

EFFECTS OF SYNBIOTIC ON GROWTH PERFORMANCE AND GUT HEALTH OF PIGLETS

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INTRODUCTION. Feed additives such as prebiotics can modulate the gut microflora and performance of piglets. *Jerusalem artichoke* (JA) contains some healthy-promoting components from which carbohydrates are the main component and the dominant fructooligosaccharide is inulin.

The aim of this work was to investigate the effect of dietary supplementation of synbiotic and probiotic *Jerusalem artichoke* on piglets production values, and gut microbiology and architecture.

METHODS.

A total 60 weaning piglets (30 days of age; 9.09 ± 0.12 kg of BW) were selected.

The piglets received:

- group 1 - a basal diet (BD) without any supplements,
- group 2 - BD with *Lactobacillus reuteri* (0.5 g/day/piglet), *Pediococcus pentosaceus* (0.5 g/day/piglet) and from the diet 3% of *Jerusalem artichoke* (JA) powder (LPJA),
- group 3 - BD with 3% JA powder (JA).

For the evaluation of microbiological parameters, fecal samples were collected from the rectum with sterile swabs and placed in sterile plastic tubes with lids at the beginning (1th day), at 21th day of the experiment (21th day) and at the end of the experiment (35th day).

Formalin-fixed jejunum tissues were stained by the haematoxylin-eosin and TUNEL methods.

The height of the villi, thickness of *lamina propria* and epithelium, and the depth of the crypts were measured with a microscope with an ocular micrometer.

RESULTS.

Supplementation with probiotics and prebiotic improved average daily gain by 18.6% and feed conversion ratio by 12.6% compared with the control (basal) diet.

Amount of microorganisms were reduced significantly compared to basal diet after 35 days supplementation with probiotic. In 2nd group, the amount of microorganisms of genera *Enterobacteriaceae* at the end of trial were by 6%, but *E.coli* - by 9% decreased. Increase by 2% of *Enterobacteriaceae* and *E.coli* levels were seen only in group 1. Pathogenic microorganism *E.coli* O157 was found at the closing stage of the trial in group 3 piglets, but *S.enteritidis* – only in group 1.

