Determination of glucose in non-alcoholic beverages using near infrared spectroscopy combined with chemometrics

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Abstract: In many researches, near infrared (NIR) spectroscopy combined with chemometrics has been employed to detect and quantify glucose. A calibration curve is always required to be use for quantification of glucose. By conventional way, the calibration curve should be suited for only one system. In this study we propose a new alternative method for determination of glucose in the simulated systems (e.g. tea, coffee) using a global model. To construct the global model, it involves the extraction and selection of significant components prior to build the calibration model. The calibration model was constructed from the data calculated from only the significant components in order to predict concentration of glucose in non-alcoholic drinks such as tea and coffee. Partial least-squares regression (PLSR) was used to construct calibration models to predict concentrations of glucose. The corresponding values for the root mean square error of calibration (RMSEC), cross validation (RMSECV) and prediction (RMSEP) were found to be 0.60, 0.66 and 1.33, respectively. These predictions are in good agreement with the results from HPLC. Therefore, this global model can be used to predict concentration of glucose in non-alcoholic drinks without building new calibration model.

Keywords: Near infrared spectroscopy; Chemometrics; Partial least-squares regression (PLSR); Root mean square error