insect development regulators, repellents, and ovipositional attractants. In many regions of the world natural plant preparations have been employed for centuries to ward off or kill mosquitoes.

The pressing need to investigate phytochemicals as insect repellents.

Orange Peels

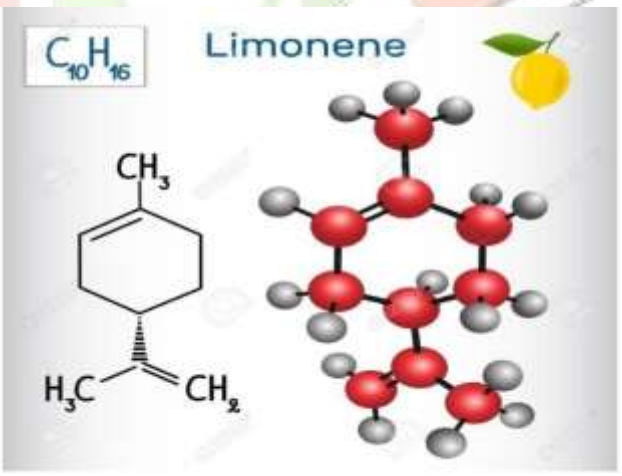
Oranges are a citrus fruit that belongs to the family Rutaceae. In addition to other important nutrients, they are a good source of dietary fibre and vitamin C. Typically round or oval in shape, oranges have a rough, leathery skin that can range in colour from orange to yellow-orange. Depending on the kind, the interior fruit is segmented, juicy, sweet or sour.

Orange peels are the outer, colored layer of the orange skin that protects the fruit inside. They are rich in essential oils, flavonoids, and other nutrients. Orange peels can be either bitter or sweet, depending on the variety of orange and the thickness of the peel. Bitter orange peels are often used to make marmalades and other preserves, while sweet orange peels are used for baking and other culinary purposes.

Chemical Constituents:

1. Limonene (90%)
2. Citral (4%)
3. Vitamin C
4. Pectin
5. Hesperidin
6. Aurantimarin and Aurantimaric acid

Limonene Oil



Orange and other citrus fruit peels are used to create the oil known as limonene. From citrus fruits, people have been obtaining essential oils like limonene for generations. Today, limonene is a widely utilised natural remedy for a number of health concerns and is a common component in household products.

Citrus fruits like lemons, limes, and oranges contain limonene in their rinds. It makes up around 97% of the essential oils in orange rinds, where it is particularly concentrated. Its primary chemical form, d-limonene, is frequently used in naming. Limonene is a member of the class of substances known as terpenes, whose potent scents protect plants by discouraging predators. Due to its strong aroma, limonene is utilized as a botanical insecticide. It's an active ingredient in multiple pesticide products, such as eco-friendly insect

repellents. Other household products containing this compound include soaps, shampoos, lotions, perfumes, laundry detergents, and air fresheners

Benefits of orange peels:

1. ***Protection against Mosquito-borne Diseases*:** Mosquito repellent dhoop using orange peel provides protection against mosquito-borne diseases such as dengue, malaria, and zika.
2. ***Natural and Safe*:** Mosquito repellent dhoop using orange peel is a natural and safe alternative to chemical-based mosquito repellents, making
3. ***Insect repellent:*** Using orange peels as a mosquito repellent, the essential oil in orange peels contains compounds that are toxic to mosquitoes and other insects. To use orange peels as a natural mosquito repellent, simply rub the inside of an orange peel on your skin or leave orange peels around your outdoor living spaces. You can also boil orange peels in water to make a fragrant, natural insect repellent spray.

One of the most irritating pests, mosquitoes itch and spread a number of ailments. Mosquito repellents are frequently used to protect humans from their bites. Although there are several commercially available mosquito repellents on the market. Many individuals prefer safer and more natural alternatives. The dhoop prepared from orange peels is one such natural insect repellant.

Hindu rites and festivities traditionally employ dhoop as incense. Orange peels are one of the main components used in manufacturing mosquito repellant dhoop, which is prepared by blending several herbs, spices, and other natural elements that release a pleasant smoke when burned. The orange peel's essential oils work as a natural mosquito repellent and deter bugs.

