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DNA barcode database of common herbal plants in the tropics: A resource for herbal product authentication

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Abstract

Ensuring the authenticity of raw materials used in herbal manufacturing is a key step prior to material processing. As species authentication is fundamental in the confirmation of herbal product quality, DNA barcoding techniques represent an efficient method for detecting plant based adulterants in traded herbal products. Through this study, we established a DNA barcoding authentication system for 112 common herbal plant species in the tropics, which can be used for species identification and authentication. The DNA barcode reference database for the authentication system was generated using *rbcL* for primary differentiation, and *trnH-psbA* for secondary differentiation. The performance of the barcodes in resolving species was evaluated using similarity BLAST, phylogenetic tree reconstruction andby estimating the barcoding gap. In this study, the multigene tiered approach for DNA barcoding is proven robust with high species-level resolution (96.4%). Upon completion of the DNA barcoding authentication system, 30 herbal products from the local market were tested for their authenticity using this approach. Recovery of DNA barcodes from the herbal products was 73.4%, of which 56.7% of the products tested were authentic, whereas 10% of the herbal products were substituted with other plant taxa and 6.7% were contaminated. To this end, authentication of herbal products is challenging, but with the establishment of a new DNA barcoding authentication system for common herbal plants in the tropics, the existing quality assurance and adulteration screening programs employed by regulatory agencies could be significantly strengthened.

Keywords: DNA barcoding; chloroplast DNA; *rbcL;* species identification; *trnH-psbA*