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Determination of the chromosome number and genome size of Garcinia mangostana L. via cytogenetics, flow cytometry and k-mer analyses (Article) (Open Access)

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Abstract

Mangosteen (Garcinia mangostana L.) is one of the most popular tropical fruit of South-East Asia. It has considerable economic potential for local and export markets. This paper describes a research work to determine the number of chromosomes and genome size of G. mangostana through chromosome counting, flow cytometry and k-mer analyses. Chromosome count analysis revealed that the chromosome number of G. mangostana varied from 74 to 110. The high number observed could be due to the occurrence of mutation and aneuploidy in G. mangostana. Using flow cytometry with Gyicine max cv. Polanka (2C = 2.5 pg) used as standard, G. mangostana genome size was found to be 2C = 6.00 ± 0.17 pg. Meanwhile, a genome survey of G. mangostana was performed using Illumina HiSeq 2000 DNA sequencing; k-mer analysis revealed that the genome size of G. mangostana was approximately 5.92 Gbp, or approximately 6.05 pg (1 pg DNA = 0.9780 x 10\textsuperscript{9} bp). Based on the flow cytometry and genome survey, the study concludes that the genome size of G. mangostana is between 6.00 and 6.05 pg. © 2017 Dipartimento di Biologia, Università di Firenze.

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