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Title:

Replicating Dairy *Creaminess* Using Plant Oil Bodies: A Comparative Sensory and Instrumental Study

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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

The demand for plant-based dairy alternatives is increasing, yet replicating the creaminess of dairy milk remains a challenge. Oil bodies (oleosomes) are natural lipid droplets stabilized by proteins and phospholipids. They offer distinct structural and functional properties compared with conventional vegetable oils, and their potential as dairy fat replacers in milk-based systems requires further evaluation. Oil bodies were extracted and washed up to two times from canola and almond seeds and incorporated into a skim milk model system. Whole milk and skim milk with added dairy cream were used as benchmarks. A trained sensory panel (n = 10) assessed attributes linked to *creaminess*, including *smoothness*, *thickness*, and *mouth coating*. Instrumental analyses included viscosity (rotational rheometry) and friction factor (soft tribology) measurements, where correlations were performed to link sensory and instrumental data. Plant oil body formulations displayed distinct textural profiles. Dairy samples were perceived the highest in overall *creaminess*, followed by milks with canola oil bodies (twice washed), while milks with almond oil bodies were rated lowest. Instrumental measures supported these results, with viscosity driving *thickness* perception and lower friction coefficients correlated with *creaminess*. This study demonstrates that plant-derived oil bodies can replicate the *creaminess* of dairy fat in a milk model system. The combined sensory and instrumental approach highlights their promise as sustainable dairy fat replacers and provides new mechanistic insights into how viscosity and tribological behaviour underpin *creaminess* perception.