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Paper Abstracts
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Evaluation of the hydrophilicity of silicone hydrogels by visualizing hydrophobic areas with Sudan IV

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Purpose: The aim of the study was to visualise hydrophobic areas of silicone hydrogels on the surface and in the bulk (core material) using a saturated solution of Sudan IV. In addition, the influence of the all-in-one solution OPTI-FREE Puremoist (MPS) and an artificial tear solution (ATS) on the hydrophobic areas was investigated.
Method: Within the scope of the study, two target values of the silicone hydrogels Balafilcon A, Balafilcon A (2), Samfilcon A, Comfilcon A and Fanfilcon A were compared with the hydrogel material Ocufilcon D in vitro. The absorption coefficient was determined using a spectrometer (SPECTRO 100, INSTRUMENT SYSTEMS), while the total percentage staining was analysed graphically using the IMAGE J software. The variation in the staining time enabled a differentiated staining of the hydrophobic areas on the surface (30 min) and in the core material (16 h).
Results: On the surface, the silicone hydrogels showed hydrophilicity comparable to that of the hydrogel. In the core material, however, statistically significantly more hydrophobic areas could be stained. MPS was able to effectively reduce the hydrophobic areas of monthly disposable contact lenses previously inserted in ATS. The following values (ATS total staining//absorption coefficient; ATS-MPS total staining//absorption coefficient) were obtained; for the bulk coloured hydrogel Ocufilcon D (0.0 % // 0.049; 0.0 % // 0.028) and the silicone hydrogels Balafilcon A (42.2 % // 0.0215; 17.2 % // 0.107), Balafilcon A (2) (25.0 % // 0.102; 6.8 % // 0.047), Comfilcon A (27.4 % // 0.151; 6.4 % // 0.075) Samfilcon A (15.2 % // 0.083; 8.6 % // 0.077), Fanfilcon A (28.2 % // 0.131; 4.0 % // 0.064). The reduction was statistically significant for all materials, with the exception of Samfilcon A ($p<0.001$).
Conclusions: By using Sudan IV, it was possible to stain specific hydrophobic areas on the surface and in the bulk area. The study identified specific differences in staining with Sudan IV for different materials.

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