

The potential use of biosurfactants as contact lenses coating Agents

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During the last years, several applications of biosurfactants (BS) with medical purposes have been reported. BS are microbial compounds that exhibit pronounced surface and emulsifying activities, and have been considered relevant molecules for applications in combating many diseases and as therapeutic agents due to their antibacterial, antifungal and antiviral activities. Furthermore, their role as anti-adhesive agents against several pathogens illustrates their utility as suitable anti-adhesive coating agents for medical insertional materials (especially the ones produced of silicone rubber).

Many of the adverse responses that occur during contact lenses (CL) wear are a consequence of its microbial colonization. Therefore, due to their properties, the use of BS as a coating agent could represent an alternative way of inhibiting or preventing contact lenses microbial adhesion. In previous work, it was already proven the antimicrobial and anti-adhesive activity of BS produced by several probiotic strains. However, although active against microbial adhesion, other contact lenses features, might limit the use of these BS. Thus, the purpose of this study was to evaluate the influence of BS adsorption on contact lenses refractive index (RI) and transmittance (T).

Two silicone-hydrogel (Galyfilcon and Lotrafilcon B) and one conventional hydrogel CL (Etafilcon A) lenses were used. Three BS produced by different microbial sources were tested. Regarding the RI of silicone-hydrogel lenses with and without adsorbed biosurfactant, no differences were found. However, for the hydrogel CL conditioned with BS, higher RI was obtained as compared to the untreated CL. This increase in RI is a consequence of the dehydration observed with the adsorption of the BS, which is not desirable.

All treated contact lenses types showed a decrease in transmittance levels in the visible spectra, being this effect more pronounced for higher BS concentrations as a result of the BS colour. Although the results obtained for the transmittance experiments are quite promising, further characterization/purification of the BS is required to enable the use of lower concentrations, more active and colorless fractions.