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Natural Mosquito Repellent

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ABSTRACT:

Plant-based repellents have been applied for generations in traditional practice as a personal protection approach against different species of Anopheles. Knowledge of traditional repellent plants is a significant resource for the development of new natural products as an alternative to chemical repellents. Many studies have reported evidence of repellant activities of plant extracts or essential oils against malaria vectors worldwide. This systematic review aimed to assess the effectiveness of plant-based repellents against Anopheles mosquitoes. The highest repellency effect was identified from Ligusticum sinense extract, followed by citronella, pine, Dalbergia sissoo, peppermint and Rhizophora mucronata oils with complete protection time Essential oils and extracts of some plants could be formulated for the development of eco-friendly repellents against Anopheles species. Plant oils may serve as suitable alternatives to synthetic repellents in the future as they are relatively safe, inexpensive, and are readily available in many parts of the world.

INTRODUCTION:

For many viral, bacterial and protozoan's diseases mosquitoes act as vector. In term of disease transmission and public health importance mosquito are considered as very important group of insects. Population of mosquito's increases exponentially that is major problem for many countries because mosquito spread the different diseases such as filarial, Japanese encephalitis, Lyme disease, Yellow fever, encephalitis, malaria, chikungunya, dengue, and epidemic poly-arthritis. In tropical and subtropical countries mosquito borne diseases are main problem. Mosquito has approximately 3500 species and present in tropical and subtropical regions. Major genera of mosquitoes that act as vector for various diseases are Culex (Japanese encephalitis, west Nile, chikungunya, Anopheles (filariasis, malaria) and Aedes (chikungunya, dengue, Yellow fever). Major cause for the chikungunya and dengue is Aedes aegypti that act as vector for the disease and affect the 2.5 million people every year. Feletti, vivax Grassi, protozoal parasites, Plasmodium ovale stephens and Plasmodium falciparum welch are the major cause of malaria that are spread by Anopheles mosquito. Most important reason for the increase of dengue fever are increased breeding places for the Aedes mosquitoes, less effective control of mosquito, more urbanization and enhanced growth of population. Annually worldwide the 200 million-450 million infections are caused by the Anopheles mosquito that leads towards 2.7 million deaths. In more than 100 rising countries it remains endemic disease. Virus of Japanese encephalitis occurs in the children with malnutrition and present in the areas that are linked with animal reservoirs particularly with pigs. On the other hand main cause for the encephalopathy is encephalitis. According to the BBC world service health program the mosquito is considered as the world's most dangerous animal. Mosquito is vector and it causes severe diseases which can lead toward death so accurate action is necessary to get away from the disease as soon as possible. There are various methods that can be adopted to protect itself from the bite of mosquitoes. When we are working outdoor we should wear long pants inserted into socks and long-sleeved shirts. As well as when we are in inside we should present in the areas that are screened, live in airconditioned and can use bed nets. Mosquito breeding can be stopped by clearing the standing water from the drains and can use repellents to kill the mosquitoes. In the middle of the 20th century modern pesticides were firstly introduced that were used for the control of pest. At that time it was considered the best control for the mosquitoes. But this is unfortunate because it had only starting achievement and after that it was evidenced to be less-than prefect solution for the long-lasting control of mosquitoes. With the pesticides such as DDT complete loss of pest occur that is worst for the environment and insects also develop resistance to that pesticide. Mosquito Control is somewhat of ultimate importance the existing day with increasing number of mosquito borne diseases.

DEFINITATION:

A natural insect repellent is a spray or lotion applied to the skin for the prevention of the mosquito bite . Natural mosquito repellents were preferred over chemical mosquito repellants.

CLASSFICATION:

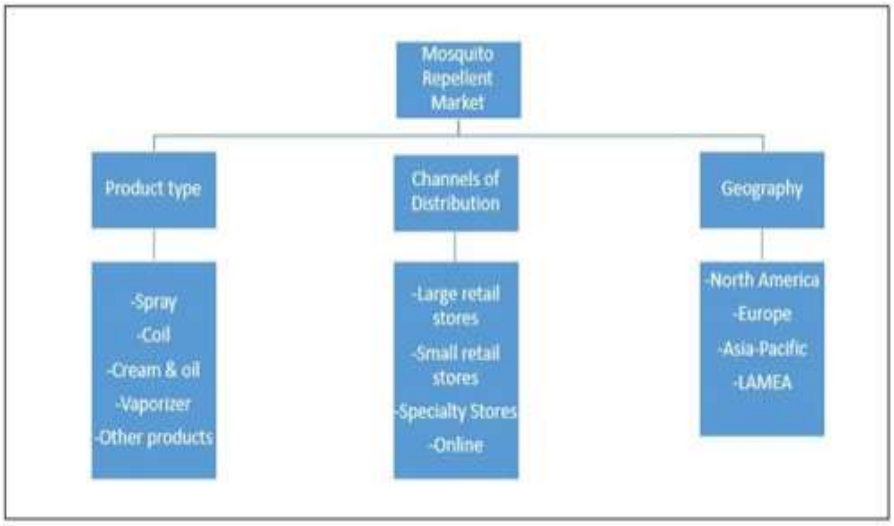


Fig. 1 Classification of Mosquito Repellents

HISTORICAL BACKGROUND :

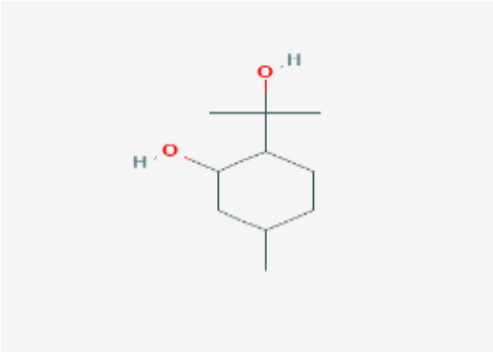
The insect repellents are used frome there ancient period. Diffrent types of plant oils are used to kill insecticide .oil of citronella is one of the mostly used repellent from those days in1937 dimethyl phthalate was discovered .Later several other compunds have been evaluated.

