

**Microencapsulation of Essential Oils (*Citronella*) and Impregnation into Cotton Fabric****Wijayapala S.**

*Department of Textile and Clothing Technology, Faculty of Engineering, University of Moratuwa, Sri Lanka  
samu@uom.lk*

**Abstract**

Microencapsulation is a micro packaging technique that has traditionally involved the deposition of thin polymeric coatings on small particles of solids or liquids. Microencapsulation is a rapidly expanding technology and finds greater applicability in textiles in recent years. Uniqueness of microencapsulation is the smallness of coated particles and it provides a means of packaging, separating and storing materials on a microscopic scale for later release under controlled conditions. The properties of microcapsules, size, shape, wall material, active substance release mechanism, have had to be adapted to the requirements of textile processing methods and use of final products. Some of the herbal compounds obtained from plants are well known from time immemorial as antibacterial and antifungal products. These plants and tree products are applied directly on skin or wounds as paste or tincture either for skin care or wound healing. These natural products are abundantly available in nature and are widely distributed. These plant products are nonirritant to skin and non-toxic. Many of these materials are skin care products. The stem, bark, leaf, root and tuber of the plants and trees can be used for special applications. In recent years various essential oils have been reported as mosquito repellents due to their eco-friendly and biodegradable nature, in particular, the essential oil extracted from citronella, one of the main aromatic crops. Citronella has been found to be possessed effective repellent activity against a female mosquito for 12h after the direct application of pure oil on the skin of human subjects. The present study was focused on the preparation of the microcapsules from citronella oil. The prepared extracts were applied on the cotton fabric and the mosquito repellent efficiency of the fabric was tested against the microencapsulated extract finished cotton fabric. Citronella essential oil was used as mosquito repellent agent. The fabric used was a bleached 100% cotton plain weave with a specific weight of 140 g/m<sup>2</sup>. Repellent textiles were achieved by padding cotton fabrics with microcapsules slurries using a conventional pad-dry method. This methodology requires no additional investment for textile finishing industries, which is a desirable factor in developing countries. The wash durability of the finished fabrics was evaluated at four intervals; 5, 10, 15 and 20 washes. Fabrics treated with microencapsulated citronella oil presented a higher and longer lasting protection from mosquitoes compared to fabrics sprayed with an ethanol solution of the essential oil, assuring a repellent effect higher than 90% for three weeks. Therefore this is a simple, low cost, scalable and reproducible method of obtaining encapsulated citronella oils for textile application.

**Keywords:** Microencapsulation, Herbal, Mosquito repellent, Cotton fabric