(Article: 3)

NEARINFRAREDSPECTROSCOPYFORAGRICULTURAL APPLICATIONS: POSSIBILITIESANDCHALLENGES

Dr Rajib Bandyopadhyay

Professor & Head, Department of Instrumentation & Electronics Engineering
Jadavpur University, Kolkata
E-mail: rb@iee.jusl.ac.in

ABSTRACT

During the last few decades, spectroscopic methods, especially the Near Infrared(NIR) technique have become a powerful analytical tool for gathering quantitative and qualitative information from a wide variety of products in the agricultural, nutritional, petrochemical, textile and pharmaceutical industries. The technique is very versatiles in ceitis non-destructive, rapid and simple to operate, requires small samples, is applicable in the use of solid samples and can determine multi- compositions at the same time. These attributes of spectroscopic technique makes its application very promising for online inspection and grading among other applications. If a sample contains chemical bonds such as C-H,N-H or O-H and if the concentration of analyte exceeds 0.1% of the total composition, the method is likely to yield acceptable answers, even in the hands of relatively untrained personnel. This technique can be implemented to assess a broad range of chemical and physical properties of materials when combined with multivariate analysis methods. Mathematical models based on statistical analysis are now known to assess interactions between the near infrared absorption spectrum and the concentration of major compounds present in the samples.

In this talk, the basic principle of NIR spectroscopy will be discussed first. This will be followed by the calibration methods and a few applications in the agriculture and food products. The hardware of the instrument will also be dealt with. Finally two case studies on estimation of poly-phenols in tea and sucrose concentration in rice plants will be discussed.

For full paper ask the Author Or write to the Editor-in-Chief