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Genetic polymorphism of β-Lg gene in Iraqi buffalo using Polymerase Chain Reaction – Restriction Fragment Length Polymorphism

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ABSTRACT

This study was conducted on 50 buffaloes from Basrah Governorate, Iraq to study the genetic polymorphisms of the β-lactoglobulin gene in the local buffaloes. The lab examinations were conducted in the Genetic Engineering Laboratory, College of Agriculture, University of Basrah. DNA was extracted by kit (PureLink Genomic DNA kits, Invetrogen, USA). The results of this technique showed the appearance of the expected gene bundle of 252 base pairs from all Iraqi buffalo samples, as the primer interacted with all DNA isolates taken from the studied buffalo samples. Digestion technique with restriction enzymes (HaeIII) was used to detect the genetic polymorphisms of β-lactoglobulin gene, exhibiting two bands to all studied buffalo samples. Only the homozygous BB genotype has been shown.

Keywords: Genetic polymorphisms, β-lactoglobulin gene, PCR technique, Iraqi buffalo.
Article type: Research Article.

INTRODUCTION

One of the basic elements in determining the genetic forms of milk proteins is the use of electrophoresis (Cattaneo *et al.* 1996). Studies on the genetic polymorphisms of proteins have developed over time. Ng-Kwai-Hang (1998) summarized its most important goals by revealing the chemical properties of proteins, including milk and blood proteins, and some features of the similarity between these proteins, as well as clarifying the different relationships between different types of animals. Electrophoresis is used to detect genetic polymorphisms in milk proteins that result from the substitution of one amino acid for another or from the deletion of one or more amino acids. Gel electrophoresis, which displays several bands of various lengths, allows researchers to see even variation among genotypes (David & Deutch 1992). As it depends on the existence or lack of mutations, DNA analysis you could also examine the DNA. Point mutations and genetic DNA restructuring (Recombinant DNA - rDNA) are two of the most significant mutations that take place at the DNA level (Di Gregorio *et al.* 1991). In the case of point mutations, a single nucleotide is replaced, and in this case, differences between individuals are detected using restriction enzymes that cut DNA in specific regions, depending on the type of enzyme. As for the phenomenon of DNA organization, it includes the insertion or deletion of part of the genetic DNA fragments. The most common is the formation of sequential chains, and these can be individually amplified and observed using the Polymerase Chain Reaction (PCR) technique (Soller 1990). The phenomenon of genetic polymorphism in cattle has been well studied in recent years due to the close relationship between the genotypes of milk proteins and the important economic characteristics in cattle. Milk contains four main types of casein, namely, α S1-casein, α S2-casein, β-casein, κ-casein (Davies & Law 1987). The PCR-RFLP amplification is one of the first techniques used to identify genetic variation in DNA between two or more organisms (Bruns *et al.* 1991 & Strange 2003). It is also one of the most important techniques used in studies of the evolution of breeds with many organisms, as it has been used

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