Formulation of Zero *trans* Special Fats by *blending* and Prediction of their Crystallization Behavior using Neural Networks.

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Fats and oils are submitted to the blending process to achieve stability and specific characteristics for development of shortenings and special fat products. Stability of crystalline structure of products depends of fat crystallization behavior, affecting directly the choice of process parameters, as well as the quality of the final product. Computer programs have been widely used in production lines, easing and optimizing processes besides assisting in product development. Artificial Neural Networks (ANN) are computational techniques that use a mathematical model, based on the concept of the neural structure of intelligent organisms, acquiring knowledge through experience. As alternative to conventional process for fat formulation, ANN have been studied, using solid fat content (SFC) of fat at different temperatures as learning parameter. Due the large possibility of formulations proposed by the software becomes necessary to use the crystallization rate and maximum SFC in ANN training to safe and maintain quality in products formulated when bases are from different sources. This study aims building and training a neural network to formulate fats of specific use, using besides SFC, also the rate of crystallization and maximum SFC at 25 ° C. In the training were used 60 blends with different proportions of fat bases: interesterified soybean fats, soybean, palm and palm kernel oils. To verify the ability to obtain answers were used five specific commercial fats, and to verify the efficiency of ANN to predict the data were used five blends used in training and 5 blends not used in training. The software showed to be highly efficient to achieve the commercial fat SFC, and showed high ability to predict the SFC, crystallization rate and maximum SFC at 25°C for all blends, and proved to be an excellent tool for the formulation process as well as easy to use in industry.