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PLoS ONE

Volume 11, Issue 10, October 2016, Article number e0163436

Open Access

Lab-on-a-chip-based PCR-RFLP assay for the detection of Malayan box turtle (Cuora amboinensis) in the food chain and traditional Chinese medicines (Article)

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Abstract

The Malayan box turtle (Cuora amboinensis) (MBT) is a vulnerable and protected turtle species, but it is a lucrative item in the illegal wildlife trade because of its great appeal as an exotic food item and in traditional medicine. Although several polymerase chain reaction (PCR) assays to identify MBT by various routes have been documented, their applicability for forensic authentication remains inconclusive due to the long length of the amplicon targets, which are easily broken down by natural decomposition, environmental stresses or physiochemical treatments during food processing. To address this research gap, we developed, for the first time, a species-specific PCR-restriction fragment length polymorphism (RFLP) assay with a very short target length (120 bp) to detect MBT in the food chain; this authentication ensured better security and reliability through molecular fingerprints. The PCR-amplified product was digested with Bfa1 endonuclease, and distinctive restriction fingerprints (72, 43 and 5 bp) for MBT were found upon separation in a microfluidic chip-based automated electrophoresis system, which enhances the resolution of short oligos. The chances of any false negative identifications were eliminated through the use of a universal endogenous control for eukaryotes, and the limit of detection was 0.0001 ng DNA or 0.01% of the meat under admixed states. Finally, the optimized PCR-RFLP assay was validated for the screening of raw and processed commercial meatballs, burgers and frankfurters, which are very popular in most countries. The optimized PCR-RFLP assay was further used to screen MBT materials in 153 traditional Chinese medicines of 17 different brands and 62 of them were found MBT positive; wherein the ingredients were not declared in product labels. Overall, the novel assay demonstrated sufficient merit for use in any forensic and/or archaeological authentication of MBT, even under a state of decomposition.

ISSN: 19326203 **CODEN:** POLNC **Source Type:** Journal **Original language:** English
DOI: 10.1371/journal.pone.0163436 **Document Type:** Article
Publisher: Public Library of Science

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References (101)

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Shackell, G.H.

1 **Traceability in the meat industry - The farm to plate continuum**

(2008) *International Journal of Food Science and Technology*, 43 (12), pp. 2134-2142. Cited 16 times.
doi: 10.1111/j.1365-2621.2008.01812.x

View at Publisher

Ali, M.E., Razzak, M.A., Hamid, S.B.A.

2 **Multiplex PCR in Species Authentication: Probability and Prospects—A Review**

(2014) *Food Analytical Methods*, 7 (10), pp. 1933-1949. Cited 23 times.
http://www.springer.com/life+sci/food+science/journal/12161
doi: 10.1007/s12161-014-9844-4

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