THE EMULSIFICATION OF HUMAN SERUM ALBUMIN AND HYALURONIC ACID SOLUTIONS IN POLYDIMETHYLSILOXANE PDMS-1000

A. M. Ruban 1, A. I. Kazanets 1, T. V. Krupskaya 2, V. V. Turov 2

1 Clinical eye hospital «Eye microsurgery center», Kyiv, Ukraine
2 Chuiko Institute of Surface Chemistry of the National Academy of Sciences of Ukraine, Kyiv
To create a biologically inert material suitable for use in a wide range of temperatures and in corrosive environments, the methods of optical microscopy and NMR-cryometry were used for investigation of emulsification of solutions of human serum albumin and hyaluronic acid in polymethylsiloxane PDMS-1000. Unlike hyaluronic acid, human serum albumin forms persistent emulsions in the silicon matrix, whose size of the droplets varies from 100 to 10 000 nm. The presence of dispersed phase (human serum albumin or hyaluronic acid) increases significantly melting temperature of polydimethylsiloxane. It is probably due to ordering influence of micro- and nanodrops of biopolymers on PDMS crystals localized between them.

In case of dispersion of hyaluronic acid solution in liquid silicone only microdroplets of the aqueous phase are observed and nanosized droplets either didn’t form or were in amount not sufficient to be detected by NMR cryometry.

The possibility of a significant influence of human serum albumin emulsified solution on PDMS-1000 defrosting temperature is revealed, that is impacted on its optical parameters. This effect is recorded both in the low temperature region and at temperature close to human body, which might influence on silicone state when it is used as implant.

**Key words:** \(^1\)H NMR-spectroscopy, silicone, human serum albumin, hyaluronic acid, water clusters.

© Palladin Institute of Biochemistry of the National Academy of Sciences of Ukraine, 2008

{spoiler title=References}


http://dx.doi.org/10.1016/S0927-7757(02)00137-1


{/spoiler}