

Use of an Artificial Neural Network (ANN) for the development of a low trans soy-based fat for application in semi-sweet biscuits

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The search for alternatives to replace trans fats that are more economic, technologically feasible and with lower saturated fat content is today the great challenge for Brazilian companies. The aim of this study was to apply Artificial Neural Network (ANN) technology to obtain a low trans fat blend derived from soybean and evaluate its performance when applied in the processing of semi-sweet biscuits and along a 4-month storage period. A previously trained ANN was used to obtain the blend using two different interesterified soy fat bases and soybean oil. The blend was defined by the smallest error given by the ANN using as parameters the melting point and the solid fat content of a low trans fat on the market. The result provided by the ANN was experimentally validated. Identical processes were used to produce semi-sweet biscuits using the fat blend selected through the ANN and a commercial low trans fat. A fat-free formulation was also produced. Dough machinability and physicochemical characteristics of the newly produced biscuits and during a 4-month storage period were compared using the Tukey test, showing no significant differences between the two fats studied. The fat-free formulation showed that fat is essential for machinability, texture and moisture content in the final biscuits and during storage. Given that the ANN provides multiple answers, it can select formulations with minimum levels of saturated fatty acids, trans fatty acids or any other component of interest. Thus, by using ANN technology, it was possible to develop a technologically feasible low trans fat to apply in semi-sweet biscuits, with lower cost (soybean derived, 0,03 g/portion trans fat, 26,4% saturated fat) and lower saturated fat content when compared to a Brazilian commercial low trans fat (with palm oil, 0,02 g/portion trans fat, 47,3% saturated fat).