DEVELOPMENT OF STANDARD DNA SIZE MARKERS FOR SHORT TANDEM REPEAT LOCI BM1818 AND BM1824 OF CATTLE DNA TYPING IN SRI LANKA

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By

NUGAPOLA WATTE NALAKA PRDEEP NUGAPOLA

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Faculty of Animal Science and Export Agriculture
Uva Wellassa University
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ABSTRACT

Cattle; the most common livestock animal reared in the world and also true in Sri Lanka. When considering Sri Lanka, National cattle herd is mainly consist of indigenous cattle "Sinhala batu cattle", European pure breeds (Jersey, Frisian, Ayrshire), Indian cattle breeds (Sahiwal, Sindhi, Tharparkar), and their crosses. Identification and traceability of cattle and their products is extremely important for proven of ownership, exploration of pedigree, record keeping and animal disease control. Current identification methods are based on tattooing, branding and ear-tagging of an animal. However tagging devices can become separated from an animal thereby compromising identity and traceability. Moreover, tattooing is not a reliable method of establishing maternity or paternity of cattle, often cause significant financial consequences for the herd owner in instances of proven of ownership.

Deoxyribo Nucleic Acid (DNA) based identification relies on using the unique, unalterable, inherited DNA profile of an individual animal as an identifier. Testing the Short Tandem Repeats of DNA (STR) in establishing the identity and parentage is widely used for humans in Sri Lanka. However DNA based identity testing methods needed to be developed for cattle in order to use it as an accurate method than conventional cattle identification in order to address problems of cattle identity and traceability.

A total of 38 blood samples and 12 tissue samples were collected, DNA was extracted by Chelex® 100 (blood) and Charge Switch® - Forensic DNA purification kit (tissue). STR analysis done for loci BM1818, BM1824, BM2123, CSRM60, CSSM66, ETH10, HAU27, ILSTS006, INRA023, TGLA126. Standard DNA size markers for BM1818 (PIC = 0.77) and BM1824 (PIC = 0.71) were constructed for Sri Lankan cattle population since they were identified as the most polymorphic among panel of 10 loci. Allelic frequencies for each allele of the BM1818 and BM1824 loci were calculated. BM1818 locus has nine alleles and allele 18 was found with highest frequency (35 %). BM1824 locus has eight alleles and allele 13 was the most frequent allele (34.1 %). Newly constructed DNA size markers (allelic ladders) were successfully applied in cattle maternity tests and the results of these STR analyses have been accepted by courts.

Key words: - Identity Test, Parentage Analysis, Microsatellite, Cattle DNA, BM1818, BM1824.