

Milk yield and gene expression in the udder of beef heifers depending on pre and post- weaning diets

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Raising female calves and heifers on high energy planes of nutrition during the pre-pubertal period has been proposed to lower the age at first calving, reducing their 'unproductive' period. The objectives of the present study were to evaluate nutrition-induced changes on the performance of the primiparous cow and its calf, milk yield and composition, and in gene expression of the mammary gland in the first lactation. Parda de Montaña female calves (n=16) were used in a 2x2 factorial experiment. In the pre-weaning period (PRE-W, 0-6 months), calves were either creep-fed or fed only on their dam's milk (Creep vs Control). In the post-weaning period (POST-W, 6-15 months), heifers received either a high (91.7 MJ/d) or a moderate energy diet (79.3 MJ/d) (High vs Moderate). After breeding (15 months), all the heifers received the same diet to the end of their first lactation (32 months). Primiparous cow and calf weights and gains during the first lactation were not affected by the PRE- or POST-W feeding management; however, creep feeding during PRE-W period reduced milk yield, milk fat, protein, casein, lactose throughout their first lactation and increased somatic cell count at 3rd and 4th months of lactation, and affected the gene expression patterns in their mammary gland at the end of the first lactation. The POST-W energy level had no impact on milk production and composition. Gene expression in mammary gland was affected by both PRE-W (307 genes; FDR<0.005) and POST-W treatments (7 genes; FDR<0.005), with PRE-W diet having the greatest impact. Overall, creep feeding during PRE-W period resulted in up-regulation of genes related with immune response and chemokine activity and down-regulation of ribosome and spliceosome genes. The data confirmed the lack of clinical mastitis, however, the possibility that the animals might be at greater risk to develop subclinical mastitis cannot be excluded. Therefore, increasing the energy level during the POST-W period would be advisable to reduce the age at first calving of heifers, without impairing milk yield or immune status.

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