

Developing A Decision Tree for Consumer Driven Sweet Potato Breeding Using Quantitative Descriptive Analysis and Consumer Testing

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Abstract

Adoption of released sweet potato varieties increases crop production and food and nutrition security. Many genotypes need to be evaluated for consumer acceptance as part of sweet potato breeding trials which makes consumer testing difficult. Laboratory based methods could be more efficient alternatives. A decision tree showing inferences drawn from attribute ratings from quantitative descriptive analysis (QDA) indicative of consumer hedonic responses can make decision-making in breeding easier. This study combined QDA and consumer liking to construct a decision tree to facilitate consumer-driven product design during selection at stages with many genotypes. The study was conducted in two agro-ecological zones in Uganda where sweet potato roots of 9 genotypes were steamed to conduct consumer acceptability tests. Consumers (n=212) rated each sample for overall, colour and aroma liking on 9-point hedonic scales and sweet taste, firmness, and mealiness on 5-point just-about-right (JAR) scales. A trained panel rated samples from both locations for various sensory attributes on 11-point scales by QDA. Target breeding values were extrapolated from graphs of trained panel ratings and overall liking as attribute ratings corresponding to overall liking = 6 and used to construct a decision tree. In both study areas, D20, NASPOT8 and NAROSPOT1 were most liked. NKB3 and D11 were the least liked in one location, while Muwulu-Aduduma was least liked in the other. The sensory profiles of some genotypes based on QDA varied by location. There was a strong positive correlation between colour liking and overall liking. However, correlation between description of sensory attributes linked to colour (rated by a trained panel) and colour liking was poor. There was also a strong correlation between overall liking and; aroma liking rating and JAR response frequencies for sweetness, firmness and mealiness. Aroma liking correlated with sweet potato aroma and flavour while JAR frequencies for sweetness, firmness and mealiness correlated with sweet taste, firmness, and mealiness assessed by the trained panel, respectively. Target breeding values were: 6 for sweet potato aroma, flavour and sweet taste each, 3 for firmness and 4 for mealiness. This decision tree which considers consumer needs will facilitate consumer driven breeding and increase adoption of released modern sweet potato varieties.