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## MECHANOCHEMICAL SYNTHESIS OF CITRONELLA OIL ENCAPSULATED MONTMORILLONITE NANOCOMPOSITE AS A MOSQUITO REPELLING AGENT

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### Introduction

Increasing population of mosquitoes are difficult to control due to their population density, reproductive capacity, genomic flexibility and metamorphosis [1]. Therefore, to control these blood sucking insects, scientists have developed environmental friendly control methods, such as Insects repellents, which is one of the most popular insect controlling methods in the world. Developing a repellent is a challenge because of the poorly known physiological mechanism of repellents, undefined different repellent phenomena and testing and quantifying the repellency [2]. Under the concept of green chemistry, natural insect repellents are more favored over chemically synthesized repellents. A repellent is a single or a mixture of volatile organic compounds that actively moves the responder out of the exact position to the opposite direction and reduces the attraction of insect until odor is faded [1]. In this study we have focused on repellents that repels insects, from odor source without direct contact.

Plant based insect repellents are known as minimum hazardous pesticides. They are essential oils, a mixture of volatile organic compounds and released under the suppressed conditions and more importantly evaporates at the room temperature. These natural products have a defense mechanism against insects and production of secondary metabolites, such as monoterpenes [4]. Most important insect repelling essential oils contain monoterpenes as their major component. In this study we used Citronella oil, which is commercially available, as the mosquito repellent essential oil [4]. Citronella oil contains constituents of citronellol, citronellal, geraniol, citral,  $\alpha$ -pinene and limonene, which is monoterpenes, has the mosquito repellent activity. It is obtained from the leaves and stems of different species of *Cymbopogon nardus* (lemongrass) [3]. However, the issue facing with the repellents is that the release is fast and hence the period of activity is short.