

Microsatellite-based evidences of genetic bottlenecks in the cryptic species “*Andrographis paniculata* Nees”: a potential anticancer agent

ABSTRACT

Andrographis paniculata (AP) is a medicinal plant species introduced into Malaysia. To address the genetic structure and evolutionary connectedness of the Malaysian AP with the Indian AP, a DNA sequence analysis was conducted based on 24 microsatellite markers. Out of the 24 primer sets, seven novel microsatellite primers were designed and amplified intra-specifically according to the available Indian AP sequences at the National Centre for Biotechnology Information (NCBI), where 17 of them were amplified using the cross-species strategy by employing the primers belonging to *Acanthus ilicifolius* Linn (Acanthaceae) and *Lumnitzera racemosa* Wild (Combretaceae). The primers were then applied on the Malaysian AP accessions. Sixteen of the new microsatellite loci were amplified successfully. Analysis of these microsatellite sequences, revealed some significant differences between the Indian and Malaysian AP accessions in terms of the size and type of the repeat motifs. These findings depicted the cryptic feature of this species. Despite identifying several heterozygous alleles no polymorphism was observed in the detected loci of the selected accessions. This situation was in concordance with the presence of fixed heterozygosity phenomenon in the mentioned loci. Accordingly, this was fully consistent with the occurrence of the genetic bottleneck and founder effect within Malaysian AP population. Apart from the amplification of new microsatellites in this species, our observations could be in agreement with the risk of genetic depletion and consequently extinction of this precious herb in Malaysia. This issue should be taken into consideration in the future studies.

Keyword: Genetic bottleneck; Founder effect; Microsatellite; Mutation; Cryptic species