DEVELOPMENT OF A PCR BASED GENOTYPING PROCEDURE TO IDENTIFY THE UNACCEPTABLE ADULTERATIONS IN SRI LANKAN MEAT MARKET

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Meat is important as a major source of dietary protein. It contains over 20 different proteins with a high biological value and contains almost all the essential amino acids. Apart from that animal source foods provide a variety of micronutrients that are difficult to obtain from plant based foods alone. Substitution of an expensive meat type with a cheaper or unacceptable meat type is a major problem associated with the meat industry. Such adulterations are taking place in many countries including Sri Lanka.

Meat adulteration is a fraudulent practice that intends to increase the profit margin of meat sales and such practices are banned by law in Sri Lanka. The beliefs of religion play a vital role in the meat consumption of its followers. The Muslims do not consume pork and Hindu and Buddhists refrain from consuming beef. Moreover, the slaughtering of buffaloes is banned by law. Yet the substitution of beef with buffalo meat is often practiced. The consumption of dog and cat meats is considered as unacceptable by the Sri Lankan public. But there have been many instances where dog meat had been used to adulterate Mutton and Chicken meat is adulterated with cat meat. One of the high demanding game meat types in Sri Lanka is Wild Boar meat. Hunting, selling and transportation of wild boar is prohibited in Sri Lanka. Therefore, identification of the species of origin of the meat sample is relevant to consumers for several reasons such as possible economic loss due to fraudulent adulterations and medical requirements of individuals who might have specific allergies and religious reasons. Also the determination of food authenticity and the detection of adulteration are important to protect consumer rights.

Reliable and sensitive methods are required in order to detect meat adulterations and methods that have been developed so far for this purpose are based on physical techniques, anatomical techniques, electrophoresis, isoelectric focusing, chromatography, DNA hybridization, polymerase chain reaction (PCR) and various methods based on Immunoassay techniques. The use of DNA based methods are considered more reliable than protein based methods. Tests based on PCR can be undertaken with much lower amounts of starting material, due to the amplification that the method provides. Due to these reasons a number of PCR techniques have been developed to identify origin of species of meat and the adulterations done to raw and processed meats.

This study was carried out to develop a DNA fingerprinting method to identify adulterations done with Bat, Buffalo, Cat, Cattle, Chicken, Dog, Goat, Guinea pig, Pig, Wild boar and Tuna fish meat. For this purpose species specific DNA forward and reverse primers were used. The PCR protocols used in the study were successful in differentiating between the common meat types found in the Sri Lankan meat market and the possible meat types used to adulterate them.