

ABSTRACT

Ethnobotanical, Morphological, Genetic, and Physicochemical Studies on Breadfruit [*Artocarpus altilis* (Parkinson) Fosberg] in the Caribbean

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Food and nutrition insecurity and high prevalence of diet-related non-communicable diseases are major concerns in tropical regions. The high-yielding but underutilised tropical food crop breadfruit [*Artocarpus altilis* (Parkinson) Fosberg] has potential to help address these issues in the Caribbean. However, the diversity of its germplasm in the region is unclear, which negatively affects greater utilisation. This study explored traditional knowledge, morphological, sensory, biochemical and molecular characteristics of existing Caribbean breadfruit accessions (ECA) and newly introduced breadfruit accessions (NIA) to facilitate cultivar identification and selection for commercialisation. Among ECA, over 44 vernacular names were recorded in a survey in selected Caribbean countries. These names were often associated with phenotypic characteristics such as fruit skin texture and pulp colour. Based on 49 quantitative and qualitative descriptors, high phenotypic variability was observed among ECA and NIA in an *ex situ* breadfruit gene bank in Trinidad and Tobago and the diversity has been expanded by NIA. Principal component analysis showed that fruit skin texture and skin colour were the predominant phenotypic traits in grouping breadfruit accessions. Molecular studies using ten microsatellite markers created two groups among 95 breadfruit samples based on genetic similarity. Average nucleotide diversity and nucleotide polymorphism were estimated as 0.159 and 0.279, respectively, indicating low to moderate genetic diversity in the breadfruit samples. Sensory and instrumental assessment showed that some NIA were very similar to the preferred ECA ‘Yellow’ regarding pulp colour and skin texture. Resistant starch (RS) was significantly different ($p < 0.001$) among 21 breadfruit cultivars and ranged from 28.16 g/100 g to 50.53 g/100 g. As a consequence of the high RS in most cultivars, dietary fibre content and energy density were shown to be higher and lower, respectively, than previously reported, which supports promotion of breadfruit as a starchy staple for the management of diet-related non-communicable disease such as type 2 diabetes.

Keywords: Oral O. Daley; *Artocarpus altilis*; breadfruit; genetic diversity; molecular markers; morphological descriptors; non-communicable diseases; nucleotide diversity; resistant starch; sensory evaluation; and traditional knowledge.