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Neutron and X-Ray Reflectivity from chocolate sandwiches

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Chocolate is a dense suspension of solids, mainly sucrose, in a continuous triglyceride fat phase of cocoa butter, containing Lecithin, which is mostly phospholipid, and in some cases the polymeric surfactant PolyGlyceryl PolyRicinoleate (PGPR). These surfactants reduce the yield stress and viscosity of molten chocolate, which is important in chocolate manufacture and influences the mouth feel of the chocolate. How these surfactants cause these modifications to the rheology of molten chocolate remains an open question.
We have developed a methodology that allows the preparation of well-defined crystalline planar sucrose films as substrates to study the structures formed by these surfactants at sucrose/triglyceride interfaces. X-ray and neutron reflectivity has been used in combination with QCM-D to characterize the adsorption of these surfactants individually and in combination at the sucrose/triglyceride interface to provide a structural basis for the observed rheology.

References: Birgit Schantz, Harald Rohm. (2005) Influence of lecithin–PGPR blends on the rheological properties of chocolate. Lebensm.-Wiss. u.-Technol. 2005, 38: 41-45. http://www.sciencedirect.com/science/article/pii/S002364380400115X

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