



APPRAISEMENT AND ORIGATION OF DIHERBAL MOSQUITO REPELLENT CREAM USING ANISOMELES MALABARICA AND AZADIRACHTA INDICA

Mrs. N. Karthiha*

Assistant Professor, Sri Ramakrishna College of Arts & Science for Women
*Corresponding Author

Sneha. N

Msc Scholar, Sri Ramakrishna College of Arts & Science for Women

ABSTRACT

Mosquitoes are common, flying insects that live in most parts of the world. Over 3,700 types of mosquitoes can be found worldwide. Plant-based repellents have been applied for generations in traditional practice as a personal protection approach against different species. Traditional repellent plants are a significant resource for the development of new natural products as an alternative to chemical repellent. Herbal products are considered safe for daily use with minimal side effects. So, the study of the present research work was to appraise and originate a mosquito repellent cream for protecting from mosquito bites by using natural ingredients. Anisomeles malabarica and Azadirachta indica are used as core ingredients, and they are natural repellents. They have medicinal values that are anti-larvicidal, anti-allergic, anti-bacterial, anti-inflammatory, etc. This paper highlights the above, provides the classes of molecules present in plants, gives some examples of the types of molecules and secondary metabolites, and also presents some data on the significance of plants against mosquito vectors. A sample extract was prepared by using hydroxyethanol. The extract was tested for phytochemical, anti-oxidant, anti-inflammatory, anti-microbial, and anti-larvicidal activity. Assays like the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging method, the hydrogen peroxide (H₂O₂) assay, the ferric ion reducing antioxidant power assay (FRAP), and the protein denaturation assay were performed to assess. In this study, the formulation and evaluation of repellent cream showed 100% mosquito repellency for outdoor and indoor fields.

KEYWORDS : Anisomeles Malabarica leaves and Azadirachta Indica leaves, Mosquito repellent cream, Herbal product

INTRODUCTION

Herbal plants are generally used as a natural remedy to cure various health problems including tuberculosis, cancer, diabetes mellitus, heart diseases, wound healing, asthma, pharyngitis, hypertension etc. Plants rich in bioactive phytochemical compounds such as alkaloids, flavonoids, tannins and polyphenols have been used to cure illnesses because of their various pharmacological characteristics. India is constantly known expected rich repository of medicinal plants and various forms of herbal medicine practices are treated as "living custom".

Medicinal Plants

Medicinal plants represent the most ancient form of medication, used for thousands of years in traditional medicine in many countries around the world. The empirical knowledge about their beneficial effects was transmitted over the centuries within human communities. Natural products play a pivotal role as a source of drug compounds and, currently, a number of modern drugs which are derived from traditional herbal medicine are used in modern pharmacotherapy. (Marrelli M 2021) Based on WHO, 21,000 medicinal plants are in use for various medical applications.

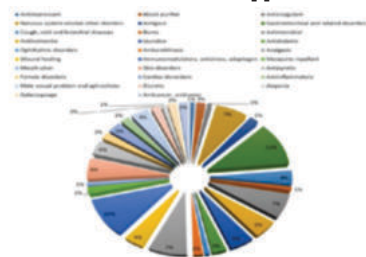


Figure 1: The main uses of medicinal plants encountered

Phytochemicals Of Medicinal Plants

Phytochemicals or chemicals in plants play important roles in their growth and development. They also attract beneficial birds and insects that promote pollination, germination, and seed dispersal. Phytochemicals provide colors to plants and an array of flavors both pleasant and unpleasant when consumed. They are unique to specific plants and parts of plants, and they usually increase in abundance during

stressful events. Phytochemicals also provide health benefits when consumed. They consist of nutrients essential for optimal health (e.g., proteins, carbohydrates, vitamins, and minerals) and other chemicals (e.g., phenolic acids, flavonoids, and other phenolics). (Krishna U M et al., 2023)

