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Genetic Diversity and Beverage Quality of King Coconut Collected from Kurunegala District of Sri Lanka

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Abstract

King coconut (*Cocos nucifera*, var. Aurantiaca) has a globally increasing demand as a beverage and its productivity in Sri Lanka is relatively low when compared with its demand. Therefore the increase of production through breeding programmes has become essential. Revealing the genetic diversity of available King coconut germplasms in the country is important to use in breeding programmes. SSR is one of the most common marker type used in genetic diversity studies. The main objective of the study was to analyse the genetic diversity of 45 King coconut samples collected from extensive cultivations in Kurunegala district using SSR markers to form a co-collection having genetically diverse germplasms and to analyse some physical and chemical parameters of those King coconuts with a special focus on total sugar content in nut water. The diversity present within the forty-five King coconut samples collected from Pannala, Kalugamuwa and Makandura of Kurunegala district was evaluated incorporating two tall and two red dwarf coconut samples as standards using ten SSR markers. The constructed dendrogram based on 10 SSR loci comprised of an out group and a main cluster, the out group containing only two tall coconut standards and the main cluster containing all other analysed King coconut samples and the two red dwarf standards. Two red dwarf coconut standards were clustered in a separate subgroup within main cluster. Out of 45 King coconut samples 10, 19 and 4 King coconut samples collected from Kalugamuwa, Makandura and Pannala respectively were clustered within one sub group showing their genetic relatedness of analysed 10 SSR marker loci. All other King coconut samples were grouped to other 5 subgroups. Fruit size, colour of epicarp, nut water volume, pH, electrical conductivity and brix value of nut water were measured using standard methods and the total sugar content of nut water was measured using Phenol-Sulphuric method. In this analysis the highest sugar content and the lowest sugar content were observed in King coconut samples collected from Makandura and Pannala respectively. Conservation of genetically different King coconut individuals with favorable nut characteristics to use in future breeding programmes is recommended.

Keywords: King coconut, Genetic diversity, Breeding programmes, SSR markers, Nut water