

Estimation of carrageenan concentration by using ultra sonic waves and back propagation neural networks

Abstract

The application of Artificial Neural Networks in chemical engineering field is being under immense research. One of the physical properties of every material has its own intensity to absorb the sound waves. Carrageenans are water-soluble gums, which occur in certain species of red seaweeds. They are sulfated natural polymers made up of galactose units. Carrageenan consists of a main chain of D-galactose residues linked alternately α - (1→3) and β - (1→4). The decibel frequency analyzer dbFA - 32 has been used for this analysis. The sound signals are captured using the hydrophone. The analog signals are then digitized at different octave frequencies. These are used to generate the frequency power spectrum. The change in the spectrum is proportional to the concentration of the material in the solution. The normalized data is used as a input to a feed forward neural network model. In this study, a simple scheme is proposed to estimate the amount of carrageenan present in a solution using under water acoustics and Artificial Neural Networks. This method is useful for the direct estimation of carrageenan in food, pharmaceutical and cosmetic industries. It can be useful for online measurement of compound in the industries. © 2010 Asian Network for Scientific Information.