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Title:

Emulsification functionality of coconut oil body membrane materials

Authors & affiliations:

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Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text into it.)

Preparation of Your Abstract

1. The title should be as brief as possible but long enough to indicate clearly the nature of the study. Capitalise the first letter of the first word ONLY (place names excluded). No full stop at the end.
2. Abstracts should state briefly and clearly the purpose, methods, results and conclusions of the work.

Introduction: Clearly state the purpose of the abstract
Methods: Describe your selection of observations or experimental subjects clearly
Results: Present your results in a logical sequence
Discussion: Emphasize new and important aspects of the study and conclusions that are drawn from them

Plant oil bodies (OBs) are surrounded by interfacial biomaterials known as oil body membrane materials (OBMMs), which can function as natural emulsifiers. Coconut was chosen as a model system to study the extraction process of OBs and OBMMs. Churning and freeze–thawing were selected as natural and solvent-free methods for OB extraction. While churning proved ineffective in destabilising the OB membrane, freeze–thawing was more successful, as the membrane was more susceptible to temperature-induced physical stress than shear stress. After freeze–thawing, the OB membrane was visualised as fragments rather than individual components using transmission electron microscopy. Liquid chromatography coupled with tandem mass spectrometry identified two isoforms of the main OBMM proteins, oleosins, as 500c and 500a, while phosphorus-31 nuclear magnetic resonance spectroscopy revealed phosphatidylinositol as the main OBMM phospholipid. A second freeze-thaw cycle improved the extraction efficiency, producing an OBMM fraction with enhanced emulsification properties. However, OBMM emulsification properties were limited due to the irregular interfacial arrangements of membrane fragments. This arrangement resulted in droplet flocculation, which could be advantageous for specific food applications, and highlights the potential of OBMMs as functional ingredients in the food industry.