

Biotechnologies towards Sustainable Development in Malaysia

Zarina Zainuddin

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Chapter 29

The effect of cooking methods on meat samples using PCR-RFLP analysis

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Introduction

Molecular methods for species detection are widely applied in food diagnostics. PCR-RFLP based on polymerase chain reaction (PCR) and subsequent restriction analysis or DNA sequencing allows a sensitive and specific detection of all relevant animal species (Matsuga *et al.*, 1999). Nucleic acid-based species identification often targets the mitochondrial DNA encoded cytochrome b (*cytb*) gene. The analysis of mitochondrial DNA has been reported to be a powerful tool for identifying beef with respect to that other land animal species due to several reasons: (1) its presence in multiple copies per cell (as many as 2500 copies in a postmitotic tissue such as skeletal muscle), that would increase the probability of achieving a positive result in the case of samples undergoing intense DNA fragmentation due to severe processing conditions; (2) its large variability compared with nuclear sequences, which undergo a less rapid evolution, that may facilitates authenticity studies (Veerkaar *et al.*, 2001). The mitochondrial *cytb* gene has been established as a target for evolutionary analysis and species identification in vertebrates and the description of universal *cytb* primers for PCR amplification led to an immense growth of *cytb* DNA sequences in database (Haunshi *et al.*, 2009). The analysis of this particular fragment is based on PCR amplification combined with the analysis of restriction fragment