

The traceability of origin and the authenticity of São Jorge Portuguese PDO cheese: a molecular approach

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The aim of this work is to provide an integrated method for the traceability of origin and authenticity of Portuguese PDO cheeses. The focus is an Azorean cheese, "São Jorge", a PDO cheese which is undergoing severe changes in the raw material and consequent quality and therefore it urges to preserve its characteristics and the traditional know-how. This work will also provide information about several characteristics of these cheeses, as organoleptic and microbiologic, that can be used, together with the molecular approach, to value the cheese and the traditional production methods (cattle breeds, natural pastures, cheese making). To relate the protein milk composition, breed, and casein genotype with cheese yield and characteristics of the cheese, we started genotyping the Ramo Grande breed for important genes and molecular markers. This is an autochthonous breed from the Azores and its milk was used for the cheese making until the recent introduction of the Holstein Frisian breed. Kappa-casein is an important casein molecule for cheese producers. The quantitative effects of kappa-casein genotypes on K-CN amount, casein micelle size, rennet coagulation time, and curd firmness have been described and it is known that the less desirable AA genotype is common on Holstein Frisian cattle, whereas the BB genotype is more common on Jersey, Normande or SRB cattle. Another important gene is the *leptin* gene, also called *Ob* gene. Publications about the role of the *leptin* gene describe its impact on the regulation of the fat metabolism in various populations. The *Ob* gene has been mapped to chromosome four in cattle and was found to be associated with the microsatellite BM1500 and OBWD located 3.6 kb downstream of the gene. The 65 animals studied presented approximately 45, 37 and 18 percent of AA, AB and BB genotypes. These results will help the marker assisted selection crossbreeding to obtain a higher percentage of B allele in this breed and consequently increase the cheese yield. The microsatellite marker BM1500 presented at these population only four alleles with frequencies 1.54 to allele 131; 49.23 to 133; 40 to 141 and 9.23 to 145. To marker OBWD was possible to find either more alleles and with higher value of PIC (polymorphism information content). The frequencies were 8.73 to allele 173; 26.19 to 175; 11.11 to 177; 7.94 to 181 and 183; 23.81 to 185; 4.76 to 187; 3.97 to 193; 5.56 to 195. The PIC values were 0.504 and 0.816 to BM1500 and OBWD respectively. Regarding the markers, when comparing Ramo Grande with other Portuguese breeds, it was not possible to find, until, now a specific allele for this breed or alleles with a higher frequency. The continuation of this work will make possible to link milk protein composition, breed and casein genotyping with cheese yield and the characteristics of the cheese.