Association of metabolic and inflammatory markers with milk yield in postpartum dairy cows treated with ketoprofen

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Abstract

Inflammation together with lipolysis and ketogenesis in early lactation can cause low productivity and may be harmful to the cow health. The objective of the study was to determine if ketoprofen treatment in the first days following parturition would positively affect the milk production and whether it was associated with the metabolic and inflammatory response. The study was conducted on 30 cows divided into two groups of 15 cows each. The experimental group was treated with 3 mg × kg. bw.⁻¹ ketoprofen for three consecutive days after parturition. The blood samples were collected on the first day of treatment and in the first and second week postpartum and they were analyzed for non-esterified fatty acids (NEFA), beta-hydroxybutyrate (BHB), tumour necrosis factor-α (TNF-α) and haptoglobin. The results suggested that ketoprofen-treated cows with a higher milk production had a significantly lower concentration of NEFA, BHB, TNF-α and haptoglobin in the first and second week postpartum. No differences were found in the control group in metabolic status regardless of the achieved level of milk production. Ketoprofen administration in postpartum cows can enhance the milk yield. The higher milk yield in the experimental group might be associated with a lower degree of lipolysis, ketogenesis and reduced inflammatory response in the first two weeks postpartum.

Key words: ketoprofen, TNF-α, haptoglobin, NEFA, BHB, cow, milk yield

Introduction

The regulation and coordination of lipid metabolism between adipose tissue, liver, gut and mammary gland in peripartum period are the key components of the adaptations to lactation (Drackley 1999). A metabolic disorder, such as ketosis and fatty liver along with metritis and mastitis during the period of lactation may limit the nutrient supply of the mammary gland, reduce the milk yield and affect the productivity of cows throughout the lactation period. During the period of early lactation an increase in non-esterified fatty acids (NEFA) and cytokines in the plasma was observed in dairy cows, which can be correlated with the development of an inflammatory response in the liver. Accordingly, the increased fatty acid synthesis is directed towards the triglyceride synthesis and may result in a reduction in gluconeogenesis and continued mobilization...