After cetronilla oil DEET is the most widly used mosquito repellents. It has less toxic effect attempts have been made to find out new active ingridents, those derived from natural plants to replace synthetic pyrethyroid. The use of insect repellent compounds dates back to antiquity, when various plant oils, smokes, tars, etc. were used to displace or kill insects.

At the outbreak of World War II, the latter three components were combined into a formulation for use by the military known as 6-2-2; six parts dimethyl phthalate, two parts Indalone . Other military repellent formulae for use on clothing were developed during the war, but they all failed to provide desired protection of military personnel deployed around the world. As a result, by 1956 the United States government had screened over 20,000 potential mosquito repellent compounds. In 1953, the insect repellent properties of N,N-diethyl-m-toluamide were discovered and the first DEET product was introduced in 1956. DEET is still the most widely used mosquito repellent. It has generally been regarded as safe, but toxic effects have been recorded, including encephalopathy in children, urticaria syndrome, anaphylaxis, hypotension and decreased heart rate.

The discovery of new plant-based repellents is heavily reliant on ethnobotany. This is the targeted search for medicinal plants through in-depth interviews with key informants knowledgeable in folk-lore and traditional medicine. It is common practice to conduct ethnobotanical surveys using structured interviews, combined with the collection of plant voucher Specimens, to evaluate plant use by indigenous ethnic groups . Questions are asked about plant usage, abundance and source. This is a more direct method of identifying plants with a potential use than general screening of all plants in an area.

However, mass screening of plants for repellent activity was the way by which PMD (para-methane 3-8, diol), an effective and commercially available repellent was discovered in the 1960s.



Structure of para-methane 3-8, diol

Current research in insect repellents Over the past several years, our laboratory has conducted research investigating insect repellents of natural origin. Insect repellents for protection of humans from biting arthropods, principally mosquitoes, make up the lion's share of insect repellents sold in the United States. As mentioned earlier, we believe that many applications of insect repellent technology are under-utilized at this time.

The use of repellent barrier strips to prevent entry of insects into sensitive areas is a largely untried approach. Pyrethroid insecticides are sometimes used in this manner, but the acute toxicity of these compounds to the insects is the principal mode of action of these compounds. Also, impregnation of repellents into packaging to prevent insect infestation of stored or shipped products is also not commonly used.

THEORY:

Plant used in the preparation of natural mosquito repellents

1) **Lemon Grass :**

Lemon grass is an herb that many homeowners like to grow in their gardens. It can only be grown as an annual in most regions of the United States. As a plant or oil, lemon grass may be a functional way to distract mosquitoes**.** Lemon grass and citronella oils are closely related, coming from the same family of grasses known as Cymbopogon.

Synonyms: Indian oil of Verbena, Indian Melissa oil, Ben- Gandhabenar tel; Mar- Hirvacha tel

Biological source:

Lemon grass oil is the oil distilled from Cymbopogan flexuosus Stapf or Cymbopogan citrates Staf.

Family: Graminae

Production of oil:

Characters:

Lemon grass oil is a reddish yellow or brown, mobile oil. It has odour resembling that of lemon oil. It is almost entirely soluble in 70% alcohol; the solubility gradually decreases on storage.

Chemical constituents:

i. Mainly contains citral and citronellal (75-85%)

ii. Geraniol,

iii. Nerol

iv. Linalool

v. Methyl heptenol

vi. Limonene

vii. The β-Ionone is used as precursor of vitamin- A

Uses:

1. Used as a mosquito repellant

2. Perfuming agent

3. Flavoring agent

Most research covering the efficacy of lemon grass relies on oil, not the whole plant. Specifically, people typically need to place the oil on their skin in some form to receive the benefit. One study noted that lemon grass in coconut oil was effective at preventing mosquito bites for up to two hours. There is evidence to suggest that combining lemon grass oil with other essential oils known for their repellent qualities may provide the best overall protection.

The health benefits of lemongrass begin with a rich source of essential vitamins such as vitamin A, vitamin B1 (thiamine), vitamin B2 (riboflavin), vitamin B3 (niacin), vitamin B5 (pantothenic acid), vitamin B6 (pyridoxine), vitamin C and folic acid , along with a host of important minerals like calcium, potassium, phosphorous, magnesium, copper, iron and zinc. Lemongrass is also a significant source of antioxidants, flavonoids and anti-fungal and antimicrobial compounds. Lemongrass is credited with an impressive array of health benefits both proven and anecdotal.

CONCLUSION :

In this study lemon grass, clove, citronella oil, neem etc. are important plant based natural products are used in muscular repellent. Also this natural muscular repellent is used in case of allergic reaction neurologic and cardiovascular side effects as well as encephalopathy in children. Herbal mosquito repellents do not come with many harmful substances that an average store-bought mosquito repellent spray contains. This natural muscular repellent also useful in pregnant women's and neonatal. Chemicals in mosquito repellents, like all other pesticides, are even more dangerous when it comes to pregnant women. They are safe for use on skin and prevent rashes, redness, and itchiness. It’s important to do what you can to keep them away, not only because the bites are itchy and annoying, but also because they can sometimes carry serious diseases, like West Nile, Zika, or malaria.