Orange peels can be used to make the mosquito-repelling substance dhoop. In order to get rid of any dirt or debris, the orange peels are first gathered and carefully cleaned. After that, they are divided into little pieces and allowed to dry in the sun. The peels are used to make a fine powder after being totally dried and processed in a grinder.

The powdered orange peel is combined with other substances including champhor, charcoal powder and turmeric. In mosquito repellent dhoop, charcoal powder lowers toxic emissions. Natural pesticide camphor is frequently employed as a mosquito repellent. As a mosquito repellant, turmeric has a potent fragrance.

To create a dough-like consistency, all the components are combined. After being formed into little cones, the dough is allowed to dry for a few days. The cones are prepared to be burned as a mosquito-repelling dhoop once they have fully dried.

One must ignite the cone and let it burn for a brief period of time in order to use the orange peel mosquito repellent dhoop. Mosquitoes and other insects are repelled by the cone's scented smoke. The dhoop works well to keep bugs away and may be used both indoor and outdoor.

Orange peel dhoop provides a number of other advantages in addition to being a natural mosquito repellent. It is well known that the dhoop's aroma has a relaxing effect and can aid in lowering stress and anxiety. Dhoop is also thought to purify the air and eliminate any bad energy by burning.

Methodology:

Ingredients:

1.Limonene oil	4 ml	
2.Activated Charcoal	2 gm	
3.Camphor	2gm	
4.Turmeric	2gm	
5.Water	Quantity Sufficient	

Table No.1

Method:

1. ***Collect and dry the orange peels*:** Collect the orange peels and wash them thoroughly with water. Then, let them dry in the sun for a few days until they are completely dry.
2. ***Grind the orange peels*:** Use a grinder or mortar and pestle to grind the dried orange peels into a fine powder.
3. ***Extraction of Limonene*:** Limonene was extracted from the orange peels using Soxhlet extractor. Fill the Soxhlet extractor with enough Diethyl ether to cover the orange peel powder. Attach the Soxhlet extractor to a condenser and warm the flask on a hot plate or heating mantle. The essential oils was drawn out of the powdered orange peels by boiling the diethyl ether at 15^0C, letting it cool, condensing and then dripping it back onto it. Keep up the extraction procedure for 6 to 8 hours, or until the solvent is colourless. Depending on the solvent employed and the quantity of orange peels this period may change. To separate the limonene and diethyl ether the extract was followed through steam distillation at 30^0C.

4. ***Mix the ingredients:*** Mix the limonene with some charcoal powder, camphor, and turmeric. The amount of each ingredient will depend on the desired strength and quantity of the dhoop. Slowly add water to the mixture while stirring it continuously until it forms a thick paste.

5. ***Make small cones*:** Take small portions of the paste and roll them into small cones. You can also use dhoop-making molds to give them different shapes.

6. ***Dry the dhoop cones*:** Let the dhoop cones dry in a cool, dry place for a few days until they are completely dry and hard.
7. ***Burn the dhoop*:** When you want to use the mosquito repellent dhoop light the tip of the cone and let it burn for a few seconds. Then blow out the flame and place the dhoop in a suitable holder or on a heatproof surface.

Evaluation of mosquito repellent dhoop:

1. ***Cage Test:*** The cage test involves placing a mosquito inside a cage and then burning the dhoop nearby. You can observe the mosquito's behavior to determine if it is repelled by the dhoop. If the mosquito avoids the area around the dhoop, it indicates that the dhoop is effective.
3. ***Mosquito Landing Test:*** This test involves counting the number of mosquitoes that land on a person's exposed skin when they are in the vicinity of the dhoop. To perform this test, you can have a person sit in a room with the dhoop burning and count the number of mosquitoes that land on their skin in a set period, such as 5 minutes.
4. ***Fume test:*** A fume test used to detect the colour and smell of the fumes that are released when a product is burned, to identify the presence of specific compounds.
5. ***Toxicity test:*** Toxicity test is done to ensure that the prepared dhoop is safe for use. The ingredient used in the preparation such as limonene oil, champhor, turmeric and charcoal at all the rates was not toxic.

Irritability test: The irritability test is performed to check the whether the prepared dhoop cause any irritation to the skin.

