

## **Modeling of a natural lipstick formulation using an artificial neural network**

### **ABSTRACT**

An artificial neural network (ANN) was applied in conjunction with experimental data from a mixture of experimental designs to predict the melting point of a lipstick formulation. The experimental data were utilized for training and testing the suggested model. By using the ANN performance results, the optimum parameters were found to be pitaya seed oil 25% w/w, virgin coconut oil 37% w/w, beeswax 17% w/w, candelilla wax 2% w/w, and carnauba wax 2% w/w. The relative standard error under these parameters was only 0.8772%. It was found that batch back-propagation (BBP) gave the optimal algorithm and topology with a configuration of five inputs, two hidden nodes and one output node; the most important parameter was the carnauba wax content with a relative importance of 24.5%.