

PHYSICOCHEMICAL METHODS IN CONJUNCTION WITH CHEMOMETRICS FOR QUALITY DETERMINATION OF HONEY

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Abstract: In the present study, quality of honey is determined by evaluating physicochemical properties of different honey samples collected from local market and analyzing the obtained data using chemometrics. Along with honey samples, cane sugar, fructose, glucose and their mixtures were also taken as samples and were used for building and calibrating the model. Eight samples out of thirty three samples were used for prediction. The coefficient of determination (R^2) and standard error of prediction (SEP) were 0.9958 and 0.0159 respectively. The results obtained demonstrate that computation technique along with instrumentation is a simple method which can be used for quality assessment of honey.

1. INTRODUCTION

Honey is a natural sweet substance, produced by honeybees from the nectar of blossoms or from secretion of plants which honey bees collect transform and store in honey combs for ripening [1]. Being a premier food product used predominantly in medicines, cosmetics, and as health benefits, it is more prone to adulteration thus degrading its quality. So, there is a need to check the quality of honey to maintain its originality. Many researchers have studied physicochemical methods namely pH, electrical conductivity, free acidity, water content, ash, sugars, color etc. to analyze honey [2] and to check the quality[3]. The aim of this work is to study and compare the physicochemical properties with the standard values to make a standard model to check the quality of honey and to find the correlation among these properties, thus making the process fast and simple for large amount of samples.

2. EXPERIMENTAL DETAILS & RESULTS

Several quality parameters i.e. pH, moisture content, ash, electrical conductivity, specific gravity, brix, refractive index, color of thirty one samples were determined according to the methods provided in codex alimentarius and Indian standards [1,4]. Two additional standard values along with thirty one samples were used for calibrating the model using Unscrambler software (version 9.8). Eight samples out of those thirty one samples were used for predicting the unknown parameters. Principal component analysis (PCA) was performed on the data set and samples formed different groups according to standard values as shown in Fig 1. The variation of physical properties can be seen from the loading plot in Fig 2. PLS 1 and PCR were performed to predict the values for predicted samples. PLS 1 gave the best results. Specific

gravity and pH were nicely correlated with coefficient of correlation of 0.58. Hence, physicochemical methods along with chemometrics can be considered as a good analytical tool for quality determination of honey.

3. FIGURES

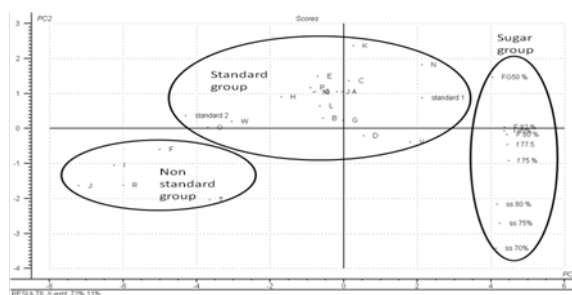


Fig.1. Plot showing standard, non-standard and sugar groups

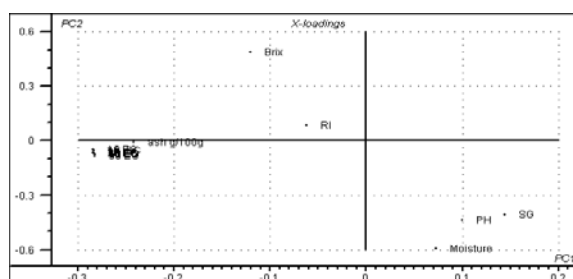


Fig. 2 Loading Plot of different physicochemical properties

4. REFERENCES

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