Analysis of MC1R polymorphism in Sardo-Modicana cattle

Silvia Sorbolini[1], Salvatore Piergiacomo Rassu[1], Antonio Maria Cubadda[2], Maurizio Altea[3], Nicolò Pietro Paolo Macciotta[1]

[1]Dipartimento di Scienze Zootecniche, Università di Sassari, Italy

[2]Azienda Sanitaria Locale Oristano, Italy

[3]Associazione Regionale Allevatori della Sardegna, Cagliari, Italy

Corresponding author: Silvia Sorbolini. Dipartimento di Scienze Zootecniche, Università di Sassari. Via De Nicola 9, 07100 Sassari, Italy – Tel. +39 079 229358 – Fax: +39 079 229302 – Email: ssorbolini@uniss.it

ABSTRACT

Coat colour has been a topic of interest for both breeders and geneticists. Currently most cattle breeds are identified by their coat colour. In mammals, red/yellow and black/brown colours are determined by the distribution of two pigments: pheomelanin and eumelanin. The relative amounts of these pigments are primarily controlled by two loci, namely *Extension* (*E*) and *Agouti* (*A*). Extension gene encodes a seven trans-membrane domain receptor called *Melanocortin 1 Receptor* (*MC1R*). Activation of *MC1R* causes the production of eumelanin, whereas its inhibition leads to the production of pheomelanin. In cattle, three main alleles are known for *MC1R* gene: i) E^+ (wild type), ii) E^D (dominant black), and iii) *e* (recessive red). Mutations in coat colour genes have already been utilized for breed traceability of livestock products. Sardo-Modicana is an old local breed that experienced a gradual decrease in numbers as a result of the mechanization of agriculture. Following the recent tendency of market for typical products, there is a renewed interest for cheese and meet produced by this breed. Traceability protocols for this breed will be useful to guarantee the consumers and protect Sardo-Modicana breeders. The aim of this investigation was to analyse *MC1R* polymorphism in Sardo-Modicana cattle breed and evaluate if these DNA markers can be useful for product traceability in this breed. A total of 60 genomic DNA samples from Sardo-Modicana cattle collected in seven farms in the Monti Ferru area of western Sardinia were analysed by PCR-RFLP method. DNA was amplified using specific primers designed on the base of the bovine sequence from GenBank Acc. no. U39469. The obtained 402 bp amplicons were separately digested with restriction endonucleases MspA1l to score allele E^D and Msp1 for allele *e* respectively. The fragments were run on 2.5% agarose gel stained with Ethidium Bromide. Results on Sardo-Modicana breed highlighted an almost exclusive occurrence of wild type allele except in one animal that resulted heterozygous E^+/e. A larger number of animals of the same or other breeds farmed in Sardinia is needed to clarify if the *locus* polymorphism for *MC1R* is a valid DNA marker for the identification of Sardo-Modicana products.

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