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Use of DNA Barcoding and UPLC-MS to Authenticate Agathosma spp. in South African Herbal Products

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Abstract : Introduction: The phytochemistry of Agathosma crenulata and A. betulina has been studied extensively, while their molecular analysis through DNA barcoding remains virtually unexplored. This technique can confirm the identity of plant species included in a herbal product, thereby ensuring the efficacy of the herbal product and the accuracy of its label. Materials and methods: Authentic Agathosma reference material of A. betulina (n=16) and A. crenulata (n=10) were obtained. Thirteen commercial products were purchased from various health shops around Johannesburg, South Africa, using the search term “Agathosma” or “Buchu.” The plastid regions matK and ycf1 were used to barcode the Buchu products, and BRONX analysis confirmed the taxonomic identity of the samples. UPLC-MS analyses were also performed. Results: Only (30/60) 60% of the traded samples tested from 13 suppliers contained A. betulina in their herbal products. Similar results were also obtained for the UPLC-MS analysis. Conclusion: In this study, we demonstrate the application of DNA barcoding in combination with phytochemical analysis to authenticate herbal products claiming to contain Agathosma plants as an ingredient in their products. This supports manufacturing efforts to ensure that herbal products that are safe for the consumer.

Keywords : Buchu, substitution, barcoding, BRONX algorithm, matK, ycf1, UPLC-MS
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