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Processed cheese as a polymer matrix composite: a particle toolkit for the replacement of milk fat with canola oil in processed cheese

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Abstract

In this study, we show that the replacement of milk fat with canola oil in a model caseinate-based imitation cheese product to increase its nutritional value can be done by treating processed cheese as a particle filled gel network. Using microscopy, model imitation cheese products with different lipid phases were found to have similar microstructures where fat or oil appears as inert particle fillers in a continuous protein network. Using a texture profile analyzer, we show that the textural properties of model imitation cheese are dependent on the material properties of the inert filler. Addition of rigid particle fillers generally results in greater reinforcement of the matrix (*i.e.,* increased hardness). The addition of oat fiber particles at 5% volume fraction to model cheese containing 51% milk fat and 49 % canola oil resulted in a product with similar functionalities (*i.e.,* hardness, oil stability, and meltability) as that of model cheese containing

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