Rapid species identification of highly degraded agarwood products from Aquilaria using real-time PCR

ABSTRACT

Aquilaria species are well known for their expensive agarwood, which is utilized as it is, or used as ingredients in many consumer products. Species validation in agarwood products is important because agarwood price is source-species-dependent. The best approach to establish species identity depends on DNA, as conventional methods (i.e. through morphology) are unable to tell apart products from different Aquilaria sources. However, genomic DNA from processed agarwood is often under poor condition. To overcome this challenge, we adopted real-time PCR technology coupled with species-specific primers derived from single nucleotide polymorphisms (SNPs) in the chloroplast DNA matK and trnL-trnF sequences. We targeted three commercial Aquilaria species: Aquilaria crassna, Aquilaria malaccensis, and Aquilaria sinensis. Dissociation curves and melting points from real-time analysis were found to be distinct across the species tested. In this study, we demonstrate that the real-time PCR-based technique using species-specific primers is capable of differentiating the three major commercial species, i.e. A. crassna, A. malaccensis, and A. sinensis, even when using highly degraded agarwood products as starting material.

Keyword: Processed agarwood; Degraded DNA; CITES; Single nucleotide polymorphism; DNA barcoding