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PHT 002

Medium-throughput methods to predict cooking quality of boiled cassava for genotypes screening and selection

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Abstract

Cooking quality for consumer acceptance of boiled cassava is an essential criteria for breeding programs. Selecting improved genotypes for cooking quality is increasingly important to maximize the likelihood of adoption, in addition to agronomic criteria such as yields and tolerance to pests and diseases. Conventional tests of cooking quality, such as probing the product's softness with a fork to determine optimum cooking time (CT), are time-consuming and labor intensive; requiring up to one hour per genotype. Hence, in a standard food-quality lab, only a few dozen of samples can be screened per day, whereas selection for breeding requires testing up to several hundred genotypes. The RTBfoods project has developed a faster method by objectively measuring water absorption, root density and texture. Among these, water absorption and change in root density after 30 minutes of boiling significantly correlated with CT (R2 = 0.60 to 0.66). Thus, this approach makes it possible to screen up to 80 genotypes per day by confidently classifying short-cooking and long-cooking behaviors of cassava roots, i.e. medium- throughput screening. Accumulating further cooking quality data will facilitate ongoing efforts to develop a true high-throughput phenotyping platform with the capacity to screen the target several hundred samples per day. A particularly promising approach is the ongoing investigation of correlations between cooking quality parameters and near-infrared spectroscopy (NIRS), which would reduce the analysis time from 30 to 2 minutes per genotype.

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Scaling flash drying of cassava starch and flour at small scale

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Abstract

Small-scale flash drying is a promising technology to meet the increasing demand for high- quality cassava flour (HQCF). The technology significantly reduces fungal and dust contaminations and reduces health risks for consumers. However, the configuration and operating conditions of existing flash dryers are sub-optimal, leading to high energy use and operating costs. Since 2013, the CGIAR Roots, Tubers and Bananas (RTB) program in collaboration with local stakeholders across Democratic Republic of Congo, Nigeria and Colombia developed a numerical modelling method to design energy- and cost-efficient flash dryers, and proven its effectiveness through construction and testing of a pilot-scale dryer. Scaling Readiness was used to identify bottlenecks for the uptake of the improved small-scale flash dryer innovation to the private sector. Through fieldwork data collection and online semi- structured interviews, the analysis highlighted the role of training sessions and sustained technical support to strengthen the capacity of stakeholders – and therefore, the increased uptake of flash dryer innovation. We also found a relationship between the economic value of theinnovation and stakeholders' willingness to adopt it across scales. For e ample, during the first six months after training, two cassava processors (out of seven) adopted innovations and increased their processing capacity by 23% and 50%, and profitability by 8% and 10%, corresponding to extra income of about $10,000/year/processor. We conclude that using the Scaling Readiness approach in collaboration with relevant private sector actors can improve uptake of agro-industrial innovations such as flash dryers, leading to gains in income and public health.

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Assessment of 20 Biofortified Cassava Genotypes for Quality Gari Properties and Products in an Advance Yield Trial

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