

ABSTRACT

Safira Oktafia Pratiwi. 24020122130118. Phenotypic Analysis and Evaluation of DNA *matK* in Phylogenetic Analysis of Cassava (*Manihot esculenta* Crantz) in Kudus Region, Central Java. Under the supervision of Jafron Wasiq Hidayat and Anggiresti Kinasih.

Cassava (*Manihot esculenta* Crantz) is an important food crop with diverse local accessions that have been widely cultivated in Indonesia. Evaluating the ability of the universal *matK* marker to identify cassava at both species and local accession levels is therefore necessary. This study employed phenetic and molecular approaches based on the *matK* marker to evaluate two local cassava accessions from Kudus. This study aimed to evaluate the similarity between two local accessions and assess the effectiveness of the *maturase K* (*matK*) DNA marker for the taxonomic discrimination of cassava in Kudus Regency. Two local accessions, KTT and KTS, were analyzed using phenetic and molecular approaches. Phenetic analysis was performed using the UPGMA method with the Gower similarity coefficient, whereas molecular analysis was conducted through DNA amplification using three *matK* primer pairs. Phylogenetic analysis was performed using the Maximum Likelihood method to determine GC content, phylogenetic relationships, and haplotypes. The phenetic analysis revealed a Gower similarity index of 29.6% between KTT and KTS, indicating that they represent distinct local accessions. The separation of accessions was primarily influenced by the anatomical characteristics of the root epidermis and leaf cortex. Primer pair 472F+1248R showed a 100% amplification success rate across all samples, whereas primer pair KIM 3F+1R achieved a 67% success rate in KTT samples, and primer pair 390F+1326R failed to amplify any samples. The GC content of KTT, KTS, and *M. esculenta* ranged from 32.4% to 32.9%. BLASTn analysis showed that sequences amplified using primer pair 472F+1248R exhibited 100% sequence identity with *Jacquemontia* cf. *glaucescens* and 99.61% identity with *M. esculenta*. Primer pair 472F+1248R produced a monophyletic grouping with several *Manihot* species, whereas primer pair KIM 3F+1R demonstrated better discriminatory power for distinguishing Kudus local accessions and *M. esculenta* cultivars. Therefore, the *matK* marker showed good amplification performance but limited discriminatory power at the intraspecific level.

Keywords: accession, amplicon, genetic distance, tissue, cultivar