

INSECT-PROOFING OF TEXTILES TO PREVENT VECTOR- BORNE DISEASES

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ABSTRACT

Each year millions of people die of diseases which are transmitted by insects (e.g. malaria, yellow fever, dengue fever). Due to climate change and globalization vector-borne diseases pose an increasing threat to the people even in Europe so that personal protective equipment becomes more and more important. Procedures to treat textiles with insecticides are known, although the treated textiles are missing sufficient permanence (to light and/or to washing). Furthermore, insecticides are not recommended for use for the application to textiles for children or pregnant women. The alternatives are insect repellents which are more difficult to apply to textiles due to their volatility.

Functional colloidal polymer particles, i.e. microgels, were developed and studied as carriers of insecticides for the application onto textiles. In this work, β -cyclodextrin-derivatives were used to introduce hydrophobic domains into acrylate- or *N*-vinylcaprolactam-based microgel systems. This leads to multifunctional colloidal polymer networks which adsorb to textiles and bind there physically ^[1-3]. The cyclodextrin-microgels were loaded with the insecticide permethrin and applied onto different fabrics. Bioactivity tests against *Aedes aegypti* that can transmit dengue fever, yellow fever and chikungunya viruses show that effectivity with regard to the knock-down effect has been reached.

In parallel, fabrics were coated with commercially available permethrin-based insecticide formulations. The permanence and biological activity of the finished fabrics was investigated in dependence on the applied insecticide concentration, added auxiliaries and thermal fixation. For fabrics which were treated with permethrin high bioactivity against *Aedes aegypti* was demonstrated.

Acknowledgements

The research project IGF No. 16869 N of the research association Forschungskuratorium Textil e.V., Reinhardtstrasse 12-14, 10117 Berlin, was funded via Arbeitsgemeinschaft industrieller Forschungsvereinigungen e.V. (AiF) within the promotion program of „Industrielle Gemeinschaftsforschung“ (IGF) of the Federal Ministry for Economic Affairs and Energy on the basis of a decision by the German “Bundestag”. - We also thank the Wehrwissenschaftliches Institut fuer Werk- und Betriebsstoffe (WIWeB, Erding/D) and the Central Medical Services of the Federal Defence Forces of Germany, laboratory group for medical zoology, Koblenz/D, for performing the biological tests. - Furthermore, we would like to thank all DWI colleagues for their support.

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