

Determination of the chromosome number and genome size of *Garcinia mangostana* L. via cytogenetics, flow cytometry and k-mer analyses

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 *Glycine max* cv. Polanka ($2C = 2.5$ pg) used as standard, *G. mangostana* genome size was found to be $2C = 6.00 \pm 0.17$ 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 ($1 \text{ pg DNA} = 0.9780 \times 10^9 \text{ bp}$). 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.

Keyword: Chromosome count; Flow cytometry; Genome size; *G. mangostana*; k-mer analysis