Introduction

Conjugated linoleic acids (CLA) is the collective name for a group of geometric and positional isomers of linoleic acid (C18:2) in which the double bonds are separated by a single carbon-carbon bond instead of a methylene group. CLA are known to have many favourable biological effects: anti-carcinogenic properties (Pariza et al., 1991), antioxidant properties (Ip et al., 1991), as well as a nutrient partitioning effect (Mersmann, 2001). They have been shown to protect against atherosclerosis in rabbits (Lee et al., 1994) due to the reduction of plasma HDL cholesterol and triglycerides (Corino et al., 2002a). Moreover, CLA isomers have also been shown to modulate the immune system (Sugano et al., 1998; Bassaganya-Riera et al., 2001; Corino et al., 2002b). The aim of the present study was to determine the effects of dietary CLA supplementation in sows during late gestation and lactation on colostrum immunoglobulins of classes G, A and M (IgG, IgA, IgM) and on the piglet serum immunoglobulin title.

Materials and Methods

A total of 21 gestating sows were allotted according to weight and parity to one of three dietary treatments: 0% CLA (C) or 0.5% CLA from seven days before parturition until seven days postpartum (T1) and 0.5% CLA from seven days before parturition until weaning (T2). CLA powder contains 50% CLA isomers (CLA ONE powder, PharmaNutrients, Inc., 918 Sherwood Drive Lake Bluff, IL 60044, USA). During parturition, samples of colostrum were collected from each sow and were...
immediately frozen at \(-20^\circ\text{C}\) pending analysis of immunoglobulin concentrations. Blood samples were taken randomly from two piglets per sow at 21 d postpartum and 15 d post weaning for the determination of the immunoglobulin titre. The immunoglobulin concentrations (IgG, IgA, IgM) were determined based on the quantification of specific antigens according to the radial immunodiffusion method of Mancini et al. (1965). A commercial kit specific for swine (Bethyl Laboratories Inc., Montgomery, TX, USA) was used for the assay.

The results on the colostrum immunoglobulin concentration were analyzed by ANOVA using the SPSS (2001). Differences between means were tested using the Student–Newman–Keuls test. Data on serum parameters were analyzed by repeated measurements (ANOVA).

RESULTS AND DISCUSSION

The results on colostrum immunoglobulin concentration are shown in Table I. Colostrum IgG concentration was significantly higher \((p < 0.05)\) for treated groups than control group \((+30\%)\). The concentration of IgA and IgM tended to be higher \((p < 0.10)\) in the colostrum of sows given CLA. There were no differences between the T1 and T2 groups because sows were given CLA treatment at the same time, 7 d before farrowing. The serum IgG concentration in piglets at 21 and 35 d post-partum is reported in Figure 2. Serum IgG concentration at 21 d postpartum was significantly higher \((p < 0.05)\) for treated groups (T1 and T2) than control group (C). At 35 d postpartum serum IgG was higher only for the T2 group as compared to control group. There were no significant differences in serum IgA and IgM in relation to the diet of sows or age of piglets, however the control group showed lower values than the treated groups.

The effects of dietary CLA supplementation on colostrum and serum immunoglobulin concentration confirmed the immunomodulatory effects of these isomers as previously reported by Corino et al. (2002) and Bontempo et al. (2002).

**TABLE I**

Colostrum immunoglobulin concentration in sows fed control (C) or CLA-supplemented diets from seven days before parturition until seven days postpartum (T1) and from seven days before parturition until weaning (T2)

<table>
<thead>
<tr>
<th>Immunoglobulin group</th>
<th>C</th>
<th>T1</th>
<th>T2</th>
<th>SEM*</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgG, mg/dL</td>
<td>8241(^a)</td>
<td>10896(^b)</td>
<td>10348(^b)</td>
<td>403.6</td>
<td>0.03</td>
</tr>
<tr>
<td>IgA, mg/dL</td>
<td>1208</td>
<td>1044</td>
<td>2096</td>
<td>184.7</td>
<td>0.06</td>
</tr>
<tr>
<td>IgM, mg/dL</td>
<td>628</td>
<td>792</td>
<td>915</td>
<td>98.1</td>
<td>0.08</td>
</tr>
</tbody>
</table>

\(^a,b\)Means without a common letter differ, \(p < 0.05\).

\(*\)SEM standard error mean.