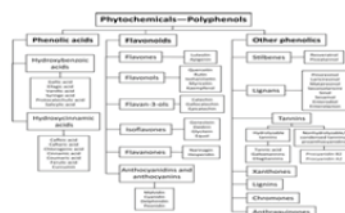


Figure 2: Phytochemicals

Classification of Phytochemical

Phytochemicals are classified as polyphenols, terpenoids, alkaloids, phytosterols, and organosulfur compounds. Chemical structure of polyphenols demonstrates one or more aromatic rings with one or more hydroxyl groups. They have been classified according to their chemical structure as phenolic acids, flavonoids, stilbenes, and isoflavones. (Krishna U M et al., 2023)

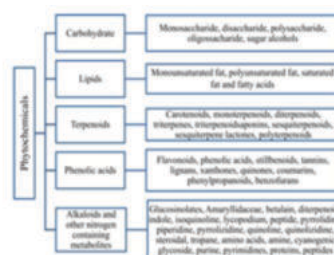


Figure 3: Uses of Phytochemicals of Plants

Antioxidant Plants

Antioxidant activity is an excellent example of a functional benefit that plant extracts can deliver. Hydrolates, are by-products of the hydrodistillation of plants. Hydrosols are widely used in 13 cosmetics. One of the greatest challenges in

skin care, whether it is healthy or affected by a pathological condition, is how to minimize oxidative stress. The antioxidant potential of hydrosols available in the cosmetics market, taking into account for the first time in scientific literature not only plant species, but also origin and method of preservation. (Jakubczyk et al., 2021)



Figure 4: Antioxidants Properties

Inflammation

The skin is the outermost organ in the human body and is exposed to various environmental factors. These factors influence the homeostasis of physiological skin function and sometimes induce an inflammatory response in the skin for appropriate adaptation to external environmental stimuli. Internal physiological factors also influence the degree of skin inflammation. (Sawada et al., 2021)

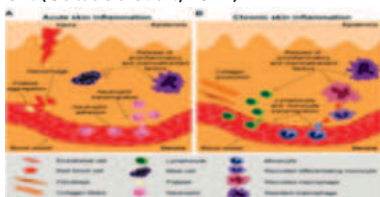


Figure 5: The Cascade of Acute and Chronic Skin Inflammation

Anti Inflammatory Activity Of Plants

Medicinal plants are often used both in the form of crude extracts and isolated compounds for biological application, some studies have reported the activity of isolated compounds is higher than the activity of crude extracts of medicinal plants against inflammatory disease. Phytochemicals such as quercetin, glabridin, liquiritigenin, apigenin-7-glucoside, salicin, kaempferol, naphthalene, gingerol, and some iridoid glycoside derivatives were reported as clinically tested and prescribed for the inflammation diseases. (Gonfa et al., 2023)



Figure 5: Different Types of Anti-inflammatory in Plant

Anti Larvicidal Activity

Insecticidal activity of plant proteins against mosquito: Plant contains defensive proteins to protect themselves against insect pests. The function of plant proteins is displayed in defensive mechanism. Proteins are digestive enzyme inhibitors, vicilins, lectins and chitinases act as insecticidal agents against insect and pest control. They effect the insect's feeding behavior, survival and fecundity. The mechanism of insecticidal activity is still not completely clear. (Kirar et al., 2022)

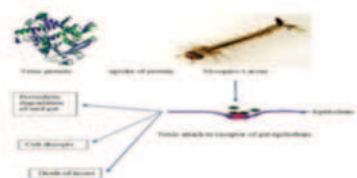


Figure 7: Mechanism of Action Towards Anti-larvicidal Activity of Plant

Therapeutic Plant Taken For The Current Study *Azadirachta indica*

The neem tree (*Azadirachta indica*) is a tropical evergreen tree in the Meliaceae family. It is native to East India and Burma, and it can be found across Southeast Asia and West Africa, with a few trees lately planted in the Caribbean and Central America, including México. Neem is now well recognized as a natural product with several uses in agriculture, industry, medicine, and the environment. Many agricultural products are made with this miraculous tree. Neem products include insecticides, pesticides, pest fumigants, fertilizers, manures, compost, urea coating agents, and soil conditioners. Products generated from neem trees are used as effective insect growth regulators (IGRs) and can also help manage nematodes and fungi. (Adusei & Azupio, 2022)



Scientific classification

Kingdom:	Plantae
Phylum:	Tracheophytes
Clade:	Angiosperms
Order:	Sapindales
Family:	Meliaceae

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