Name of test	Result Obtained		Description
	Positive	Negative	
1.Cage test	✓	-	Here we found that the prepared dhoop the mosquito in the cage were repelled.
2. Mosquito landing test	✓	-	The dhoop was tested on the person for 5 minutes it was observed that the number of mosquitoes that landed on the skin was very less nearly 2-3.
3. Fume test	✓	-	The fume produced from the prepared dhoop was white which indicates that the dhoop does not contain any hazardous substance.

4.	Toxicity test	-	✓	As the dhoop contain all natural ingredients it does not cause any toxic effect to human
5.	Irritability test	-	✓	Here we found that the prepared dhoop did not cause any irritation to the skin.

Table No.2

Discussion:

An old-fashioned and all-natural method of keeping mosquitoes away is to make mosquito repellent dhoop from orange peels. Limonene oil and Citronella oil two substances recognized for their ability to repel insects, are found in orange peels. You can use orange peels to produce the mosquito-repelling dhoop as described. Firstly Amalgamate dried orange peels into a fine powder. The powder is then combined with a binding agent, additional chemicals, and essential oils like limonene and citronella oil are then added to the concoction. Small dhoop cones made of the mixture are rolled up and left to dry in the sun. When the dhoop cones are dry, you may light them and set them up in a space to ward off mosquitoes. The effectiveness of this natural method to keep mosquitoes away is good, although it might not be as strong as repellents made with chemicals. People who have respiratory issues may also become irritated by the smoke produced when burning dhoop. The dhoop should always be tested in a small location before being used in a bigger one. Overall, mosquito dhoop produced from orange peels is a natural and environmentally safe method of warding off insects. It's a fantastic option for those who favour all-natural, chemical-free alternatives to conventional insect repellents.

Summary:

An organic and natural substitute for mosquito repellents with chemical bases is mosquito repellent dhoop prepared from orange peels. The natural insecticide limonene which keeps mosquitoes away is abundant in orange peels. The orange peels are dried and then powdered into a fine powder to create the dhoop. This powder is used with additional all-natural insect repellents such activated

Charcoal powder, camphor and turmeric. In order to create miniature cones or sticks that can be smoked like traditional incense, the mixture is then made into a paste and molded into these shapes. The dhoop emits a fragrant smoke when smoked that deters insects like mosquitoes. Although there is little scientific evidence to support the efficacy of mosquito repellents manufactured from orange peels, many people in India and other areas of the world have used dhoop made from orange peels for generations with good success. It's crucial to keep in mind though that natural repellents for mosquitoes could not be as efficient as chemical-based ones and might require more frequent reapplication. It's also a good idea to try a new product on a small patch of skin first because some people might be allergic to the components in natural mosquito repellents.

Result:

As a result we had found that the dhoop which we had prepared from the orange peels extract has the ability to repel mosquito. Due to the presence of limonene a natural pesticide present in orange peels is an efficient mosquito repellent. The dhoop emits a pleasant citrus perfume when smoked which keeps mosquitoes and other insects away. Additionally it contributes to air purification and fostering a tranquil environment in our house. Limonene the primary component in orange peels was used to make the insect repellant dhoop. Evaluation of the prepared dhoop revealed that it exhibits an immediate effect. It was found that the majority of the mosquito growth was hindered when plates containing different aeromicroflora were exposed to the dhoop made in accordance with the above mentioned process. The prepared dhoop was observed with a 0.90% toxicity test whereas the toxicity test for the conventional preparation is 0.99%. The table no. 02 had containing the test we had and their result.

Conclusion:

The information that is currently available suggests that producing an orange peel-based insect repellent dhoop is available alternative. Limonene and Citral two substances that are known to have insect-repelling qualities, are found in orange peels. It is crucial to remember that the effectiveness of the dhoop may differ based on elements including the concentration of these chemicals, the manner of manufacture, and the particular kind of mosquito in the area. Making ensuring that dhoop is created with safe, non-toxic substances and that it doesn't endanger the health of people or animals is also crucial. Additionally, it's critical to use the dhoop in a well-ventilated space and to take all necessary safety measures when lighting and handling it. Overall, manufacturing an orange-peel-based insect repellent dhoop may be a safe and efficient technique to ward off mosquitoes, but it is crucial to proceed carefully and to carefully assess the safety and efficacy of the product.

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