

PÔSTER - RESUMO - INOVAÇÃO

INTERACTIONS OF ACETYLENIC ACETOGENINS WITH BIOMIMETIC MEMBRANE MODELS AT THE AIR-WATER INTERFACE

Gabriel Torquato Berllini (gabriel.berllini@unifesp.br)

João Henrique Ghilardi Lago (joao.lago@ufabc.edu.br)

Luciano Caseli (lcaseli@unifesp.br)

This study aims to investigate the interactions of a compound composed of an enriched

mixture of acetylenic acetogenins, naturally occurring in species of the Annonaceae

family and known for their potent cytotoxic and neurotoxic effects [1], as well as their

demonstrated pharmacological activity against both trypomastigote and amastigote

forms of *Trypanosoma cruzi* [2], with biomimetic cell membrane models in the form of

Langmuir films. The compound is incorporated into lipid monolayers composed of

phosphatidylcholine (DOPC and DPPC), phosphatidylethanolamine (DOPE and DPPE),

phosphatidylserine (DOPS and DPPS), and cholesterol. Mixed monolayers are formed

by co-spreading the compound with the selected lipids at the air–water interface,

enabling a detailed investigation of interaction mechanisms between acetylenic acetogenins and membrane models. Monolayer characterization is carried out through

surface pressure–area isotherms, compression–expansion (hysteresis) experiments,

tensiometric stability measurements, and Brewster angle microscopy analyses. These

techniques allow assessment of surface activity and elucidation of the effects of acetogenin incorporation on the structural, thermodynamic, and viscoelastic properties

of lipid monolayers. The study is expected to identify lipid classes that are most strongly affected by interactions with acetylenic acetogenins, correlating changes in

monolayer organization and mechanical properties with their antiparasitic potential.

Furthermore, comparative analyses of monolayers and liposomal systems will provide

insight into possible mechanisms of action and assess the feasibility of employing these

molecules in selective membrane-targeted delivery strategies.

Acknowledgements:

FAPESP - processo nº 2025/27044-5 e CNPq - processo: 408449/2024-1

Keywords: Langmuir films, acetylenic acetogenins, biomembranes

References:

[1] Qazi AK, Siddiqui JA, Jahan R, Chaudhary S, Walker LA, Sayed Z, Jones DT, Batra SK, Macha MA, Emerging therapeutic potential of graviola and its constituents in cancers. *Carcinogenesis* 39(4) (2018) 522–533

[2] Oliveira, E. A., Brito, I. A., Lima, M. L., Romanelli, M., Moreira-Filho, J. T., Neves, B. J., et al. (2019). Antitrypanosomal Activity of Acetogenins Isolated from the Seeds of *Porcelia macrocarpa* Is Associated with Alterations in Both Plasma Membrane Electric Potential and Mitochondrial Membrane Potential. *Journal of Natural Products*.

Palavras-chave: langmuir films; acetylenic acetogenins; biomembranes.