204 FATTY ACID COMPOSITION OF FOLLICULAR FLUID FROM DAIRY COWS FED TROPICAL FORAGE-BASED DIETS SUPPLEMENTED WITH INCREASING LEVELS OF SOYBEAN OIL

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Abstract

Recent studies have shown that dietary supplementation with sources rich in polyunsaturated fatty acids (PUFA) can improve reproductive perfor-mance of lactating dairy cows. However, no studies have reported the fatty acids composition of follicular fluid (FF) from dairy cows fed high-PUFA diets. This study aimed to evaluate the fatty acids composition of FF from dairy cows fed tropical forage-based diets containing different levels of soybean oil (SO). Four multiparous Holstein-Zebu cows in midlactation (90 ± 25 days in milk) were assigned to 1 of the following dietary treatments (on a dry matter basis): (1) T1 (control) = no SO; (2) T2 = diets containing 1.5% of SO; (3) T3 = diets containing 3.0% of SO; and (4) T4 = diets containing 4.5% of SO. Diets were composed of chopped elephant grass and a concentrate mixture and the forage concentrate ratio was 55 : 45 (dry matter basis). The experimental design was a 4 4 Latin square in w hich each period lasted 21 days. All cows received intravaginal progesterone-releasing devices and follicular waves were synchronized with 0.5 mg of gonadorelin. The FF from dominant follicles was collected by transvaginal ultrasound-guided aspiration on the last day of each period (Day 21) and centrifuged (10000 *g*, 1 min) and the supernatant was frozen at -80°C until fatty acid analysis. Extraction and methylation of fatty acids in FF were performed according to the 1-step simplified method described by Masood A *et al.* (2005 J. Lipid Res. **46**, 2299-2305). The fatty acid profile from FF was determined by gas chromatography as described by Cruz-Hernandez C *et al.* (2007 J. Dairy Sci. **90**, 3786-3801). Treatment effects were determined by regression analysis using the REG procedure of SAS (SAS Institute, Cary, NC, USA) and declared significant at $P < 0.05$. Nearly 30 different fatty acids (70% of the total area) were identified in the FF samples. The most representative fatty acids (% total area) for the 4 dietary treatments (T1, T2, T3, and T4, respectively) were C18 : 2 *cis* - 9, *cis* - 12 (19.8, 20.3, 16.1, and 24.2), C18 : 0 (17.7, 16.6, 19.5, and 16.8), C16 : 0 (12.2, 10.7, 11.3, and 17.8), and C18 :1 *cis* - 9 (6.5, 7.3, 5.5, and 7.7). Inclusion of SO in the diet linearly reduced ($P < 0.05$) concentrations of C16 : 1 *cis* - 9 (0.8, 0.7, 0.4, and 0.5) and C20 : 3 (1.2, 1.1, 0.5, and 0.7), but linearly increased ($P < 0.05$) concentrations of C18 : 1 *trans* - 11 (0.4, 0.4, 0.6, and 1.4), C18 : 1 *cis* - 11 (0.4, 0.5, 0.4, and 0.9), and C18 : 1 *cis* - 12 (0.2, 0.5, 0.5, and 0.7) isomers in FF. The increase in the concentration of C18 : 1 *trans* - 11 in FF from cows fed higher levels of SO was not accompanied by an increase in the proportion of CLA *cis* - 9, *trans* - 11 (0.9, 1.0, 0.7, and 0.9 for T1, T2, T3, and T4, respectively). It suggests the absence or low activity of A9-desaturase enzyme in the follicular environment, unlike that observed in the mammary gland. In general, our results indicate that fatty acid composition of follicular fluid from lactating dairy cows is sensitive to changes in dietary supply of PUFA.

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