UNDERSTANDING TRIBOLOGICAL BEHAVIOR OF COMPLEX GEL SYSTEMS FOR PERSONAL CARE APPLICATIONS USING *SURROGATE SKIN* AND THEIR BULK RHEOLOGY

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Key Words: tribology, rheology, phospholipids, hydrophobically modified polymers, sensory.

Creams and lotions based on oil-in-water emulsions with polymers are commonly used to treat dry skin conditions. Since the accumulation of traditional surfactants on the skin can promote irritation, an alternative is the use of hydrogenated phosphatidylcholine (HPC), a type of phospholipid that can form a lipid lamellar structure similar to the *stratum corneum*, the outermost layer of the epidermis which acts as a skin barrier. This research aims to investigate the effect of composition on the rheological and tribological characteristics in systems with HPC as surfactant and to find relationships between rheological and tribological properties to help predicting sensory perception of emulsions for skincare applications. For tribology experiments we used a ball-on-disk configuration to obtain friction curves *using different disk materials to mimic the skin surface* (PDMS and artificial skin, Bioskin™), while for bulk rheology studies we used dynamic and steady shear experiments. We examine how the addition of different amounts of HPC and polymers with different hydrophobicity affects friction and lubrication regimes from the tribological standpoint and the viscoelasticity, yield stress, and gel formation from the rheological standpoint. The bulk rheology shows that the studied systems are shear thinning and have gel-like behavior. The effect of each component was investigated by going from a simple system (polymer and water) to the more complex system. Systems containing a hydrophobically modified polyacrylic acid lightly crosslinked showed lower yield stresses and lower moduli than systems with carbomer type polymer. Analogous experiments were carried out in tribology. In the range of entrainment speed investigated, the friction coefficients in the boundary regime were lower for diluted systems containing the hydrophobically modified polymer than for systems containing the carbomer type polymer. The Stribeck curves obtained for each of the systems are compared for different polymer types and related to the bulk rheology results to obtain physical insights into these complex systems.