



Application of Optical Measurements

Along the recent explosive growth of computational power and data storage size at affordable prices, various optical measurement methods with adequate software are getting available for various research and commercial area.

Optical measurement has great potential to improve the efficiency of phenotyping, especially for large sample size with its advantages. For example, non-destructive analyses enable breeders to incorporate various new traits into their selection process.

Advantage

- Rapid
- Non-destructive
- Repeatable
- Low-cost
- Labor-effective

Application of suitable optical measurements in IITA crop breeding programs will open the way for further developments.

Currently, two methods are available in Bioscience Center.

Fourier Transform Infra-Red (FTIR) Spectroscopy

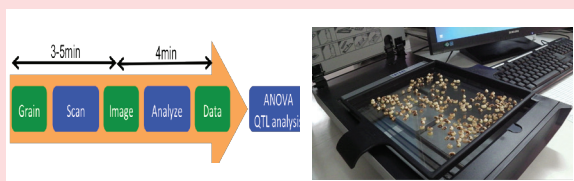
FT-IR spectrometers is fresh technology for measuring all IR frequencies simultaneously presenting the desired spectral information for analysis. In addition, the multiplex and throughput advantages have opened up new areas of application.



Currently, the works on the evaluation of chemical profiles of cowpea seed are on-going, and the reasonable calibration curve model for protein content has been obtained in both NIR and MIR. The measurement only takes approx. 1min per sample. Next challenge is to estimate multiple traits (water, sugars, etc.) without destruction, which enable breeder to plant the seed after evaluation.

Image Analysis for Grain Quality

Image analysis using the simple combination of flatbed scanner and software can now provide 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 grain. The Satake Grain Scanner system in Bioscience center evaluates average seed size, uniformity of grain-size, and grains number of the sample placed on the scanner within 10 minutes.



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