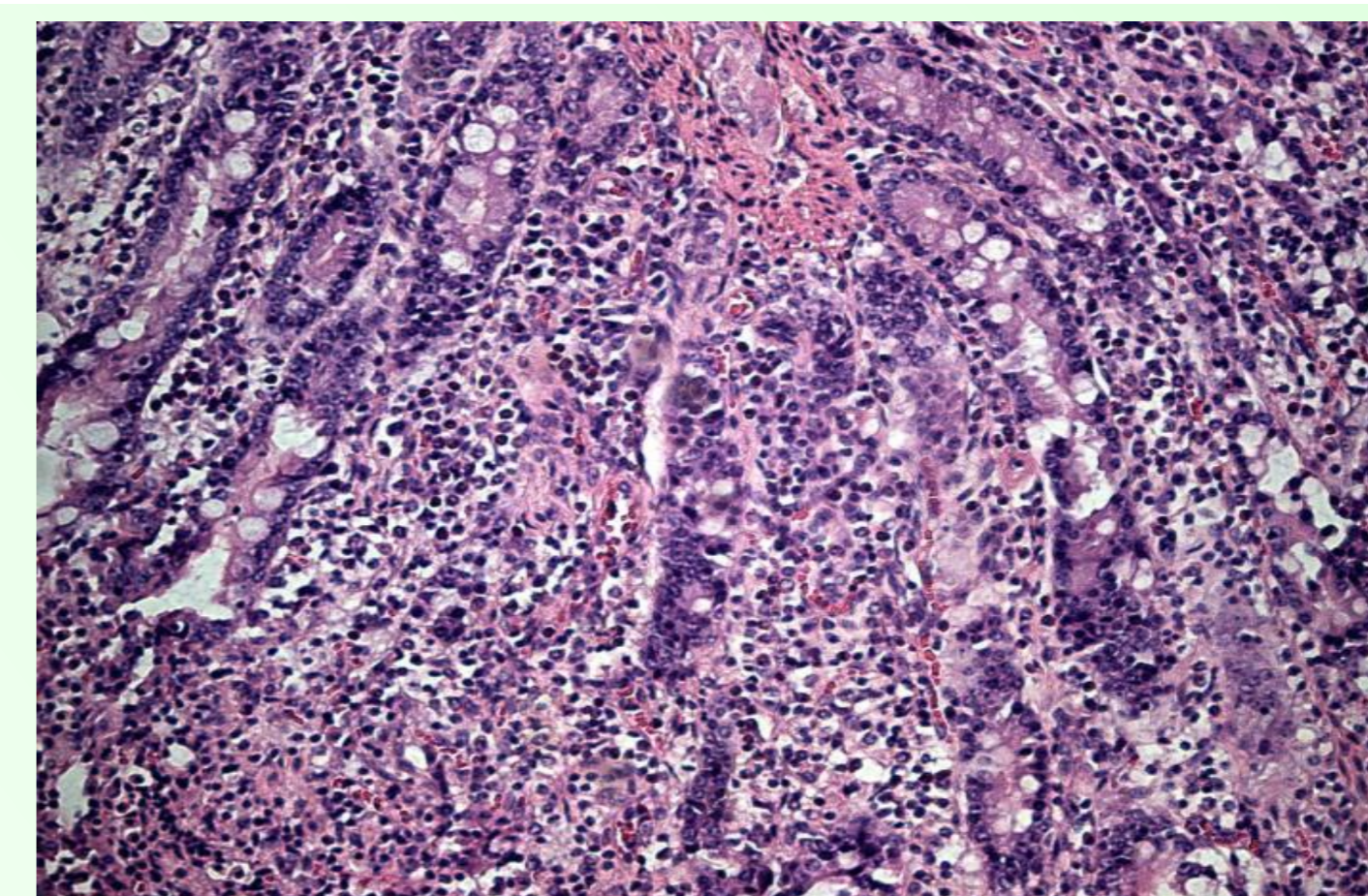
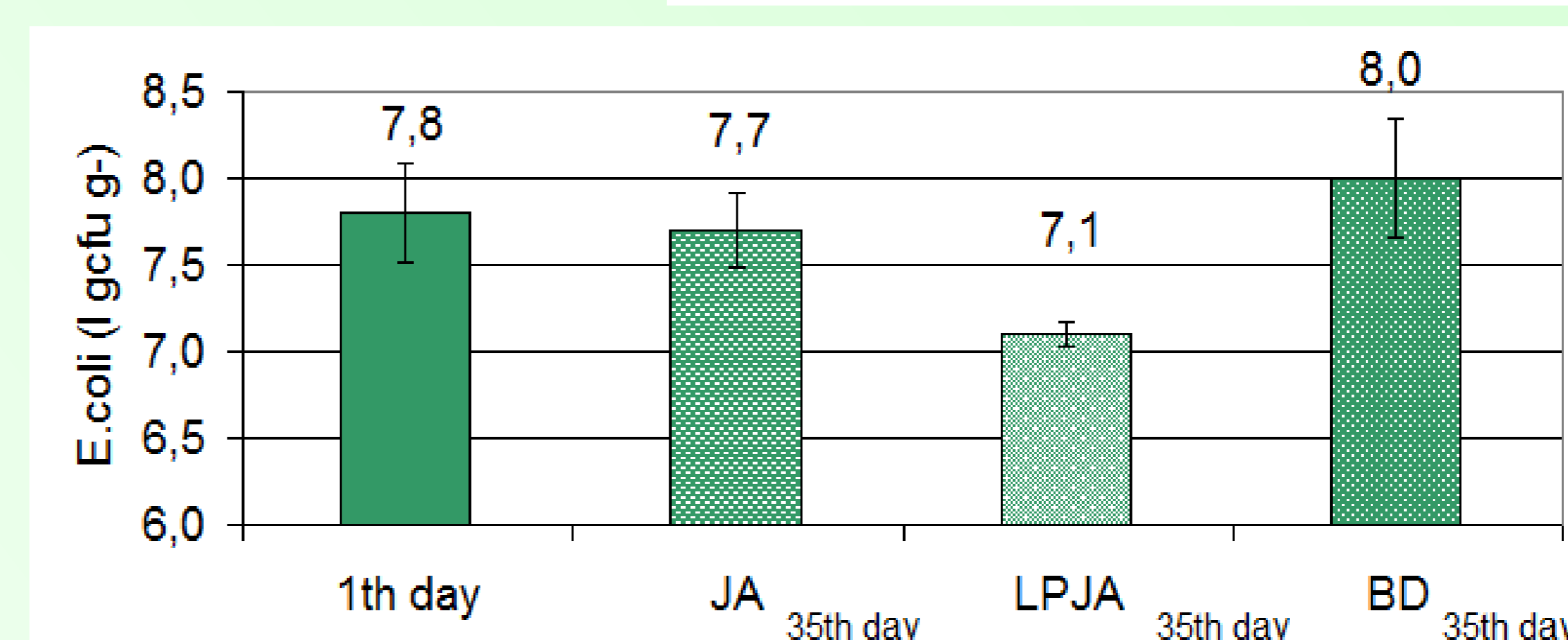
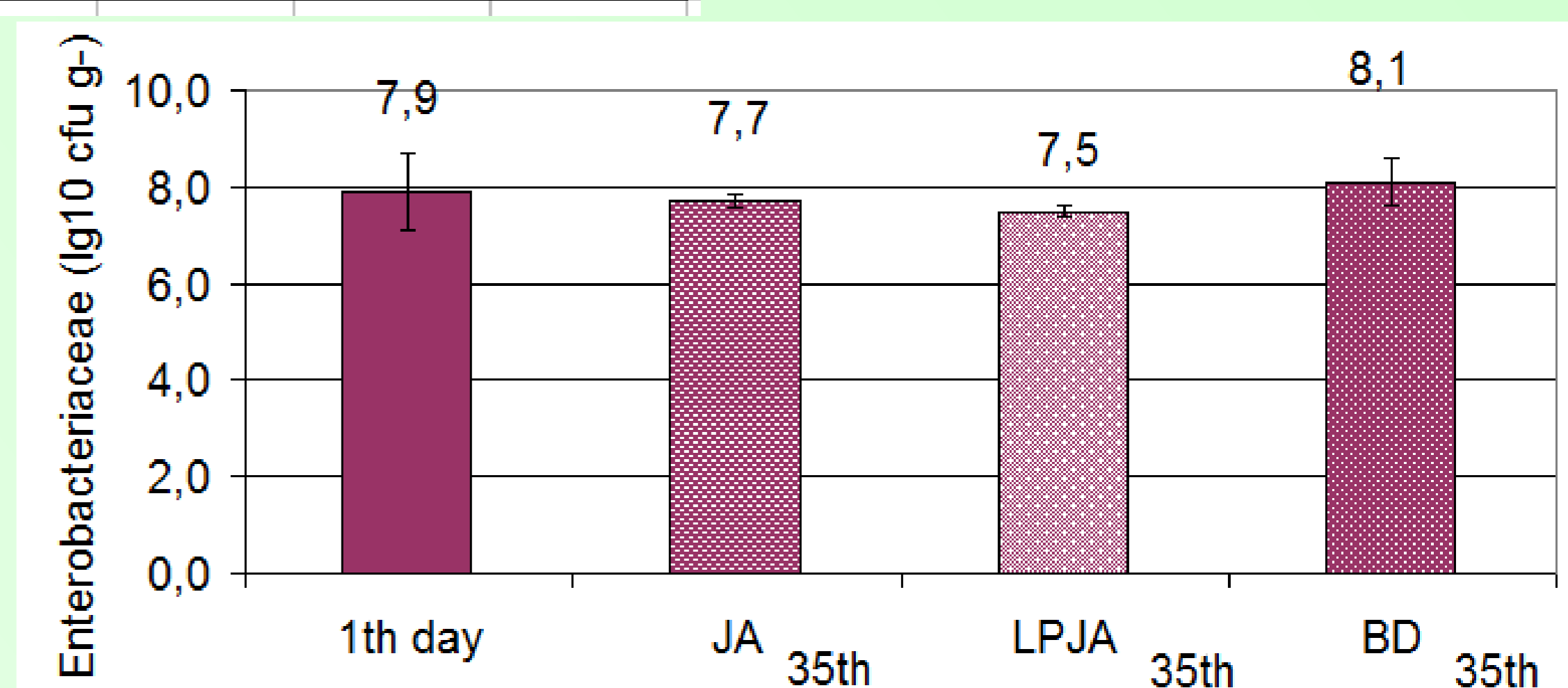
In animals of group1 and group 2 jejunum villi were slim and the small intestinal mucosa revealed no histopathological changes, but in group 3 - distinct degeneration process up to crypts, moderate inflammation process and plasmocytes were seen.

