2026

Target Food Product Profile

Pounded Yam



RTB Breeding

RTB foods

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National Root Crops Research Institute Umudike

IITA Transforming African Agriculture

Breeding Root, Tuber, and Banana (RTB) varieties that better serve user and consumer preferences will lead to greater varietal adoption in RTB value chains. This will help to further boost RTB-linked livelihoods and food and nutrition security, and reduce drudgery.

The RTB*foods* project designed and implemented a participatory gendered interdisciplinary methodology with RTB researchers and regional stakeholders. This has contributed to **identifying key traits and characteristics required for RTB food products, in terms of processing and consumption**. **New high-throughput phenotyping tools** for assessing RTB food product quality and preferences have been developed and deployed for use by breeders and food scientists. These validated new traits are already being incorporated into breeding programmes. The project has developed product profiles covering the complete range of RTB food products. Furthermore, the previously unknown and often stereotyped African gastronomy is emerging as an 'African nouvelle cuisine' which will benefit from RTB varietal quality improvements. The RTB*foods* project was supported by the Bill & Melinda Gates Foundation, and ended in 2023, and the work is now embedded within the RTB Breeding Initiative.

This Target Food Product Profile (TFPP) for **Pounded Yam** is being translated into market-driven breeding initiatives to develop new, end-user-focused yam varieties for yam pounding, which is significantly boosting their adoption.

Product Identity

Pounded Yam is a staple food that is usually made with white yam or yellow yam (*Dioscorea cayenensis* subsp. *rotundata* complex), but can also be made with water yam or greater yam (*Dioscorea alata*). Yam can be prepared as pounded yam, poundo yam (industrially prepared yam flour), amala (traditionally prepared yam flour: Elubo), boiled yam, and others. Yam is most commonly eaten as boiled yam, followed by amala, pounded yam, poundo yam, fried yam, or yam porridge. Pounded yam is a key feature of West African cuisine and cultural festivals. It is called 'iyan' in Nigeria, 'foutou' in Côte d'Ivoire, 'fufu' in Togo and Benin, and 'yam fufu' in Ghana. It is consumed at about a fifth the volume of boiled yam, so it averages around 20kg per capita annually. Pounded yam is a "swallow food" likened to a glutinous-type dough, made by peeling, chopping, and boiling the tubers for 15–20 minutes, then pounding them in a mortar using a pestle. **The mash is kneaded for 20–30 minutes with occasional addition of water until a stretchable, cohesive, moldable, moderately firm dough is formed.** Pounded yam is usually served with soup or stew, and is most commonly processed by women. It was once considered a high-status food, but it is now more commonly consumed, particularly by wealthy individuals, due to its high price.



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Exploration of good quality traits for Pounded Yam



Stretching pounded yam dough
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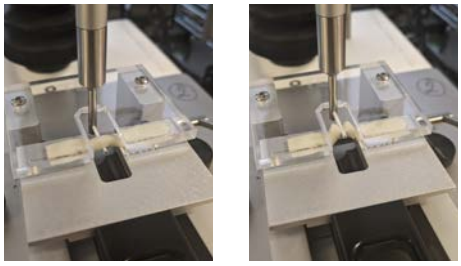
In order to obtain the best product quality and rank traits in order of importance, a gendered map of characteristics demanded by food-chain actors was achieved through a multidisciplinary methodology. These actors included yam farmers, processors/cooks, and consumers. By including pounded-yam processors in a participatory diagnosis of processing, and consumers in rural and urban areas in consumer testing, a more appropriate gendered food-product profile for pounded yam has been developed. Several key end-user preferences for pounded yam quality traits have been identified, but these have not been previously included in breeding pipelines[1]. Not all yam varieties exhibit the qualities expected by pounded yam consumers. Farmers prefer varieties of yam that produce big and healthy tubers, have a low water content, and a lower tendency to oxidative browning (no discoloration throughout the processing steps). Yam skin should be smooth and free from spots or rot. For pounded yam, flesh color is the most important characteristic. It should be bright white or cream, except if it is 'yellow yam' (*D. cayenensis*), and must not change during processing. Important processing traits include easy to peel, easy to form dough, good aroma, and short cooking time. Women highlighted ease of forming the dough, and ease of peeling as key desirable traits for processors. Women can benefit from easier dough forming as it reduces drudgery and increases output, leading to an increase in comfort and income. Pounded yam palatability was evaluated by consumers, based on its hand feel and color. **Texture is the key characteristic of yam quality for all stakeholders. Pounded yam of good textural quality is described as smooth (without lumps), stretchable, cohesive, moderately adhesive and moderately soft.** Pounded yam having a white or cream-colored dough, with sweet taste and appealing aroma, is preferred by consumers. However, **taste and aroma are not considered essential traits** because pounded yam is normally consumed with soups, where taste and aroma are masked.

