Validation of NIRS calibration models developed for the determination of proximate components of flours from fresh cassava roots

Crop & Product/Sample Presentation: Cassava/flour

Device / Instrument: FOSS XDS

Nb of samples / Nb of spectra used to build the model: 260 samples

Process Description

The objective is to develop a calibration model to measure ash and protein in dried cassava flour. Calibration models were developed for ash and protein content of cassava flour using a total of 230 spectra data obtained from Cassava roots from the IITA/NextGen experimental trials. The samples were processed to flour by drying at 50^0C for 72 hrs in an Oven. The ground dried cassava spectra were collected using the ISIScan software of the Benchtop XDS at a wavelength range of 400 to 2498 nm. No outliers were detected with t-test, and therefore, there was no sample removed. Dried Cassava flour samples from the two seasons were pooled to obtain the calibration data set which was used to generate the models. Validation of the model was done using the selected set of new materials which are not part of the calibration data set. The equations developed showed good prediction performance, R^2= 0.93 and R^2= 0.91 respectively, for ash and protein content of cassava flour with SEC and SECV of 0.32 and 0.36. The calibration and validation statistics for ash and protein determination are as shown in the table below:

Table 1: Calibration and validation data for ash and protein determination

Constituent	SEC	R²	SECV	SEP	BIAS	SLOPE	R² Pred
Ash	0.20	0.93	0.32	0.22	0.19	1.09	0.94
Protein	0.24	0.91	0.36	0.31	0.21	0.89	0.80

Conclusion

There were good predictions coefficients for both hash and protein contents of cassava flour, and this implies that the models can be effectively used for the ash and protein analysis of cassava flour.