2026

Target Food Product Profile

Attiéké



RTB Breeding

RTB foods

Gates Foundation

CNRA CENTRE NATIONAL DE RECHERCHE AGRONOMIQUE

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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 **Attiéké** is being translated into market-driven breeding initiatives to develop new, end-user-focused cassava varieties, which is significantly boosting their adoption.

Product Identity

Attiéké is a cassava *couscous*-like dish made from fermented, steamed cassava pulp semolina. It is an Ivorian traditional, calorie-dense side-dish, with a slight sour taste. Attiéké is native to and traditionally produced in southern Côte d'Ivoire by women from diverse ethnic groups such as *Adjoukrou, Avikam*, and *Ebrié*. Women's social status is influenced by their skills in Attiéké processing. In general, preparation of Attiéké takes between 3 and 5 days. A traditional inoculum begins with the fermentation of slightly boiled or braised cassava roots for 1–3 days. Then, fresh cassava roots are peeled, cut into pieces, washed, and ground with an added fermentation 'starter' (7–12%) and palm oil (1%). The mash is left to ferment in bags for 12–15 hours. After fermentation, the watery paste is wrung in a hand hydraulic press and then the cake is sieved. The granules are then rolled by hand (with added water) and lightly sun-dried in very thin layers for approximately 1.5 hours. Dried granules are winnowed to remove fibres and any extraneous matter. The semolina is either cooked in its original form or sieved using smaller mesh sieves that range from 1 to 2mm, depending on the Attiéké's type. Attiéké product prepared with rapid rolling and without the winnowing and sieving steps is considered as the lowest quality, called "Attiéké Garba", and is sold at the lowest price on market. Whereas the high-quality product "Attiéké Agbodjama" is prepared with additional rolling, winnowing and sieving steps to obtain homogeneous, non-fibrous granules. The cooking process for Attiéké granules involves steaming them for 20 to 25 minutes. The end-product is packed into small or large plastic bags or baskets. It has a slightly sour taste and is a good accompaniment with fish, meat, and vegetables. Attiéké has become popular, and is now consumed in several West African countries, as well as by non-natives in Europe and America. To satisfy this demand, Attiéké is exported in either frozen or dried form.



Different granule sizes of Attiéké
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Exploration of good quality traits for Attiéké



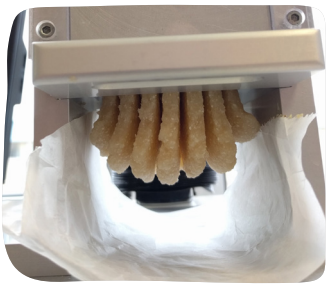
Attiéké granulation (rolling)
© Dominique Dufour- CIRAD

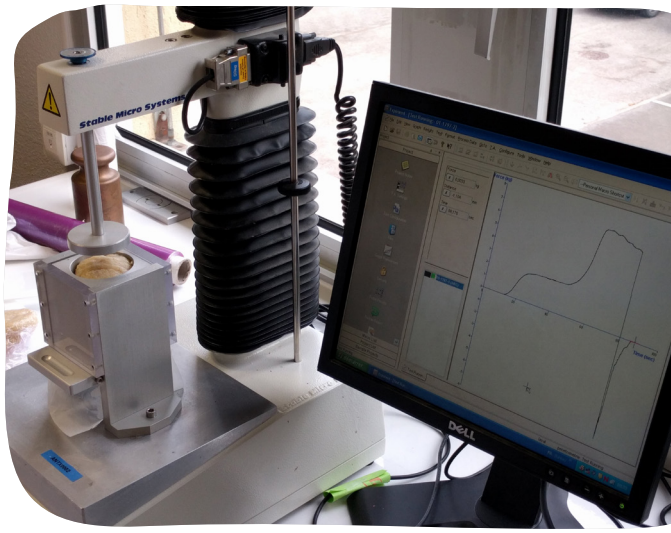
In order to obtain the best product quality and rank traits in order of importance, a gendered map of characteristics demanded by food-chain actors was achieved through a multidisciplinary methodology. These actors included cassava farmers, processors/cooks and consumers of Attiéké. By including Attiéké processors in a participatory diagnosis of processing, and consumers in rural and urban areas in consumer testing, a more appropriate food-product profile for Attiéké has been developed. Farmers prioritize cassava varieties with high yield, and tolerance to diseases (mosaic and anthracnose) and pests (mite and mealybugs). Appreciation of **flesh color and low fiber** are considered as key quality attributes for cassava varieties for Attiéké production. Overall, white-fleshed cassava roots are preferred over yellow-fleshed roots. However, food habits have an impact on the preference for cassava flesh color. Certain populations who mix Attiéké with red palm oil, dislike colored-flesh varieties. Processors preferred **medium size white cassava, non- or less fibrous roots, with a high dry matter content, and roots that are easy to peel and to grind**. The quality of the end-product depends more on the control of **fermentation steps**, which can be adjusted for a preferred outcome.

