CONTROL OF PARTIAL COALESCENCE IN SOLID-OIL-IN-WATER EMULSIONS AS A TOOL TO TUNE THE TEXTURE

Julie Bloquet-Maurras [1,2], Ahmed Bentaleb [2], Eric Laurichesse [2], Mathilde Bayard [1] and Véronique Schmitt [2]

[1] Soredab, Groupe Savencia, France
[2] Centre de Recherche Paul Pascal, UMR 5031, University of Bordeaux, CNRS, France

veronique.schmitt@crpp.cnrs.fr

In cosmetics, as well as in food, many emulsions are made of oil that can solidify at low temperatures. After preparation in the liquid state, when cooled down, the drops exhibit surface rugosity that may lead to destabilization through partial coalescence also named edge piercing consisting of connecting drops together. This deleterious phenomenon is also an opportunity to tune the texture of the sample as illustrated in Figure 1, where it can be see that the texture varies from hard and brittle, to liquid and to easily spreadable .

The objective of the present work was to determine the effect of three stabilizers on partial coalescence and therefore on the texture of cocoa butter-in-water emulsions [1]. The emulsions were initially prepared in the oil liquid state and allowed to crystallize for seven days. We show that the type of emulsifier is of utmost importance, everything else being unchanged: dairy proteins are too protective, inhibiting partial coalescence and the formation of a gel, lecithins are not protective enough to lead to interesting gels while buttermilk powder, comprising a mixture of both stabilizers, is very promising since a spreadable gel could be obtained thanks to connections between droplets.

Keywords:
O/W emulsions, solid oil, partial coalescence, edge-piercing, interface

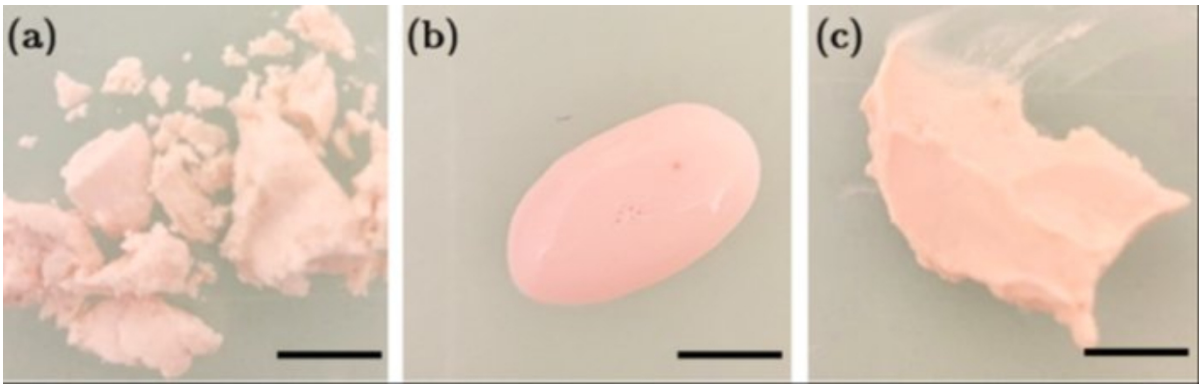

Figure 1: Photographs of solid oil-in-water emulsion obtained after 7 days crystallization stabilized with (a) vegetal lecithin, (b) a milk protein and (c) buttermilk powder. The scale bar represents 0.5 cm. The pink color is due to the addition of a dye for easier observation.

References:

[1] Bloquet-Maurras J., Bentaleb A., Laurichesse E., Pecastaings G., Bayard M., Schmitt V., Food Hydrocolloids, 2025, 169: 111593 DOI: https://doi.org/10.1016/j.foodhyd.2025.111593.