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Characterization and evaluation of commercial fragrance microcapsules for textile application

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Characterization and evaluation of commercial fragrance microcapsules for textile application

Carla Sofia Nogueira Rodrigues Teixeira^a, Isabel Maria Duque Martins^a, Vera Lúcia Gomes Mata^b,
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In this paper, some commercial microcapsule samples, containing different fragrances used for textile application purposes, were characterized and evaluated. Microcapsule samples were evaluated in terms of particle size, morphology, shell material composition, and fragrance intensity. The effectiveness of the textile impregnation and its durability were assessed. The selection of samples used in each study was made in order to the specific goals of characterization and evaluation of microcapsules. Lemon_Bayer, Lemon_Focor, Lemon_Horquim, Strawberry_Horquim, and Jasmine_Focor samples were used to study the morphology and particle size distribution, and it was observed that microcapsules have a spherical shape with size between 2 and 6 μm . The chemical composition of Lavender_Horquim, Mints_Horquim, Eucaliptus_Focor, and Apple_Focor samples was checked/confirmed and was based on melamine copolymers including melamine-formaldehyde ones. Lemon_Horquim microcapsules were impregnated on textile substrates, and it was observed that a loss of 46% of limonene occurred after one domestic wash and a loss of 97% occurred after 20 domestic washes.

Keywords: commercial microcapsules; perfume; textile; microscopy; chromatography; FTIR

Introduction

The competitiveness of the textile sector depends on the capability to understand and meet customer needs by incorporating technology evolution and mobility of human resources. The introduction of microencapsulation into a traditional industrial sector, such as the textile, will help in making products innovative in accordance with the requirements of fashion.

At the beginning of the 1990s, a few commercial applications of microcapsules in textiles appeared. Today, the number of commercial applications of microcapsules in textile keeps on growing. Developed countries have shown interest in textiles with new properties and high-added value, such as functional textiles and medical textiles. This need is, therefore, leading textile industries to take action by investing in cutting-edge technology such as microencapsulation in order to achieve the desired finishes with the required properties, which would not be possible using another technology (Ulrich & Eppinger, 2003).

Nowadays, scientific advance is being used for the development of innovative textile products. Insect repellents (Nelson, 2002), anti-cellulite treatments (Naylor Rocha Gomes, Magalhaes Vaz Vieira, Pinto Cerqueira Barros, & Pinto Cerqueira Barros, 2006), long-lasting fragrances and skin softeners (Gumi, Gascon, Torras, & Garcia-Valls, 2009; Hirech, Payan, Carnelle, Brujes, & Legrand, 2003; Monllor, Bonet, & Cases, 2007; Nelson, 2001), medical applications such as antibiotics, hormones and other drugs (Nelson, 1991; Re & Biscans, 1999; Vasiliu, Popa, & Rinaudo, 2005), and antimicrobial agents for medical textiles (Gniotek, 2003; Muzzarelli, Stanic, Gobbi, Tosi, & Muzzarelli, 2004) are some applications for which clothing manufacturers are applying to add value to the products. In particular, finishing textiles with fragrances is an important commercial target and an engineering challenge (Costa, Moggridge, & Saraiva, 2006; Oktem, 2003; Rodriguez Romero, Sanchez Silva, Sanchez Pare-des, De Lucas, & Torres Barreto, 2007). Developing new products with high-added

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