A trait evaluation toolbox to support breeding superior yam varieties for enhanced adoption of Pounded Yam



Pounded yam strip rupture point evaluation
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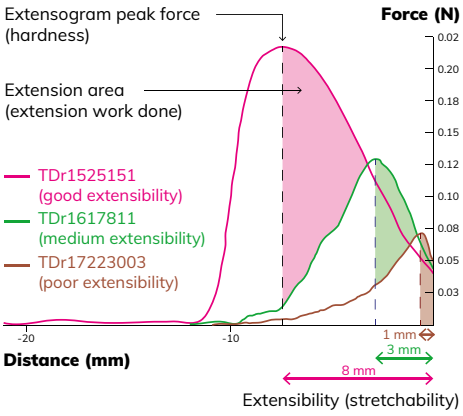



↑ Dr. Oluwatoyin Ayetigbo, Food Scientist (CIRAD, France) evaluating pounded yam stretchability with a Kieffer dough extensibility rig
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← A graph showing diverse extensibility profiles for pounded yam dough © Oluwatoyin Ayetigbo - CIRAD

For the first time, food technologists and social scientists can now assist breeders with quantifiable thresholds in terms of biophysical, instrumental, and sensory scores for overall preference for each measured trait. A toolbox of standard operating procedures (SOPs) for texture and sensory characterization for pounded yam has been developed. Quantitative descriptive analysis (QDA) and consumer acceptance assessments are conducted with sensory panels. Data analytical methods have been standardized to maximize meaningfulness of comparisons[2]. **Preferred priority quality traits in pounded yam are associated with textural quality and color.** Texture profile analysis (TPA) using a texture analyzer could discriminate between the textural quality of pounded yam samples made from the two different species (*D. alata* and *D. rotundata*). The TPA parameters of adhesiveness, cohesiveness and hardness have been used to estimate the stickiness and moldability of pounded yam. **Pounded yam stretchability is a key textural quality that appeals to consumers**, which can be determined by medium-throughput procedures such as 'Kieffer dough extensibility' (KDGE). CIRAD has developed KDGE as a new robust and repeatable procedure for evaluating stretchability. KDGE allows comparisons between collections from different programs across the world, (e.g. from Benin, Côte d'Ivoire, Guadeloupe, and Nigeria). It also enables us to locate specific parents, develop new parents, and create new lines. KDGE significantly correlates with sensory (by hand or in the mouth) pounded yam stretchability, according to different food laboratories' assessments across multiple locations (Benin, Côte d'Ivoire, Nigeria). Assessments show that pounded yam extensibility significantly increases with storage (up to six months), though yam dormancy usually sets in at around 3 months post-harvest. Fresh yam dry matter (DM) also plays some role in the degree of pounded yam extensibility. Yams of the *D. alata* species often have comparably lower DM, hence they generally have poorer pounded yam extensibility compared to yams of the *D. rotundata* species. Landraces popularly and widely grown by farmers often have better pounded yam extensibility than most hybrids, but recent new improved elite clones developed by IITA display superior extensibility, even over check landraces.

Measurement of color using a chromameter corroborates sensory evaluation results. Hence this can be used to support or replace sensory panels. Screening by IITA in Nigeria revealed that some water yam clones showed excellent pounding qualities, and were preferred by farmers. These clones are being considered as candidates for new variety releases. By applying **instrumentally-measured acceptance thresholds**, yam breeders can develop new clones that better cater to stakeholder pounded yam preferences. **Combining instrumental food quality analyses, high-throughput phenotyping tools, and advanced genomic technologies in yam selection pipelines will enhance the discovery of new elite pounded yam varieties.** This will fully address the preferences of stakeholders across the entire pounded yam value chain. The work will have a significant impact on the adoption rates of new varieties and make them more attractive in the market, and to consumers.

