Adsorption capacity evaluation of a lipopeptide biosurfactant on human hair

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Nowadays, surfactants are used in a wide variety of applications in several fields, such as cosmetic and health care, environmental issues and, generally, as detergents. They present valuable characteristics since they can decrease water surface tension and solubilize molecules that cannot be eliminated in an aqueous media in normal conditions. Due to their surface active nature, synthetic surfactants can result toxic in the media in which they are applied. These drawbacks can be overcome by using biosurfactants, since they result environmentally friendly because of their biodegradability and low toxicity. Therefore, it would be interesting to replace synthetic detergents by biosurfactants in cosmetic and personal care formulations. From this point of view, Vecino et al., [1] have extracted biosurfactants from an industrial stream of corn wet milling industry, consisting of a lipopeptide that could have important applications in the formulation of natural shampoos. This biosurfactant is able to reduce the surface tension of water in more than 30 units. Thus, the aim of this work was to study the adsorption of this biosurfactant in human hair.

Biosurfactant was extracted from corn steep liquor using the methodology proposed by Vecino et al. [1], obtaining a biosurfactant extract that was dissolved in water at its critical micelle concentration. After that, samples of hair were added to this solution using a liquid-solid ratio of 50:1. Adsorption experiments were carried out at 20°C, pH 6 at 200 rpm during 30 min. At different intervals of time, samples of biosurfactant solution were obtained and their surface tensions were measured.

The results showed that after 30 min, part of the biosurfactant was adsorbed onto the hair, thus samples increased their surface tension from 43.4 mN/m up to 52.8 mN/m. These are very promising results because they open the door for obtaining more biocompatible an ecofriendly shampoos. Moreover, this biosurfactant could increase the strength of damaged hair by incorporating lipopeptides to the hair fiber, although more studies would be needed in order to corroborate this fact.

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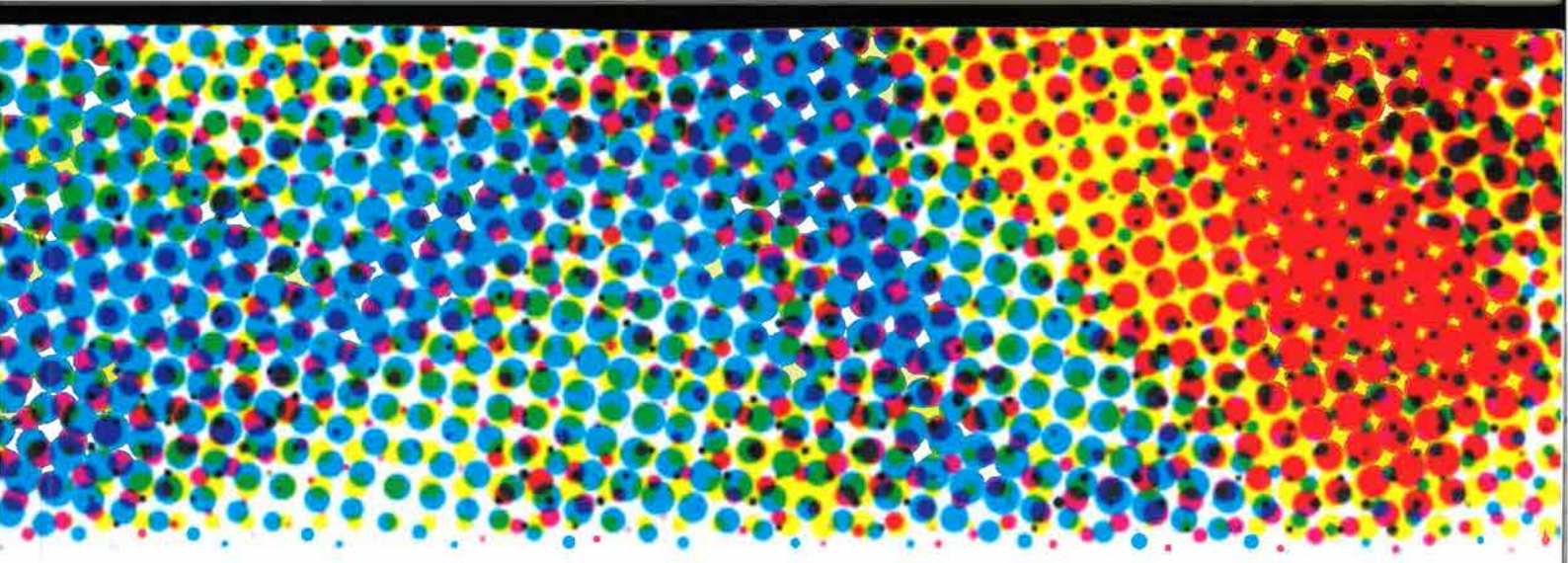
References

[1] Vecino, X., Barbosa-Pereira, L., Devesa-Rey, R., Cruz, J. M., & Moldes, A. B., Bioprocess and Biosystems Engineering, vol 38 (2015), 1629-1637.



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