A study on the removal of protein deposits on contact lens using enzymes

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ABSTRACT

This study was conducted to investigate the quantification and cleaning methods for the protein deposits on contact lens. The items studied include the effect of wearing time on the quantity of protein deposits; the effect of finger-rubbing on the removal of protein deposits; and the effect of protease addition on the removal of protein deposits. Furthermore, a cleaning solution was prepared in this study, and its storing stability and cleaning efficiency were estimated and compared with the commercial products. The results showed that the changes in the absorbance at 275 nm could be an indicator of the quantity of protein deposits on contact lens. For the same type of contact lens (disposable or long-term wearing), the higher the water contents of contact lens, the larger the quantity of protein deposits. Of these, the quantity of protein deposits on disposable contact lens was greater than that on long-term wearing ones. For a short soaking term, there had an enhancing effect on the removal of the protein deposits on contact lens by finger rubbing. In this regard, it was significant when the soaking time was less than an hour; however, it was less significant when the soaking time was more than four hours. As for the effect of the proteases on the removal of the protein deposits on contact lens, when cleaning for 30 minutes, the flavourzyme had the best performance (82.94 %, expressed as the percentage of the absorbance reduced at 275 nm). When cleaning for two hours, the subtilisin A was the best (95.07 %). Moreover, there was no difference between three proteases when cleaning over four hours. A cleaning solution, designated as DYU-C001, was prepared in this study. When the solution was stored for different periods of time, it showed no remarkable changes in the efficiency for the removal of protein deposits on contact lens. This reveals that the DYU-C001 solution had a good storing stability. In comparison with other commercial products (Sample S and Sample J), the DYU-C001 solution had a low cost and had a good performance on the removal of protein deposits on contact lens.

Keywords : cleaning solution, contact lens, proteases, protein deposits

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