The effect of β-hydroxy-β-methylbutyrate (HMB) on selected parameters of humoral immunity in calves

R. Wójcik¹, J. Małaczewska¹, A.K. Siwicki¹, J. Miciński², G. Zwierczowski²

¹ Department of Microbiology and Clinical Immunology, Faculty of Veterinary Medicine, University of Warmia and Mazury in Olsztyn, Oczapowskiego 13, 10-718 Olsztyn, Poland
² Department of Cattle Breeding and Milk Quality Evaluation, Faculty of Animal Bioengineering, University of Warmia and Mazury in Olsztyn, Oczapowskiego 5, 10-718 Olsztyn, Poland

Abstract

The objective of this study was to evaluate the effect of HMB on selected parameters of the humoral immunity in calves. The experiment was performed on 14 calves aged 30 ± 2 days, divided into two equal groups of control (group K) and experimental (group H) animals. The feed administered to the experimental calves was supplemented with HMB at 40 mg/kg BW, whereas the control calves were administered standard farm-made feed without supplementation. Blood was sampled from the jugular vein immediately before the experiment (day 0) and on experimental days 15, 30 and 60 to determine the following immunological parameters: total protein levels, gammaglobulin levels, lysozyme activity and ceruloplasmin activity. An analysis of the results obtained revealed a significant increase (p < 0.05; p < 0.01; p < 0.001 respectively) in gammaglobulin levels and lysozyme activity throughout the entire experimental period, an increase (p < 0.05; p < 0.01 respectively) in ceruloplasmin activity on experimental days 15 and 30, but no changes in serum total protein levels of calves administered HMB as compared to those found in the control group.

Key words: HMB, calves, total protein, ceruloplasmin, lysozyme, gammaglobulin

Introduction

β -hydroxy-β-methylbutyrate (HMB) is naturally synthesized in the body from the oxidation of approximately 5% of dietary leucine, whereas the remaining 95% of the product of leucine transamination, 2-ketoisocaprate (α-KIC), is converted to isovaleryl-CoA in the liver (Van Koevering and Nissen 1992). Small quantities of HMB are found in corn, milk, cheese, citrus fruit, selected fish species, red wine and red meat. The quantity of HMB which occurs naturally in the body and is supplied with food is insufficient and, therefore, has to be supplemented from external sources. Dietary supplementation is safe because even if the recommended dose is exceeded, there are no side effects, and excessive HMB is excreted with urine (Vukovich et al. 2001). HMB has been found to stimulate the immune system of