Diversity analysis and correlation study of fruit physical, biochemical characters and antioxidant properties of some palmyrah palm (*Borassus flabellifer* L.) genotypes under Western dry tract of West Bengal

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ABSTRACT

The present study investigates the diversity in fruit morphology, biochemical composition, and antioxidant attributes of eighteen naturally occurring palmyrah palm genotypes growing under the western dry tract of West Bengal, India. The selected region, characterized by lateritic soils and semi-arid climate, supports a wide range of seedling progenies exhibiting considerable phenotypic variation. Fruit morphological evaluation of eighteen seedling progenies (each considered as treatments for mean, variance analysis) of palmyrah palm from different locations of western dry tract of West Bengal in the year 2023-24 and 2024-25 revealed pronounced differences among genotypes in fruit size, shape, and pulp content. Fruit weight varied from 787.2 g to 2381.7 g, and pulp content ranged between 369.8 g and 1340.5 g, indicating substantial potential for yield improvement. Biochemical analyses also displayed significant variability, with total soluble solids (TSS) ranging from 15.7°Brix to 22.0°Brix, total sugars from 13.7% to 20.1%, and ascorbic acid from 19.4 to 46.7 mg 100 ¯¹ g fresh pulp. Antioxidant activity (DPPH radical scavenging) spanned from 45.2% to 77.3%, strongly correlating with phenolic and ascorbic acid contents. Correlation analysis demonstrated that fruit weight was highly associated with pulp content (r = 0.963), while TSS showed strong positive relations with reducing sugars (r = 0.904) and TSS: acidity ratio (r = 0.842). The results highlight the existence of broad genetic variability within the regional germplasm and identify genotypes such as PPG-17, PPG-12, and PPG-13 as promising candidates for both table and processing purposes. Overall, the findings provide a scientific basis for selection, conservation, and genetic improvement of palmyrah palm for enhanced fruit quality and antioxidant potential under dry land conditions.

Keywords: Bioactive compounds, diversity, fruit morphology and quality, palmyrah palm,