The Effect of Lipid-Modified Maize Starch Microspheres on the Meltability and Texture of Imitation Mozzarella Cheese

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Abstract

Introduction: The driving force for the dynamic growth of mozzarella consumption is the increasing popularity of pizza. At the same time, the demand for low-calorie convenience foods has been increasing. This study will explore the use of lipid-modified starch microspheres as fat replacers in imitation mozzarella cheese and its effects on the melting and textural properties.

Methodology: Imitation mozzarella cheese was formulated with varying content of lipid-modified maize starch microspheres (0 – 40%). The lipid-modified maize starch microspheres were used to replace fat at 1:1 ratio (dry basis). The meltability and texture of imitation mozzarella cheese were studied with a domestic microwave and a rheometer.

Results and Discussions: The imitation mozzarella cheese with reduced fat content showed poor melting properties. Thus, lipid content affects the melting properties of cheese. A significant proportion of the fat was trapped within the starch matrix and unable to flow as the temperature increases and this resulted in reduced melting behaviour. The addition of starch (hygroscopic) competed with the casein polymers for the available water thus limiting hydration of the latter which in turn affected the melting behaviour of cheese. Imitation mozzarella cheese with the highest starch content (40% fat replacement) was characterized by a firmer texture (9.2 x 104 Pa) due to the formation of starch-starch, starch-proteins networks.

Conclusion: Low-fat imitation mozzarella cheese containing lipid-modified maize starch microspheres that function as a fat mimetic can be manufactured. The application of the lipid-modified maize starch as fat replacer in cheese has the potential to reduce caloric intake and price of convenient foods such as pizza.

Biography: Humbulani Nekhudzhiga

Humbulani Nekhudzhiga is an innovative research assistant who is busy with his PhD in Food Science at the University of Pretoria. He is an Unleash Innovation Lab Alumni with 2 Provisional Patents in Food Chemistry and Sustainability and Waste Management.