

## **INTERACTION OF SYNTHETIC AND NATIVE BLOCK COPOLYMERS (LUTROL F-127 AND BOVINE BETA-CASEIN) IN WATER SOLUTION. MIXED MICELLES**

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Mixtures of water soluble synthetic block copolymers with various ionic-, non-ionic surfactants and other synthetic block copolymers are widely investigated in recent decades. The amphiphilic properties of mixing components have a considerable effect on the complex mixture associative behaviour due to their interactions in solution. A deeper investigation of these interactions may get a key to understanding of the self-organization mechanism in these mixtures and allow extending their industrial applications (including drug delivery, cosmetic and food industry). From this point of view it was very interesting to perform pioneer studies with regard combination of synthetic symmetrical triblock copolymer, such as Lutrol F-127 [(EO)<sub>101</sub>(PO)<sub>56</sub>(EO)<sub>101</sub>], and native block copolymer beta-casein (the most abundant milk protein). Previous studies by us and others showed that in neutral pH conditions beta-casein self-organizes into micelles similar to those encountered in an anionic surfactant. Water solutions of Lutrol F 127 behave like non-ionic surfactant due to its dual - hydrophilic (PEO-blocks) & hydrophobic (PPO-block) properties. By using of Calorimetry techniques (DSC and ITC) the self-assembly and binding parameters in the block copolymer's mixtures were determined and found to be dependent on the temperature and component's ratios. These results are correlated with results obtained by SAXS, employed for calculation of radius of gyration of the mixed micelles and estimation of the common micelles volume. The factors affecting the mixed micelles morphology studied by employing the cryo-TEM technique and the self-organization mechanisms in the block copolymer's mixtures are discussed.