A good Attiéké is defined as being **whitish, shiny (brightness), visually appealing, moderately firm, and chewable, and having a fresh smell**. Good granules should be **very round, firm, not sticky, with no extraneous matter or fibers**. A good tasting Attiéké is **slightly sour, moldable and has a slightly sweet aftertaste**.

A trait evaluation toolbox to support breeding superior cassava varieties for enhanced adoption of Attiéké







Textural analysis of Attiéké © Dominique Dufour- CIRAD

For the first time, food technologists and social scientists can now assist breeders with quantifiable thresholds in terms of biophysical and sensory scores for overall preference for each measured trait. A toolbox of standard operating procedures (**SOPs**) for sensory analyses for Attiéké has been developed. A descriptive sensory profile of Attiéké has been evaluated by the trained panelists. Traits include brightness; cohesiveness; color; fermented or fresh Attiéké odor; firmness; masticability; moldability; palm oil taste; presence of fibers; sourness; stickiness; and sweetness. Physico-chemical analyses including dry matter (or moisture content), pH, ash, and organic acids (lactate, acetate, propionate, iso-butyrate, and butyrate), and the water absorption capacity for raw cassava roots and Attiéké samples can be characterised. Sweetness of taste indicated by the amount of soluble sugars (fructose, glucose, maltose, mannitol) has been determined using high-performance liquid chromatography (HPLC). Cassava flesh color can be rapidly measured using a chromameter. Quantitative descriptive analysis (QDA), and consumer acceptance assessments have been conducted with sensorial panels. Data analytical methods have been standardized to maximize meaningfulness of comparisons. These tools have enabled quantitative and qualitative evaluation of new cassava varieties for Attiéké. Agronomic, biophysical and sensory quality traits have been characterized at CNRA, Côte d'Ivoire[1] **Color, flavor, grain size, consistency, presence of fiber and aroma, are the key sensory assessment criteria**. Sensory perception of Attiéké varieties can vary according to harvest date. The improved varieties have high yields and produce a good attiéké. The attiéké production process, the criteria associated with the quality of attiéké, the sensory drivers of consumer acceptance, and their thresholds have been assessed[1]. Cassava variety can influence the total processing yield of attiéké, which is primarily based on the fermentation-pressing yield. **The variety of cassava has a significant impact on dry matter, organic acids, soluble sugars, total pectin, and pH of raw material and attiéké**. Attiéké dry matter can affect the cohesiveness and moldability. Sensory attributes can clearly discriminate between Attiéké samples. Overall, the preference for attiéké is associated with its **brightness, sourness, and texture**. In translating the sensory thresholds of texture attributes into reliable instrumental methods, measurement of Attiéké's product quality will become faster, more uniform and more reliable.

Additionally, high-throughput screening tools for phenotyping such as near infrared spectrometry (NIRS) and hyperspectral imaging, have been developed for screening raw tubers or flour for rapidly, and non-destructively evaluating large populations of cassava clones. Amylose, dry matter, and cooking properties of fresh cassava can be quantified using NIRS. Breeders will now be able to boost cassava selection speed and efficiency through marker-assisted selection (MAS), using validated markers for genes that control desirable quality traits. Developing molecular markers for identifying genes of interest can be achieved through our approaches based on the preferences of Attiéké users and consumers. **Combinations of instrumental food quality analyses, and high-throughput phenotyping tools, together with advanced genomics technologies in cassava selection pipelines will enhance discovery of new elite cassava varieties**. This will comprehensively address stakeholder preferences across the entire Attiéké value chain. The work will significantly boost new varieties' adoption rates and make them more attractive in the market.

