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# DETERMINATION OF SUGARS AND ORGANIC ACIDS IN ORAGE JUICES USING NEAR INFRARED DIFFUSE REFLECTANCE SPECTROSCOPY

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Beverages based on fruit juices are among the most popular commercially available drinks. There is an ever-increasing demand for these juices in the market. Orange juice is one of the most common as well as most favorite flavor. The fruit processing industries have a tremendous responsibility of quality control. For quality evaluation estimation of various components of the juice is necessary. Sucrose, glucose, fructose, citric acid and malic acid are the prime components of orange juice.

Little information is available on analysis of orange juice. However, conventional and general wet chemistry procedures are currently being used which are no longer desired by the industry owing to the time involved, labor input and harmful chemicals required for each analysis. Need to replace these techniques with new, highly specific and automated sophisticated techniques viz. HPLC and spectroscopy has been realized since long time. Potential of Near Infrared Spectroscopy in quantitative analysis of different components of food samples has also been well established. A rapid, non-destructive and accurate technique based on Near Infrared Spectroscopy for determination of sugars and organic acids in orange juice will be highly useful.

The current study is an investigation into the potential of Near Infrared Diffuse Reflectance Spectroscopy for rapid quantitative analysis of sucrose, glucose, fructose citric acid and malic acid in orange juice. All the Near Infrared measurements were performed on a dispersive NIR spectrophotometer (ELICO 153) in diffuse reflectance mode. The spectral region from 1100 to 2500nm has been explored. The calibration has been performed on synthetic samples that are mixtures of sucrose, glucose, fructose, citric acid and malic acid in different concentration ranges typically encountered real orange juice. These synthetic samples are therefore considered to be representatives of natural juices. All the Near Infrared spectra of synthetic samples were subjected to mathematical analysis using Partial Least Square (PLS) algorithm. After the validation, calibration was applied to commercially available real samples and freshly squeezed natural juice samples. The actual concentrations were compared with those predicted from calibration curve. A good correlation is obtained between actual and predicted values as indicated by correlation coefficient ($R^2$) value, which is close to unity, showing the feasibility of the technique.