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Abstract

In the modern competitive world, agriculture sectors and food processing industries need new tools and technologies for the classification of raw materials based on its ingredients presence (Protein, Carbohydrate, Sugar, Fat, Fiber, Vitamin, and Minerals etc.) and to be used for suitable application process based on its ingredients. In order to ensure the final product quality in food processing industry, it is essential to identify and feed the high quality raw materials for

higher end applications and Segregate low grade materials for lower end applications. Tapioca is the important crop in the world after wheat, rice, maize, potato and barley. It has lot of applications in pharmaceuticals, food industries, paper industries and textile industries. It is essential to ensure the quality of tapioca and segregate it based on its constituent for different applications to make the industrial final product as competitive. Currently in industries, Tapioca starch constituent identified by means of traditional wet chemical methods, as per Indian Standard testing procedure IS4706 (Part-II)-1978. These methods are time-consuming, costly, require skilled operators and would not suitable for rapid identification check at the reception of raw materials. This paper focus on extraction of the ingredients in tapioca using Fourier Transform Infra Red spectroscopy (FTIR) with Chemometric analysis. Tapioca starch ingredients were found out from FT-IR Spectrum by identifying the corresponding functional group peak absorption value with FTIR Standards. Calibration model for determination of concentration was built separately using Partial Least Square (PLS). The conventional wet chemical methods results from the observed industrial data were compared with proposed work according to root mean square error of prediction (RMSEP) value. The RMSEP for the ingredients in tapioca was found as 0.003924% for protein, 0.3557% for water, 0.00392% for ash and 2.3162 for starch. This method was suitable for predicting the concentration of the ingredients present in tapioca with high precision. These results can be further used for classification of tapioca towards various industrial needs.

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Index Terms

Computer Science

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Keywords

Fourier Transform Infrared Red (ft-ir) Spectroscopy Partial Least Squares (pls)
Tapioca Starch

Beer-lambert's Law

Near Infrared (nir)

Root Mean Square Error Of Prediction (rmsep).