



FT Infra-Red Spectroscopy

Evaluation of quality traits

With the recent economic boom in the region, “value addition” is a way to enhance the role of traditionally important crops which maintain cultural significance and have tremendous potential to increase production, marketing, and utilization to improve livelihoods.

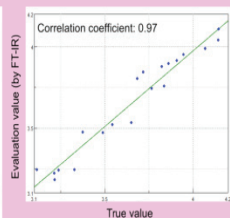
To achieve an adequate level of understanding of consumers’ preferences and develop suitable tools for the evaluation of quality-related traits, a precise and rapid phenotyping methods are necessary. Application of a suitable methodology in IITA crop breeding programs will open the way for further developments. Currently, three machines and related analysis are available in the Bioscience Center.

FT Infra-Red (FT-IR) Spectroscopy

The FT-IR spectrometer is a new technology for measuring all IR frequencies simultaneously presenting the desired spectral information for analysis. In addition, the multiplex and throughput advantages have opened up new areas of application. Currently, activities on the evaluation of chemical profiles of cowpea seed are ongoing, and a reasonable calibration of the curve model for protein content has been obtained in both NIR and MIR. The measurement only takes 1–2 min approx. per time. The next challenge is to estimate multiple traits (moisture content, starch sugar, etc.) without damaging the seed, which will enable the breeder to plant the seed after evaluation.



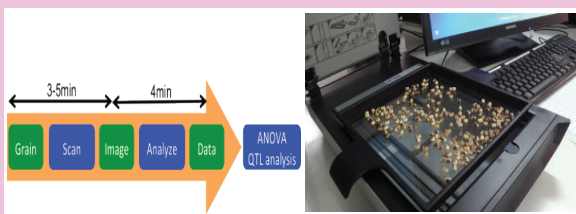
FT-IR system (JASCO)



Calibration curve model of protein content in cowpea grain

Image Analysis for Grain Qualities

Image analysis using the simple combination of a flatbed scanner and software can now provide a high-throughput measurement system of shapes and sizes of various plant tissues. Currently, in cowpea, image analysis is utilized for the detection of the width and length of individual grains. The Satake Grain Scanner system in the Bioscience Center evaluates average seed size, uniformity of grain size, and grain number of the sample placed on the scanner within 10 minutes.



Rapid Viscosity Analyzer

Viscosity is an important physical characteristic for crops and their products (e.g., milled flour or extracted starches) that determines potential use in various foods. For the evaluation of pasting property, the Rapid Viscosity Analyzer is widely used all over the world. In the Bioscience Center, the RVA (RVA-TechMaster, Perten) is available for the analysis of various samples within mid-viscosity range. It takes approx. 10–10–20 min depending on the program and sample type to evaluate pasting properties.



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