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Instrumental texture profile analyses of pounded yam produced from yam genotypes of contrasting pounding quality

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Abstract

Traditional roots and tubers breeding techniques often target yield, disease/pest resistance and nutrition as important traits for breeding programs, while consumer food quality preferences such as textural quality are often neglected. Textural quality is important to consumers of pounded yam, a popularly consumed doughy food product made from yam in Nigeria. The RTBfoods Project is targeted at developing medium-to-high throughput methods for roots and tubers, to evaluate preferred food quality attributes such as textural quality, and applying them as important traits in breeding pipelines. This study developed a standard operating protocol (SOP) for evaluating instrumental texture profile (ITPA) of pounded yam. Pounded yam was prepared from four varieties of D. rotundata with contrasting textural quality (TDr1401220, TDrMeccakusa, TDr1401593 and TDr1400158) based on a SOP (RTBfoods_E.6.6_SOP). ITPA was conducted on the pounded yam by means of texturometer (TVT 6700, Perten) at product temperature of 45 oC under standard parameter conditions.

Statistic t-test reveal good repeatability of the textural attributes (hardness, adhesiveness, cohesiveness, springiness, stickiness, gumminess & chewiness), while analysis of variance (ANOVA) evidenced the significant contrast ($p < 0.0001$) in textural attributes between the varieties. The first two principal components (PCA) of the textural data explained 94.2 % of variation and the varieties were grouped into unique clusters within the components space. The textural quality attributes that contribute the most to variation among the varieties are cohesiveness, springiness, chewiness and gumminess, which are attributes particularly associated with the varieties TDr 1400158 and TDr Meccakusa within the components' space. This outcome seem agreeable with the perception by pounded yam consumers that good quality pounded yam must be stretchable, mouldable, and moderately firm. Discriminant analysis also supported the PCA results. Pearson correlation coefficients between the attributes were generally significant ($p < 0.0001$), such as between cohesiveness and springiness (r = 0.96).

It is expected that descriptive sensory textural scores and overall consumer acceptance scores may afterwards be correlated with these highly discriminant instrumental attributes

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and useful regression models developed for medium-throughput instrumental estimation of sensory textural attributes as perceived by the consumers.