Key Publications

[1] Otegbayo et al., 2021. End-user preferences for pounded yam and implications for food product profile development. *Int. J. Food Sci. Technol.*, 56(3), 1458–1472. https://doi.org/10.1111/ijfs.14770

[2] Otegbayo et al., 2024. Food quality profile of pounded yam and implications for yam breeding. *J. Sci. Food Agric.,* 104(8), 4635–4651. https://doi.org/10.1002/jsfa.12835

Mazza et al., 2026. Farmer trait preferences and implications for demand-led yam breeding in selected production areas of West Africa. *Front. Sustain. Food Syst.*, 10, 1757206. https://doi.org/10.3389/fsufs.2026.1757206

Ayetigbo et al., 2025. Influence of physicochemical properties of yam starch and flour on extensibility of pounded yam in Côte d'Ivoire. *LWT-Food Sci. Technol.*, 223, 117769. https://doi.org/10.1016/j.lwt.2025.117769

Dansi et al., 2025. Yield stability of water yam (*Dioscorea alata* L.) landraces compared to improved varieties across multiple environments and their culinary qualities in the Republic of Benin. *JSFA Rep.*, 5(7), 315–325. https://doi.org/10.1002/jsf2.70011



Target Food Product Profile of Pounded Yam

Yam is a key RTB food security crop in African and other developing countries.



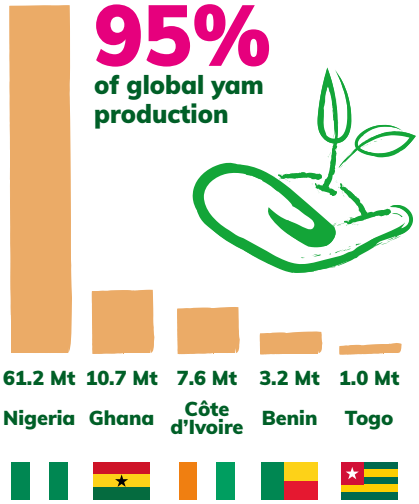
88.3
million tons

World yam annual production

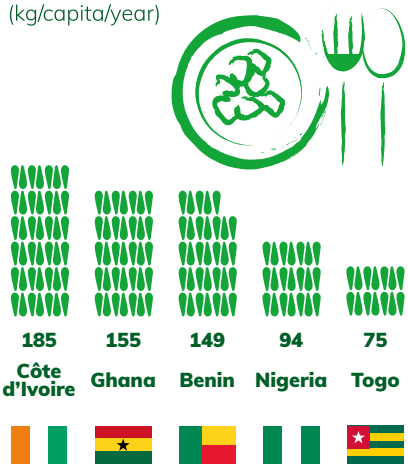
- **98.1% Africa**
- 1.2% Latin America
- 0.2% Asia
- 0.5% Others

Source: FAOSTAT, 2022

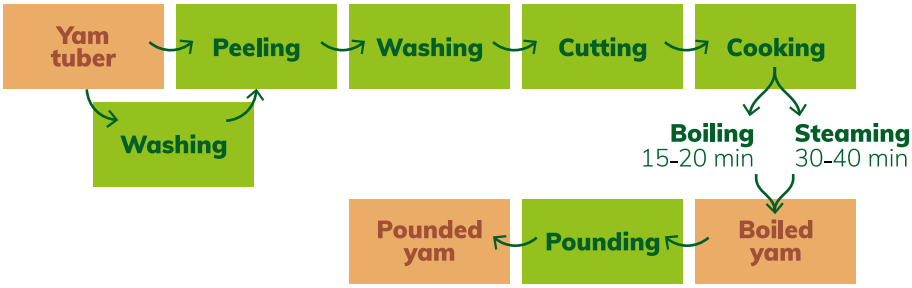
Five countries in West Africa account for 95% of global yam production



Top five yam consumers
(kg/capita/year)



Pounded yam preparation



Preferences of farmers, producers, processors, and consumers of pounded yam

Raw yams

- Healthy big tuber
- Low water content
- Brown colored skin
- Regular shape

During processing

- White flesh color (except if it is yellow yam)
- Easy to peel
- No discoloration during peeling
- Short cooking time
- Absorbs less water during cooking and pounding
- Easy to form dough

Ready-to-eat pounded yam

- White color dough (except if it is yellow yam)
- Moldable
- Stretchable
- Smoothness
- Not sticky
- Moderately soft
- Appealing aroma

Key priority traits for development of yam varieties for pounded yam

- **White/cream /light yellow color**
- **Smoothness** (without lumps)
- **Acceptable texture** (stretchable, cohesive, moderately adhesive)
- **Moderately soft**
- **Appealing aroma**

As a result of our work, new traits are being integrated into the yam breeding pipeline. Moving forwards, this will significantly boost adoption rates and performance of new yam varieties.

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For more information about Pounded Yam, please see https://rtbfoods.cirad.fr/

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