

Detecting Mislabelling of Packaged Frozen Seafood Products in Sri Lanka: A DNA Barcoding Approach

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Seafood trade has conquered a vast market in global, as well as the local context. Substitution of high value species with those of low cost has become an emerging problem for the expanding market, since some of the products are visually unrecognizable and morphologically indistinguishable. The objective of this study was to assess the suitability of DNA barcoding as a method for species identification of packaged seafood to detect any mislabelling. Eight packaged frozen seafood product samples including finfish, crab, shrimp and cuttlefish were obtained from randomly selected supermarkets and subjected to DNA extraction by standard phenol chloroform DNA extraction protocol. Mitochondrial cytochrome oxidase subunit I gene (COI) was amplified in those samples with appropriate primers. Then successful five PCR products of tuna (T1 & T2), sailfish (SF1 & SF2) and crab (C1) were selected for sequencing to build DNA barcodes. The prepared DNA sequences were compared with the Barcode of Life Database (BOLD) system for species identification. Close related sequences of each sample were downloaded from NCBI Genbank and phylogenetic trees were constructed using Maximum Parsimony, Maximum Likelihood and Neighbor Joining methods. Samples were identified as follows, T1 - *Thunnus albacares* (100%) and T2 - *Thunnus alalunga* (99.85%), SF1 and SF2 - *Istiophorus platypterus* (100%) and C1 - *Portunus pelagicus* (97.71%). Identical tree topologies were resulted from three methods and three major clades were revealed in the phylogenetic tree as tuna, sailfish and crab groups. All selected five samples were matched (100%) showing that correct labelling had been done. This study concluded that DNA barcoding is a feasible, efficient and reproducible method for detection of mislabelling of packaged frozen seafood. However, the packaged frozen seafood trade has not reached high extent in Sri Lanka yet, hence substitution of seafood products does not occur frequently.

Keywords: Seafood, Identification, DNA Barcoding, Phylogenetics, Mislabelling