A study of the influence of surfactants on the wettability of the human skin surface

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Because of a very high surface tension of water (72.8 mN/m) it does not spontaneously spread over solids which surface tension is smaller than 72.8 mN/m [1]. Therefore, an addition of surface active agents, especially surfactants, is needed to achieve its better wettability. Studies on the wettability of the human skin surface by surfactants used in cosmetics are very important because of the fact that its wettability is the most important factor of the skin protective and barrier function: minimizing water loss and preventing the entry of foreign matters and chemicals. In addition, wetting and interfacial phenomena play a major role in the skin surface ecosystem, adhesion of microorganisms, survival and proliferation of the resident flora, washing and cosmetic skin care [2,3,4]. However, in spite of such an important role in skin physiology and cosmetic science, the wettability of the human skin surface has been poorly investigated.

The barrier properties of the human skin surface are exerted by its outermost and very thin layer - the stratum corneum. This layer is built of dead cells stuck together by an intercellular cement which is the current path of the skin permeation by chemicals (for example, surfactants). On the other hand, it is well known that surfactants, because of their amphiphilic character can absorb and penetrate into and through the skin. Their absorption depends on the surfactant type and condition of the skin (barrier functions of the stratum corneum). It is also determined by the contact area between surfactant solution, the skin surface and its wettability [5,6].

Because of the ability of surfactants to be adsorbed on the human skin surface they can reduce the interfacial tension at skin-water interface in the skin-water-air system. It also affects the solution or the cosmetic product wetting properties. Thus, it was interesting to deduce the adsorption properties of surfactants used in cosmetic and the correlation between these properties and the human skin surface wettability.