

AVANT-GARDE MOSQUITO REPELLENT TECHNOLOGIES BASED ON NANO-TECHNOLOGY AND MICRO-CAPSULES IN COMBATING VECTOR-BORNE DISEASES

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ABSTRACT

This talk aims at the investigation of new ways of controlling vector borne diseases mainly transmitted by mosquitoes via new technological processes in textile and paint industry using Nano- and Micro-particles releasing repellents or pesticides. Malaria, Dengue, Chikungunya and Yellow Fever are examples of vector-borne diseases caused by Mosquitoes are major health risk and also a negative economic factor in large parts of the world. The WHO has set the goal to constrain and control the spreading of dengue fever by 2020 [1], however there are major obstacles in achieving this goal. Some Vaccines are in advanced trial stages, but not effective against all serotypes [Phase 3, Sanofi Pasteur]. Classical mosquito control, like bed-nets and municipal spraying in the streets etc. have proven to be of little effective in combating disease cases [2].

The use of nano-particles in textiles [11],but also other applications like wall paint, containing and continuously releasing mosquito repellents and insecticides could be an effective tool to combat dengue. Nano- and micro-particles are used in textile production for various purposes, and can be used to slowly release chemicals like mosquito repellents and insecticides in a well-controlled rate, which can be more efficient than spraying on skin or other classical ways of application. Other applications are e.g. nano- and micro-particles containing repellents in wall painting colours. First attempts in this direction have been made, but so far no efficacy studies could be performed and the spectrum of combinations of nano- or micro-particles repellents, insecticides and types of textiles has not been well studied yet. In mosquito control, some activities in demonstration of efficacy using bed-nets via the WHO are performed. However bed nets are not very efficient against the disease.

The key question remains, in how far such new avant-garde technologies of mosquito-disease spreading can help to combat the vector-borne disease burden, eventually in collaboration with (in the case of dengue fever for sure) existing vaccines and other measures which turned out to only have limited efficacy [4, 5]. Unfortunately serious scientific trials are lacking in this relation. In order to analyse the above questions Statistical Tools are needed, which are in the core of the research carried out in the Biomathematics and Statistics group at University of Lisbon [3, 6, 7, 8, 9, 10].

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