Effect of trans-10 cis-12 conjugated linoleic acid on Bovine Oocyte Competence and Fatty Acid Composition


Contents

The reproductive performance of dairy cows may be improved by feeding conjugated linoleic acid (CLA) supplements during early lactation. The mechanism of action of t10,c12 CLA is not clearly known. Our objective was to investigate the effect of t10,c12 CLA on oocyte maturation and lipid composition of cumulus oocyte complexes (COC). The developmental potential of oocytes incubated in in vitro maturation (IVM) medium supplemented with t10,c12 CLA to the blastocyst stage and embryo quality were also assessed. In experiment 1, abattoir-derived oocytes were matured in TCM199 + 10% serum supplemented with 100 μM t10,c12 CLA (t10,c12 CLA n = 672) or without it (control n = 672). Mature oocytes were either stained for chromatin configuration or inseminated and cultured for embryo development assessment. In experiment 2, COC and IVM culture media were subjected to fatty acid (FA) analysis prior and after maturation with t10,c12 CLA or without it (control). Total lipids and FA profiles in oocytes, cumulus cells and culture media were determined by gas chromatography. t10,c12 CLA supplementation to IVM medium improved (p = 0.05) embryo quality evaluated morphologically. This effect was associated with t10,c12 CLA presence (3.1 ± 0.7%, p = 0.04) and lower levels of arachidonic acid in FA profile of t10,c12 CLA mature oocytes (immature oocytes = 4.4 ± 1.9%, t10,c12 CLA mature oocytes = 1.0 ± 0.7%, p = 0.05). Differences in myristic and eicatrienoic acids, saturated and unsaturated FA concentrations between oocytes and cumulus cells were detected (p ≤ 0.05). In conclusion, the presence of t10,c12 CLA during maturation interfered on lipid metabolism improving bovine oocyte competence to develop into higher quality embryos.