Key Publications

[1] Diby, et al., 2024. Use of sensory and physico-chemical parameters to understand consumer perception of Attiéké, a fermented cassava product. *J. Sci. Food Agric.*, 104(8), 4596–4605. https://doi.org/10.1002/jsfa.13141

Koffi, et al., 2026. Stability of the technological and sensory performance of 14 cassava varieties according to harvesting date. *Am. J. Plant Sci.*, 17, 1021-1036. https://doi.org/10.4236/ajps.2026.1710061

Kouassi et al., 2025. Quality attributes of attiéké from lagoon areas selected for geographical indication labelling compared to the production of new zone in Côte d'Ivoire. *J. Agric. Food Res.*, 21, 101954. https://doi.org/10.1016/j.jafr.2025.101954

Mundéné-Timothée et al., 2025. Artisanal production of semolina: an agro-industrial prospect for the reduction of post-harvest losses of roots, tubers, and plantains in sub-Saharan Africa. *Sustainable Food Technol.*, 3(6), 1744–1765. https://doi.org/10.1039/d5fb00326a



Target Food Product Profile of Attiéké

Cassava is a key RTB food security crop in African, Asian, and Latin American countries.



326
million tons

Global annual cassava production

- 64% Africa
- 28% Asia
- 8% Latin Ameria

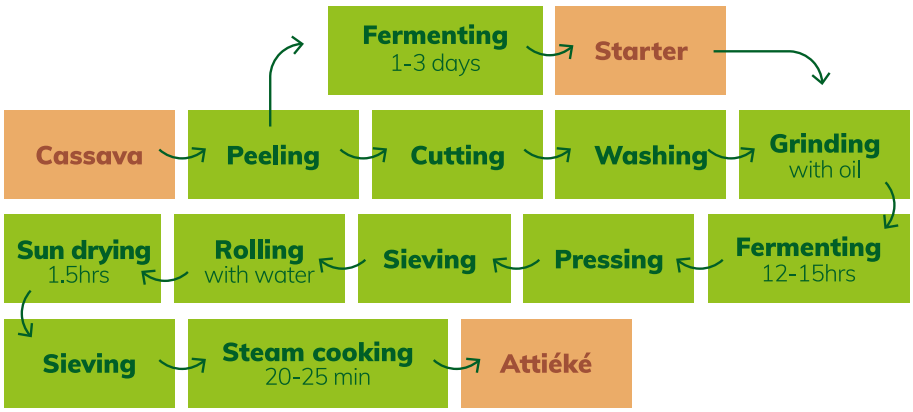
Source: FAOSTAT, 2022

Attiéké quality characteristics

	Attiéké Graba	Standard Attiéké	Attiéké Agbodjama
Rolling step	✓	✓✓	✓✓✓
Winnowing step	– –	– –	✓
Sieving step	– –	✓	✓✓
Fibers	+ + +	+ +	– –
Quality	low	standard	high

Source: Diby, et al., 2023

Attiéké preparation



Preferences of farmers, producers, processors, and consumers of attiéké

Raw cassava
- White-fleshed roots
- Low fiber

During processing
- Hard and dry flesh
- Ease of peeling and grinding
- Fermentation time (3 days)

Ready-to-eat Attiéké
- Whitish or yellowish (depending on eating habit)
- Shiny (brightness)
- Having a fresh smell
- Slight sweet and slight sour taste
- Very round and firm granules
- Not sticky / moldable
- No extraneous matter or fibers

Key priority traits for development of cassava varieties for Attiéké

- **Hard and dry flesh**
- **Ease of peeling**
- **Short fermentation time**
- **Not sticky**
- **Slight sour taste**
- **Hard and round granules**

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

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

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This article is available at: https://doi.org/10.18167/agritrop/00905