Experimental report

21/03/2017

Proposal: 8-02-768 **Council:** 4/2016

Title: Interaction of Rhamnolipids with single model membranes

Research area: Biology

This proposal is a new proposal

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Samples: deuterated phospholipids
dirhamnolipids
sistosterol
glucosylceramide

Instrument	Requested days	Allocated days	From	To
FIGARO	6	2	13/12/2016	15/12/2016
D17	6	0		

Abstract:

Biosurfactants have been widely studied in the last years due to their low toxicity, biodegradability and ecological safety. Among biosurfactants, rhamnolipids (RLs) hold a prominent position because of their interesting biological properties such as antimicrobial, antiphytoviral, zoosporicidal activities. Moreover RLs are able to trigger an immune response in Arabidopsis, characterized by signalling molecules accumulation and defense gene activation. The biological activities of natural RLs are highly supposed to be related to their interactions with plasma membranes of target cells. Some studies have been performed to investigate the effects brought by RLs to model lipid membranes, showing their importance in membrane stabilization or destabilization and in regulation of lipid polymorphism, but the detailed molecular mechanism of these interactions is still unknown. In this context, we are studying the structural changes brought by the presence of RLs to complex model membranes by complementary techniques, and we propose to apply neutron reflectometry to investigate the transverse structure modifications brought by RLs presence to different asymmetric model membranes.

Interaction of Rhamnolipids with single model membranes

Aim of the proposed experiment was to study the structural changes brought by the presence of rhamnolipids (RLs) to model membranes.

For a lack of time we could not investigate all the proposed systems.

In Figure 1 we report the reflectivity spectrum and contrast profile of an asymmetric d_{31}-POPC:glucosylceramide membrane prepared by the Langmuir-Blodgett + Langmuir-Schaefer technique, studied at 22°C in D_2O.

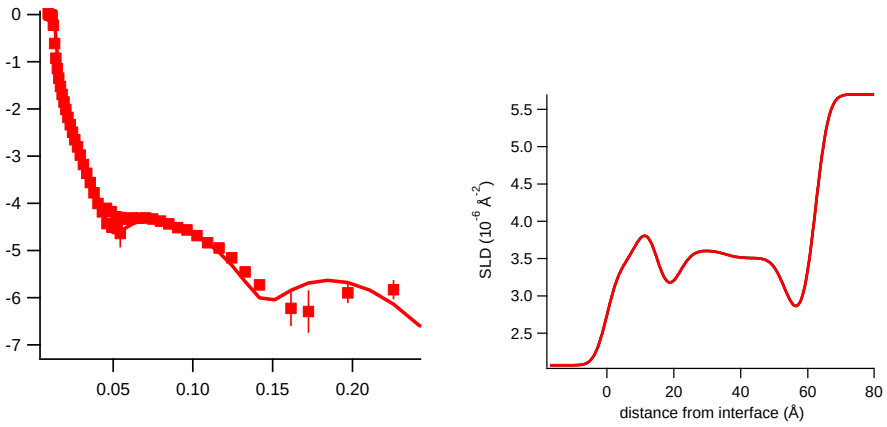

Figure 1. Reflectivity spectrum (left, squares are the experimental points, line the fit) and contrast profile (right) of a d31-POPC:glucosylceramide model membrane at T=22°C in D_2O.

We observed that RL-membrane interaction occurred and that interaction strongly depends on membrane composition.