

Molecular identification of species and production origins of edible bird's nest using FINS and SYBR green I based real-time PCR

ABSTRACT

The increasing demand and consumption of edible bird's nest (EBN) by people worldwide has contributed to the food fraud issue. To ensure the authenticity of EBN in regard to their origin, rapid and accurate analytical methods are very much needed. In this study, forensically informative nucleotide sequencing (FINS) technique based on mitochondrial and nuclear DNA sequences, and phylogenetic analysis was performed to identify the species and production origins of raw and commercial EBNs. The cytochrome b (Cyt b), NADH dehydrogenase subunit 2 (ND2), 12S ribosomal RNA and beta-fibrinogen intron 7 gene markers used were able to identify and classify EBN produced by *Aerodramus fuciphagus* and *Aerodramus maximus*. It was newly discovered that EBN from man-made houses and natural caves were genetically differentiable using the mitochondrial Cyt b and ND2 genes. The phylogenetic results revealed that all EBN samples were well-separated into two groups following their species origin and production origin. A rapid and cost-effective identification alternative of SYBR green I based real-time PCR assay targeting a 177 bp of the mitochondrial Cyt b gene was developed and it efficiently differentiated genuine EBN from counterfeits. This FINS and SYBR green I based real-time PCR are highly sensitive, specific and reliable methods for identification of EBN origins and could be useful for preventing fraud substitution and mislabelling of EBN to ensure food safety.

Keyword: Edible bird's nest authentication; Origin identification; *Aerodramus* species; Forensically informative nucleotide sequencing (FINS); Phylogenetic tree; Real-time PCR