THE PROBLEM

Cassava (*Manihot esculenta*) is a **climate resilient staple root crop** for millions of people across the tropics. When developing improved cassava varieties, one of the most important traits breeders must keep in mind is high dry matter content. Not only is dry matter content a critical determinant of quality across the many different home preparations and uses of cassava roots, providing the preferred texture for boiled or steamed roots, it also serves as a true measure of yield for roots processed into flour and other dried products. The problem is that the traditional method of measuring **root dry matter content** is so labor- and time-intensive that it creates a bottleneck in breeding program workflows. To address this issue, researchers at Cornell University and the International Institute of Tropical Agriculture (IITA) collaborated to develop a more efficient method to characterize cassava roots for this critical trait.

THE SCIENCE

Rather than measuring dry matter directly by skinning, grating, drying, and weighing the roots of cassava breeding lines, the team sought to develop a rapid, real-time, non-destructive method of determining root dry matter using **near-infrared spectroscopy (NIRS)** right in the field. A low-cost, handheld NIR spectrometer, the SCiO, was tested for its ability to accurately predict root dry matter content in the context of an active cassava breeding program. By systematically comparing various sample preparation techniques and prediction model algorithms, the team discovered that quick NIR scans taken on sliced roots (see inset cover photo) provide adequate predictive performance for selection.

THE IMPACT

With proper calibration, mobile NIRS enables the rapid and accurate prediction of cassava root dry matter content, allowing breeding programs to **phenotype** (measure traits) more efficiently and therefore speed the development of improved varieties. The use of NIRS to help breeders assess and improve the quality and nutrition of our food crops is a promising area of active area of research across many species.

THE TEAM

NOT PICTURED – Gaby Mbanjo, Prasad Peteti, Kayode Ogunpaimo, Kehinde Nafiu, Ismail Rabbi, and Mike Gore

Find out more: https://doi.org/10.1002/ppj2.20040

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