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"Pan de muerto", Mexican traditional bread: Understanding its characteristics and staling by relating its fat content to starch retrogradation

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"Pan de muerto", a traditional Mexican bread, is composed of a high fat/starch ratio. It is a popular belief that its fat content ensures its long-term preservation. Still, this complex cereal system has not been scientifically studied. The objective of this work was to study the functionality of fat on the bread evolution with time with emphasis on fat crystallization and starch retrogradation. After characterization of the original bread, fat functionality was studied. The formulation, fat type and presence, and the storage, moisture and temperature conditions, were modified. The evolution of bread over 8 days was determined through the mechanical, thermal and crystalline properties. In parallel, microstructure was observed by confocal microscopy. "Pan de muerto" was shown to be a hybrid between bread and pastry products in terms of structure and staling behavior. The conditions set-up led to different staling behavior not dependent on moisture content. The storage conditions impacted 1) butter crystallization, but not that of lard despite its well-known polymorphism, 2) starch retrogradation rate but not its nature. The fat conditions allowed highlighting a new relation between fat composition and thermal properties of retrograded starch, B-type crystals; in fat-containing products they needed more energy to be melted. The bread microstructure highlighted different localization and distribution of fat, starch and proteins. This structure organization together with specific interactions between lard and bread matrix or starch components could explain the behavior highlighted. Both aspects continue to be currently studied.

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Influence of soy hull pectic polysaccharide on the rheology and stabilization of soy protein-based emulsions

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Soy hull pectic polysaccharide (SHPP), extracted with sodium citrate from soybean hulls assisted by microwave had the ability to decrease surface tension of oil/water interface. In this study, impact of the type of SHPP (i.e. SHPP-L; SHPP-M; and SHPP-H differentiated by molecular characters with respective extraction conditions) was examined through analysis of the interfacial tension, droplet-size and rheological properties of emulsions stabilized by soy protein. SHPP-H was the most capable in reducing interfacial tension followed by SHPP-L. SHPP-H was a better emulsifier for achieving smaller droplets. Emulsion viscosity was influenced by SHPP types and SHPP-H produced high viscosity emulsions which may help to obtain the more stable emulsion.

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