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The study the properties structurals and elastics of phases lamellar of lipid

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Lamellar systems composed of lipid bilayers have been widely used as model system for investigating properties of biological membranes, interactions between membranes and with biomolecules. The composition of the membrane determines its three dimensional shape and its properties such as rigidity and compressibility which play an important role on membrane fusion, protein adhesion, interactions between proteins, etc. We present a systematic study of a lamellar system composed of lecithin and a commercial co-surfactant (Simusol), which is a mixture of ethoxylated fatty acids. Using X ray scattering and a new procedure to fit X-ray experimental data, we determine relevant parameters characterizing the lamellar structure, varying membrane composition from 100% of lecithin to 100% of Simulsol. We present experimental data illustrating the swelling behavior for the membrane of different compositions and the respective behavior of the Caillé parameter. From and GISAXS experiments on oriented films under controlled humidity we investigate the compressibility of the lamellar phase and the effect of incorporating co-surfactant. Combining the Caillé parameter and compressibility studies we determine the bending rigidity of membranes. The results obtained with this experimental approach and new procedure to fit X-ray experimental allows us to identify structural changes in the bilayer depending both on hydration and co-surfactant content, with implications on elastic properties of membranes.

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