The objective of this research was to develop the process of leech lime osmotic dehydration and find the optimal process condition by applying Artificial neural network (ANN). The research started with a consumer survey to determine the preference of osmotic dehydrated leech lime from several sources. The results showed that consumers preferred the product from Angthong province. From Just About Right score, the characteristic of hardness was moderate but the appearance lightness and sweetness were quite too strong. The characteristic of flavor was quite too weak. The moisture content, water activity (a_w), lightness and hardness of the product from Angthong were measured and then used as product profiles for the process development. Therefore the product specifications of this research were moisture content of 12%-18%, a_w of 0.60-0.75, lightness (L) more than 30 and hardness of 0.2-0.4 N. For sweet taste, the product with low sweetness was developed in this research. The process of leech lime osmotic dehydration was composed of two steps: immersion process of leech lime in an osmotic solution and drying process of osmotic leech lime. For the immersion step, a standard curve between %total soluble solid (TSS) and immersion time was constructed and a fitting equation was determined. The fitting equation was a logarithmic equation with the correlation coefficient (r) of 0.9677. This equation could be used to find an immersion time to reach a specified %TSS, which was used as an input variable in the drying step. For the drying step, back-propagation ANNs and regression models were used to predict a moisture content, a_w, hardness and L of osmotic dehydrated leech lime from drying process based on three input variables; time (2, 4, 6, 8 hours), temperature (45, 50, 55, 60 °C) and %TSS (45, 50, 55, 60). The performance measures for selection of the best model were mean squared error (MSE) and correlation coefficient (r). From the results, ANN had a lower MSE and a higher r than the regression model for each product characteristic. Therefore, the ANN was an appropriate model for predicting characteristics of osmotic dehydrated leech lime. Using the best ANNs, a contour plot for each characteristic was constructed and overlapped to find the optimal process condition with 50%TSS. The optimal process condition during drying process was 2 hours and 60 °C which gave moisture content, water activity, L and hardness of 15.16% 0.70 40 0.36 N, respectively. According to a consumer test, the overall liking was moderate and 88% of consumers accepted the product.

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