Colostrum as source of passive immunity in caprines: Study of comparative antibody absorption in goat kids using bovine or caprine colostrum

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INTRODUCTION

The colostrum in goats as well as in other ruminants, is rich in immunoglobulin with the IgG as the mean class present. This first lacteal secretion with IgG concentration varying from 50 to 200 mg mL^{-1}, decline approximately, 50% in the following hours. Bovine colostrum and goat milk goat can be also a vehicle for offspring diseases, being the virus responsible for caprine arthritis encephalitis (CAEV) the most important challenge in the goat farming systems. This infection is caused by Lentivirus, clinically characterized as polyarthritis in adult and leucoencephalomielitis in goat kids. The establishment of a Lentivirus-free, IgG-rich bovine colostrum bank, is an important alternative to feed a source of passive immunity to newborn goat kids.

OBJECTIVE

The objective of this study was to evaluate colostrum management alternatives, estimating the passive immunity acquisition in goat kids fed bovine or caprine colostrum.

MATERIALS and METHODS

Thirty three animals were randomly distributed in two groups receiving caprine colostrum (group A) and bovine colostrum from Holstein cows (group B), 5% of the newborn body weight, at 0, 12, 24 and 36 hours of life. From 48 hours of life all animals received 400 mL of bovine milk in buckets, twice a day, until weaning at 60 days of life. Goat kids blood samples were collected at 0, 12, 24 and 48 hours, and at 5, 10, 15, 20, 25, 30, 40, 50 and 60 days of age. Serum variables analyzed were total protein (TP) and immunoglobulins (Ig) (zinc sulfate turbidity test - ZST). A completely randomized design was used with serum variables analyzed as repeated measures. All statistical analyses were performed using SAS, Version 6.12 software (SAS Institute Inc., Cary, NC, USA).

RESULTS

Serum total protein concentration differed between groups (P<0.0001) and interaction between groups and period (P<0.0001), indicating different behavior in the fluctuation of total protein between the groups along the experimental period. The serum TP concentrations in group A did not differ (P>0,05) after goat colostrum ingestion, while in animals that ingested bovine colostrum, the maximum concentration was at 48.68 ± 0.70 hours day of life, then showing little variation until the end of the experimental period (Figure 1). The average concentration of total protein at 24 and 48 hours of life was 5.09 ± 1.18 and 6.85 ± 1.11 g dL^{-1} and 5.21 ± 1.13 and 6.95 ± 1.18 g dL^{-1} for the groups that received bovine and goat colostrum, respectively. The average concentration of total protein at 60 days of age was 5.77 ± 0.55 g dL^{-1}.
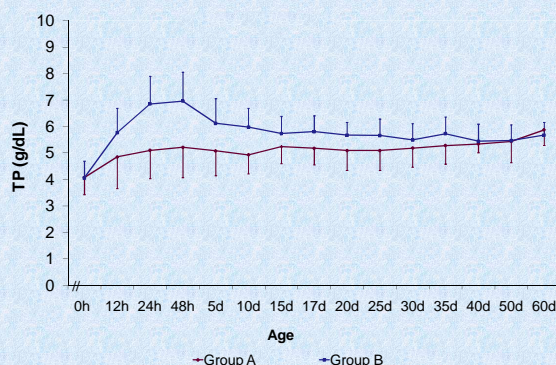

Figure 1 – Behavior of the fluctuation of total protein (g/dL) in groups during the experimental period

Serum immunoglobulins differed (P = 0.0006) between the groups and the interaction between groups and period (P<0.0001), indicating differences in the fluctuation of serum immunoglobulins between groups during the experimental period. This difference between groups was observed until 25 days of life (Figure 2), and the averages for the period was 18.26 ± 5.50 units ZST to animals that received goat colostrum and 27.59 ± 8.94 units ZST for receiving bovine colostrum.
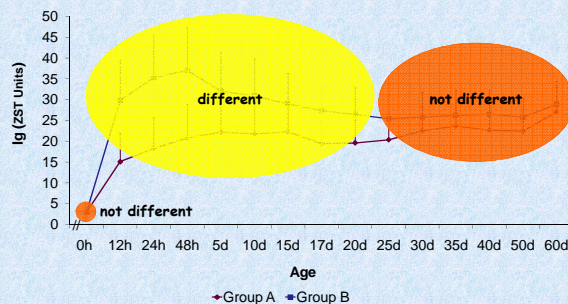

Figure 2 – Behavior of the fluctuation of serum immunoglobulins (ZST units) in groups during the experimental period

Group A showed maximum values of TP and Ig later than group B, at 20.05±1.36 and 20.11±1.72 days after birth, with means of 5.91±0.22 and 28.17±2.05 ZST units, respectively.

CONCLUSIONS

The results indicate that caprine colostrum can be used as bovine colostrum surrogate with advantages in the initial acquisition of immunoglobulins by the neonates.