EFFECT OF POTENTIATED PROBIOTICS ON FATTY ACID COMPOSITION IN WEANING PIGLETS

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Introduction:
Weaning involves complex psychological, social, environmental and dietary stresses that interfere with the development and adaptation of gut. Probiotics potentiated with n-3 polyunsaturated fatty acids (PUFA) have a positive effect on digestive tract, plasma fatty acid composition, immune system and thus total adaptation of piglets after weaning.

Methods:
The aim of our study was to investigate the effect of Lactobacillus plantarum - Bioceno™ LP96 and Lactobacillus fermentum -Biocenol™ LF99 in combination with flaxseed as a source of n-3 PUFAs on fatty acid profile and enzymatic activity of conventional piglets in problem breed. The experiment was carried out on 36 piglets at the age of 28 days of Slovak white x Landrace cross-breed divided into control (C) and experimental (E) group. The experimental piglets in group E were supplied probiotic cheeses at a dose of 4 g/animal/day for each cheese and in the same period the feed of group E was supplemented with whole crushed flax-seed. Piglets in group C were supplied control cheese at a dose of 8 g/animal/day. Plasma fatty acids were determined using GC-FID. Results were elevated by Tukey test and Anova one way.

Results:
In experimental group of piglets the following processes were observed in fatty acid composition: significant increase (P<0.05) of ΣPUFA, Σn-6, Σn-3, SFA/MUFA/PUFA ratio in favour of PUFA α-linolenic acid, eicosapentaenoic acid, docosapentaenoic acid (n-3), docosahexaenoic acid and stearic acid (P<0.05) and significant decrease of ΣMUFA, ΣSFA, n-6/n-3 ratio, myristic acid, palmitic acid, palmitoleic acid, docosatetraenoic acid and docosapentaenoic acid (n-6). In control group was found increase of n-6/n-3 ratio. Significant changes between control and experimental group on Day 14 were observed of ΣMUFA, ΣPUFA, Σn-3 PUFA, linoleic acid (n-6), eicosapentaenoic acid (n-3), docosatetraenoic acid, docosapentaenoic acid (n-6) and docosapentaenoic acid (n-3) by P<0.001, of lauric acid, palmitoleic acid, stearic acid by P<0.01; of myristic acid, palmitic acid, oleic acid, arachidonic acid and docosahexaenoic acid by P<0.05.

Discussion:
The n-6/n-3 ratio in the tenderloin was significantly influenced by dietary flaxseed, which was due to increases in n-3 PUFA (especially α-linolenic and eicosapentaenoic acids) and low increases in the linoleic acid and decreased n-6 PUFA contents (D’Arrigo et al., 2002; Hoz et al.,2003). Authors pointed out that n-3 PUFA potentiated the immunostimulative effect of probiotics (Kaštěť et al. 2007, Valavan et al. 2006, Kaštěť et al. 1999). According to Kankaanpää et al (2001) higher concentrations of PUFA inhibited the growth and mucus adhesion of selected lactobacilli, whilst growth and mucus adhesion of Lactobacillus casei Shirota was promoted by low concentrations of γ-linolenic acid and arachidonic acid, respectively. PUFA also altered bacterial adhesion sites on Caco-2 cells. It is suggested that dietary PUFA affects the attachment sites for the gastrointestinal microbiota, possibly by modifying the fatty acid composition of the intestinal wall (Bomba et al., 2002). Dietary addition of flaxseed at dose of 10 % and probiotics in feed positively improved plasma fatty acids of conventional piglets after weaning.

Keywords: Potentiated probiotics, Omega-3 fatty acid, Fatty acid composition, Probiotics, Piglets, Weaning
Citation: