Soy Lecithin Foam Stabilization: Thin Foam Films and Interfacial Rheology Study

Hristina Petkova [1, 2], Dimitrinka Arabadzhieva [1], Nikolay Panchev [1], Khristo Khristov [1], Plamen Tchoukov [1, 2]

[1] Institute of Physical Chemistry, Bulgarian Academy of Sciences, "Acad. G. Bonchev" Str. bl. 11, 1113 Sofia, Bulgaria
[2] National Centre of Excellence Mechatronics and Clean Technologies , 8 bul. "Kliment Ohridski", Sofia, P.C . 1756, Bulgaria

hpetkova@ipc.bas.bg

Lecithins are phospholipidic mixtures of natural origin, which are known for their ability to stabilize colloidal systems such as foams and emulsions. They are widely applied in various processes in the food, pharmaceutical, cosmetic, and other industries due to their biocompatibility, minimal environmental impact and potential health benefits.
The present study explores the interfacial behavior of Soy Lecithin (Soy PC) as well as its ability to stabilize foams. The investigations are focused on the physicochemical properties of the basic elements of foams: thin liquid films and adsorption layers, in view of a better understanding of the underlying mechanisms of foam stabilization.
Dynamic surface tension and surface rheology are measured using a profile analysis tensiometer. Thin foam films characteristics (drainage kinetics, film thickness, disjoining pressure isotherm, critical pressure of film rupture, etc.) are explored using the microinterferometric method of Scheludko-Exerowa and the TLF Pressure balance technique.
The results are correlated to the stability of Soy PC based foams studied under the same experimental conditions. The data shed additional light on the mechanism of foam stabilization and might be helpful for optimization and control of foams with potential industrial applications.

Keywords:
thin liquid films, interfacial rheology, foam

Acknowledgements:
Research equipment of the project № BG16RFPR002-1.014-0006 "National Centre of Excellence Mechatronics and Clean Technologies" was used for experimental work financially supported by European Regional Development Fund under "Research Innovation and Digitization for Smart Transformation" program 2021-2027.
The research was partly funded by the European Union – NextGenerationEU through project BG-RRP-2.015-0009.