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"Solidarity in a competing world — fair use of resources"

Addressing Post-Harvest Losses During Traditional Banana Fermentation for Increased Food Security in Southwest Uganda

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Abstract

Postharvest losses (PHL) destroy 20-60 % of the food production in East Africa, exacerbating already severe regional food insecurity. Fermenting perishable foods such as fruits may reduce PHL while providing nutritional enrichment, improving shelf-life and food quality, and addressing seasonality in food supply. Fermented banana products have been refined and diversified in Uganda over generations to make the greatest use of available food resources, but still parts of the raw material are being lost during processing. This study aimed at exploring existing traditional methods and efficiency of fermentation of *Musa* (AAA-EAHB) '*Mbidde*' in southwestern Uganda. The study gathered information through participatory explorations (working with brewers) on banana juice (lightly fermented beer with < 1 % alcohol content [n=20 brewers]), *tonto* (turbid beer with ∼4% alcohol [n=20]), and *amarwa* (smoky spirit with ∼40% alcohol [n=20]). Brewers mentioned several losses of material during harvest and processing. Harvesting bananas requires felling the plant causing ripe fruit damage, particularly during harvest for processing banana juice (loss from fresh bananas=6.4% ± 8.8%) or *amarwa* (loss=9.3% ± 9.5%). Second, losses occur when brewers squeeze juice from the raw banana pulp using stems of *Imperata cylindrica*, which is then discarded or fed to animals together with the adherent fruit pulp (losses from raw banana juice=50.6% ± 0.2%; from *tonto* 39.2% ± 21.4% and *amarwa* 47.6% ±12.5%). Other causes of PHL during processing are excessive peeling for *tonto* processing (loss of banana flesh=18.6% ± 5.8%) and losses of intermediate products during distillation of *amarwa* (loss=75.9% ± 1.3%). Total losses of banana products during processing were rare and caused by sabotage (mostly by children), mistakes in the brewing process (e.g. addition of too much water), using bananas of wrong ripening stage, and equipment failure (e.g., burst or leaking drums in distillation equipment). Other non-PHL challenges include Banana Xanthomonas Wilt (BXW) and bad weather (up to 50% losses in the field).

Despite the general efficiency of traditional fermentation practices, significant portions of fruit are still lost. Reduction in PHL can complement, both culturally and nutritionally, the role that fermented banana products play in Ugandan food systems and contribute to regional food security. Collaborative mechanisms for PHL reduction should target the cited sources of PHL.

Keywords: Banana beer, indigenous knowledge, *Musa* spp., postharvest losses (PHL), traditional knowledge

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