Received: 4 March 2025 | Revised: 28 March 2026 | Accepted: 2 April 2026

DOI: 10.1002/jsf2.70064

RESEARCH ARTICLE

JSFA Reports

Nutritional and sensory characteristics of local and hybrid East African Highland cooking bananas: Implications for breeding programs

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Funding information
Bill and Melinda Gates Foundation

Abstract

Background: Bananas (*Musa* species) are an important staple food and cash crop in many parts of the world. The East African Highland cooking bananas form the backbone of food security for millions of Ugandans. The demand for high quality cooking bananas is thus closely linked to their sensory characteristics (which drive consumer preference) and physicochemical properties, which, on the other hand, influence their nutritional and culinary values. We explored the relationship between nutritional composition, sensory characteristics, and physicochemical properties of 23 cooking banana cultivars from Uganda. These included officially released hybrids ($n = 2$), hybrids under evaluation ($n = 12$), female parent cultivars used in breeding ($n = 3$), and popular local East African Highland bananas ($n = 6$).

Results: Local cultivars (Mpologoma, Mbwazirume, and Muvubo) had significantly higher moisture, crude fat, ash, protein, and amylose contents compared to the hybrids ($p < 0.05$). Hybrid cultivars (N2, N6, and M33) had the highest dry matter contents, while the other hybrid cultivars had higher phenolic contents. Sensory evaluation identified key desirable characteristics of cooked bananas to be color, texture, aroma, taste, and astringency. Some hybrid cultivars (N21, N15, N11, N8, 17914S-24, N2, and N6) had lower sensory scores compared to others (M32, N17, M9, M33, and N24) and the local cultivars. Principal component analysis and Pearson correlation revealed positive relationships between physicochemical properties (titratable acidity, pH, phenols, tannins, starch, amylose, moisture, and minerals composition) and desirable sensory characteristics (yellow homogeneous color, sweet and matooke tastes, and low astringency).

Conclusion: Breeders could select for the attributes with positive relationships to enhance the adoption and consumption of the hybrid cooking bananas. However, further work is needed to establish the acceptability thresholds of the attributes.

KEYWORDS
astringency, East African Highland bananas, phenolic compounds, proximate composition