Influence of the Processing Parameters on the Physicochemical Properties of Puff Pastry Margarines

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Margarines present different physical properties with respect to their purposed application. For example, a special type of fat is required for preparation of puff pastry. Puff pastry margarines (PPMs) have to be very firm and plastic. The required physical properties are thus obtained by processing suitably selected blends of fats and oils. This study focuses on the influence of processing parameters on physicochemical properties of puff pastry margarine. For this goal, two selected fat blends were considered (both palm-based): one was low-trans (0,5 ± 0,0 %) and the other was trans-free. A simple pilot-scale line, equipped with a scraped surface heat exchanger (SSHE) and a resting tube, was used to produce margarines. The chosen processing parameters were: the “buffer tank” temperature, flow rate, SSHE temperature, scraper blade rotation and resting tube temperature. A Plackett-Burman experimentation plan was used to select the parameter combinations to test (each of them possessing two levels). Produced margarines were stored at 15 °C and 20 °C. Studied properties were the solid fat content (SFC), dropping point (DP), and texture (hardness) at these two storage temperatures. Finally the results were statistically analyzed by the surface response methodology to find out the processing parameter influence on each physicochemical property.

Experimental results confirmed that physical properties of both margarines were strongly influenced by the processing parameters. In this study, it was shown that the SSHE temperature, the flow rate and the resting tube temperature were the most frequently significant parameters.