

Finding the sweet spot for low-sweet sweetpotato in West Africa

There are great opportunities to expand consumer demand for sweetpotato both as staple and fried products. In Ghana we are exploring consumer reactions to less sweet varieties, refining breeding methods, and marketing strategies, including suitable branding to help promote these healthy and versatile types.



Fig. 1 Trained sensory panel at the Sweetpotato Support Platform for West Africa, provides objective guidance for sweetpotato breeding efforts.

► What is the problem?

The sweetness of sweetpotato has long been considered by some to be a constraint to its wider consumption as a bland starchy staple. High sugar content in sweetpotato also contributes to undesirable browning in fried products for which markets are expanding both in West Africa and globally. Stakeholders at formulation workshops for SASHA in West Africa prioritized the development of low-sweet types as a key objective of breeding efforts at the Sweetpotato Support Platform for West Africa (SSP-WA). However, when we started our breeding work, we soon realized that we did not really understand what researchers and consumers really meant when referring to low-sweet sweetpotatoes.

We had sophisticated instrumentation to help us accurately and efficiently measure sugars in our sweetpotato lines, and we routinely conducted consumer testing as part of on-farm participatory variety trials. However, when we asked consumers, including men, women and children, what they thought of genotypes in our advanced trials, they told us that almost all tasted good.

Additionally, informal taste tests in our laboratory were not precise enough to guide us. Our instrumental sugar measurements were accurate for raw sweetpotato, but not for cooked sweetpotato which can contain much higher sugar levels due to breakdown of starch during cooking. Furthermore, we were faced with larger constraints in breeding for adaptation to the challenging lowland tropical environment in West Africa, including severe virus infections, weevil infestations, drought and low soil fertility, and our breeding populations had to withstand these concurrent with selecting for low sugar levels.

► What do we want to achieve?

Several years into our breeding efforts, we now have the capacity to successfully understand and address consumer needs for sweetpotato in Ghana. We have a range of adapted germplasm with both high and low sugar levels after cooking, with a range of flesh colors (from orange to white), dry matter content (from low to high), and texture (from soft to hard). And we are using these in boiled and fried forms to precisely determine a) how Ghanaian consumers in major urban and rural markets react to non- and low-sweet sweetpotatoes, b) how we can use our laboratory instruments to help us select specific types of sweetpotato, and c) how to develop suitable branding strategies to assist with the promotion and marketing of low-sweet sweetpotatoes.

► Where are we working?

We are working at key sites in Ghana with the anticipation that our findings, germplasm and methods will serve not only Ghana, but other parts of West Africa, and beyond. Our breeding efforts, centered at the CSIR-Crops Research Institute, and the CSIR-Savanna Agricultural Research Institute, cover major production environments of southern and northern Ghana, respectively. Work to understand consumer preferences and develop marketing strategies is taking place in Ghana's largest city, Accra, as well



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- Council for Scientific and Industrial Research of Ghana-Crops Research Institute (CSIR-CRI)
- Council for Scientific and Industrial Research of Ghana-Savanna Agricultural Research Institute (CSIR-SARI)
- Kwame Nkrumah University of Science and Technology (KNUST)



Fig. 2 Consumer sensory panel assessing preference for sweetpotato fries at Kaneshie market, Accra

as in smaller urban centers in the traditional sweetpotato producing Central, Volta, and Upper East Regions.

► How are we making it happen?

We have developed a sensory panel of 8 to 10 highly trained individuals to precisely evaluate the taste and appearance of our sweetpotato varieties. We used this panel to develop a detailed and accurate description of sensory attributes using a large sample of sweetpotato germplasm in boiled and fried forms. For boiled roots, the panel developed a lexicon of 32 characteristics to describe samples and for fries they developed a list of 19. Multiple characteristics relate to appearance, texture (in hand and mouth), flavour, mouthfeel, basic tastes and sweetness. We are now using a small set of germplasm with low to high sweetness to conduct taste tests and focus group discussions with hundreds of consumers to better understand and target consumer acceptance and preferences for low-sweet boiled and fried sweetpotato in urban markets. We can relate precise evaluations by our sensory panel, to the responses of consumers of different backgrounds, gender and ages. Further, consumers are providing their input with respect to naming of the low-sweet types which will help us with branding and marketing efforts.

► Who are we working with?

The sensory panel of the SSP-WA is based at CSIR-Crops Research Institute, drawing on its staff for trained panelists. The ongoing consumer sensory work is being done by Eric Kuuna Dery, a food scientist with CIP and graduate student in the department of Food Science at Kwame Nkrumah University of Science and Technology in Ghana.

► What have we achieved so far?

Using our trained panel, we have found out that sweet taste in sweetpotato is not just related to sugar content. The majority of genotypes in our program were classified as low-sweet or moderately sweet by the trained panel. However, the sugar content standardized for sweetness (sucrose equivalent) of varieties classified by the panel as low-sweet ranged from 5% to over 10% fresh weight, essentially covering the range of all genotypes evaluated. We also found that in general consumers did not really like the varieties that were rated lowest in sweetness, mentioning that they were bland and did not have expected sweetpotato flavor. The low-sweet fried sweetpotatoes were, however, generally preferred, and we believe have considerable potential for market entry. Consumers also gave us their assessments of proposed names for the low-sweet class of sweetpotato, with the name Lopato proving popular.

► What's next?

Results relating consumer preferences and demographics for our boiled and low-sweet varieties will be assessed and complemented by focus group discussions to develop suitable branding strategies and promotion of these types. We will also continue to explore additional forms of utilization for possible promotion in the coming years, but sweetpotato fries represent an expanding market segment and will likely be our priority for the low-sweet sweetpotato.

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