Enrichment of Chicken Nuggets with Microencapsulated Omega-3 Fish Oil: Effect of Frozen Storage Time on Oxidative Stability and Sensory Quality

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Abstract

This work studies for the first time the elaboration of frozen chicken nuggets enriched with microcapsules of omega-3 fatty acids using fish oil. Three types of chicken nuggets were prepared: control (C), enriched in bulk fish oil (BFO), and with added microencapsulated fish oil (MFO). Effect of length of frozen storage after pre-frying and before domestic frying was studied. The pre-fried nuggets were stored during 24 h at refrigeration temperature (0–2 °C) (T0) or during 1 month (T1M) or 3 months (T3M) in a domestic freezer at −18 °C before frying. Length of frozen storage after pre-frying and before domestic frying promoted lipid and protein oxidative reactions in omega-3-enriched nuggets. Microencapsulation showed a protective effect against lipid and protein oxidation, especially during the first month of storage. In MFO, sensory traits were not affected by enrichment. In BFO-T0, a higher juiciness and saltiness and a less intense meat flavor in comparison with C-T0 and MFO-T0 was found. Time of frozen storage did not influence the sensory quality of chicken nuggets enriched with omega-3. Microencapsulation seems to be a promising method for enrichment of pre-fried frozen meat products with fish oil, improving the oxidative shelf life and preserving the sensory quality characteristics of the enriched products.