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Duplex real-time PCR assay using SYBR Green to detect and quantify Malayan box turtle (Cuora amboinensis) materials in meatballs, burgers, frankfurters and traditional Chinese herbal jelly powder (Article)

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Abstract

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The Malayan box turtle (Cuora amboinensis) (MBT) is a vulnerable and protected species widely used in exotic foods and traditional medicines. Currently available polymerase chain reaction (PCR) assays to identify MBT lack automation and involve long targets which break down in processed or denatured tissue. This SYBR Green duplex real-time PCR assay has addressed this research gap for the first time through the combination of 120- and 141-bp targets from MBT and eukaryotes for the quantitative detection of MBT DNA in food chain and herbal medicinal preparations. This authentication ensures better security through automation, internal control and short targets that were stable under the processing treatments of foods and medicines. A melting curve clearly demonstrated two peaks at 74.63 ± 0.22 and 78.40 ± 0.31°C for the MBT and eukaryotic products, respectively, under pure, admixed and commercial food matrices. Analysis of 125 reference samples reflected a target recovery of 93.25–153.00%, PCR efficiency of 99–100% and limit of detection of 0.001% under various matrices. The quantification limits were 0.00001, 0.00170 ± 0.00012, 0.00228 ± 0.00029, 0.00198 ± 0.00036 and 0.00191 ± 0.00043 ng DNA for the pure meat, binary mixtures, meatball, burger and frankfurter products, respectively. The assay was used to screen 100 commercial samples of traditional Chinese herbal jelly powder from eight different brands; 22% of them were found to be MBT-positive (5.37 ± 0.50–7.00 ± 0.34% w/w), which was reflected through the Ct values (26.37 ± 0.32–28.90 ± 0.42) and melting curves (74.63–78.65 ± 0.22°C) of the amplified MBT target (120 bp), confirming the speculation that MBT materials are widely used in Chinese herbal desserts, exotic dishes consumed with the hope of prolonging life and youth. © 2016 Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

herbal jelly powder | limits of detection and quantification | Malayan box turtle | protected species | SYBR Green real-time PCR

Indexed keywords

Engineering controlled terms: Assays | Binary mixtures | Chains | Chemical contamination | Melting

Compendex keywords: Limits of detection | Malayan box turtle | Medicinal preparation | protected species | Quantification limit | Quantitative detection | Real-time PCR | Real-time PCR assay

Engineering main heading: Polymerase chain reaction

EMTREE drug terms: cytochrome b | RNA 18S | DNA | herbaceous agent | organic compound | powder | SYBR Green I

EMTREE medical terms: Article Chinese herb food chain food processing limit of detection limit of quantitation meat nonhuman nucleotide sequence powder priority journal real time polymerase chain reaction turtle analysis animal chemistry China food analysis food contamination genetics meat procedures

MeSH: Animals China DNA Drugs, Chinese Herbal Food Analysis Food Contamination Meat Products Organic Chemicals Powders Real-Time Polymerase Chain Reaction Turtles

Molecular Sequence Numbers:

GENBANK,

AP003428(submitted), EU755253(submitted), KF907307(submitted), KM612279(submitted), KP168712(submitted), KP269069(submitted), KR059217(submitted), KU050703(submitted), NC001700(submitted), NC001941(submitted), NC001960(submitted), NC002081(submitted), NC006295(submitted), NC006880(submitted), NC007579(submitted), NC011573(submitted), NC012374(submitted), NC012670(submitted), NC016005(submitted)

Chemicals and CAS Registry Numbers:

cytochrome b, 9035-37-4; DNA, 9007-49-2;

DNA; Drugs, Chinese Herbal; Organic Chemicals; Powders; SYBR Green I

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References (72)

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1 Adeola, M.O.

Importance of Wild Animals and Their Parts in the Culture, Religious Festivals, and Traditional Medicine, of Nigeria

(1992) *Environmental Conservation*, 19 (2), pp. 125-134. Cited 92 times.
doi: 10.1017/S0376892900030605

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2 Aguirre, A.A., Gardner, S.C., Marsh, J.C., Delgado, S.G., Limpus, C.J., Nichols, W.J.

Hazards associated with the consumption of sea turtle meat and eggs: A review for health care workers and the general public

(2006) *EcoHealth*, 3 (3), pp. 141-153. Cited 37 times.
doi: 10.1007/s10393-006-0032-x

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(2015) Food Additives and Contaminants - Part A Chemistry, Analysis, Control, Exposure and Risk Assessment

A suitable method to detect potential fraud of bringing Malayan box turtle (Cuora amboinensis) meat into the food chain

Ali, M.E. , Asing , Hamid, S.B.A. *(2015) Food Additives and Contaminants - Part A Chemistry, Analysis, Control, Exposure and Risk Assessment*

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