Conclusion.

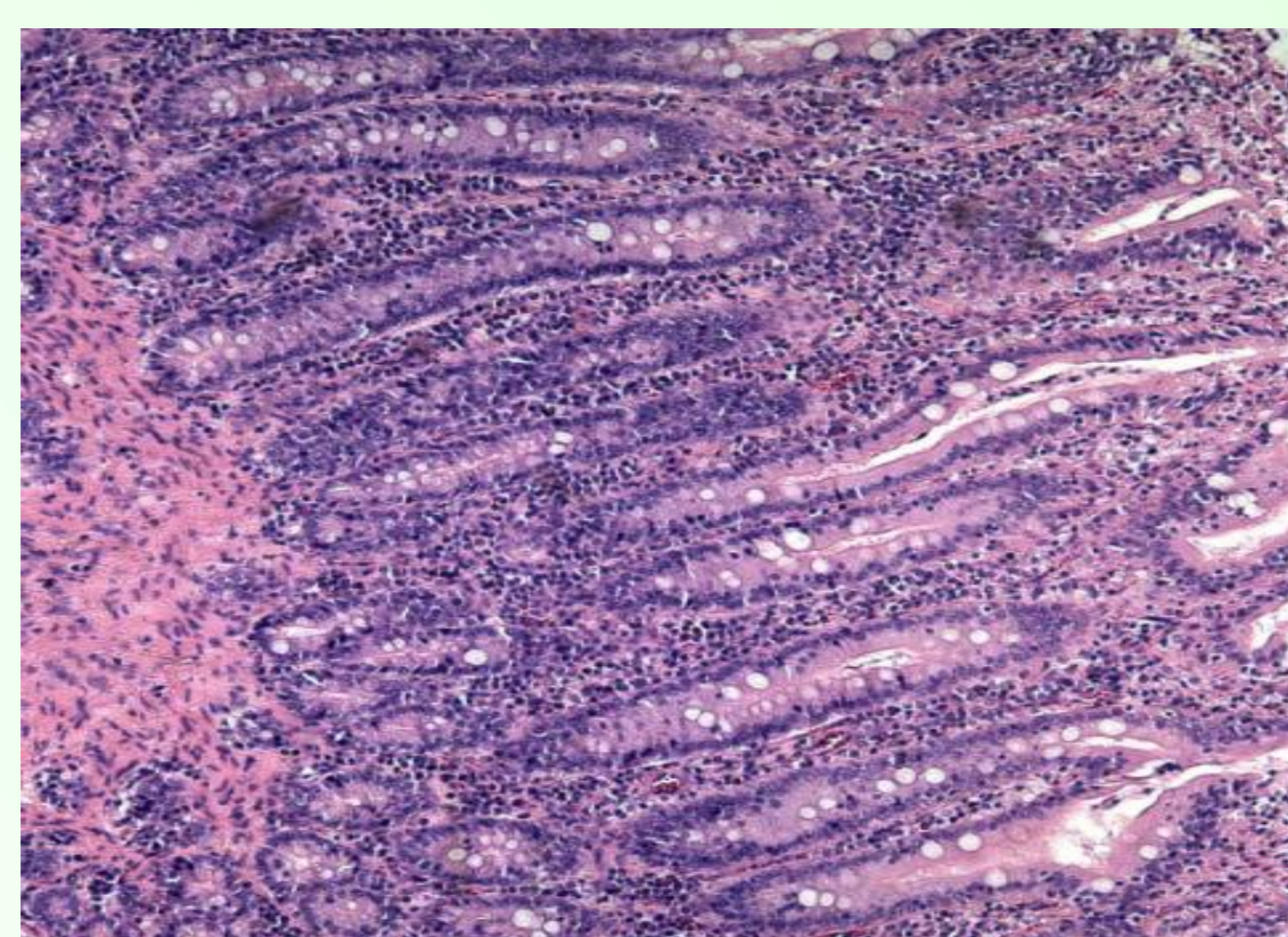
Our results confirm that the synbiotic action of *Lactobacillus reuteri* and *Pediococcus pentosaceus* with JA has the potential of inhibiting pathogenic microflora of gut and has positive effect on feed conversion ratio.

Items	JA	LPJA	BD
Feed consumption, kg	27,02	31,12	26,34
Conversion of feed, kg/kg	1,96	1,75	2
Conversion of feed in comparison with the control group, %	-2,4	-12,88	0

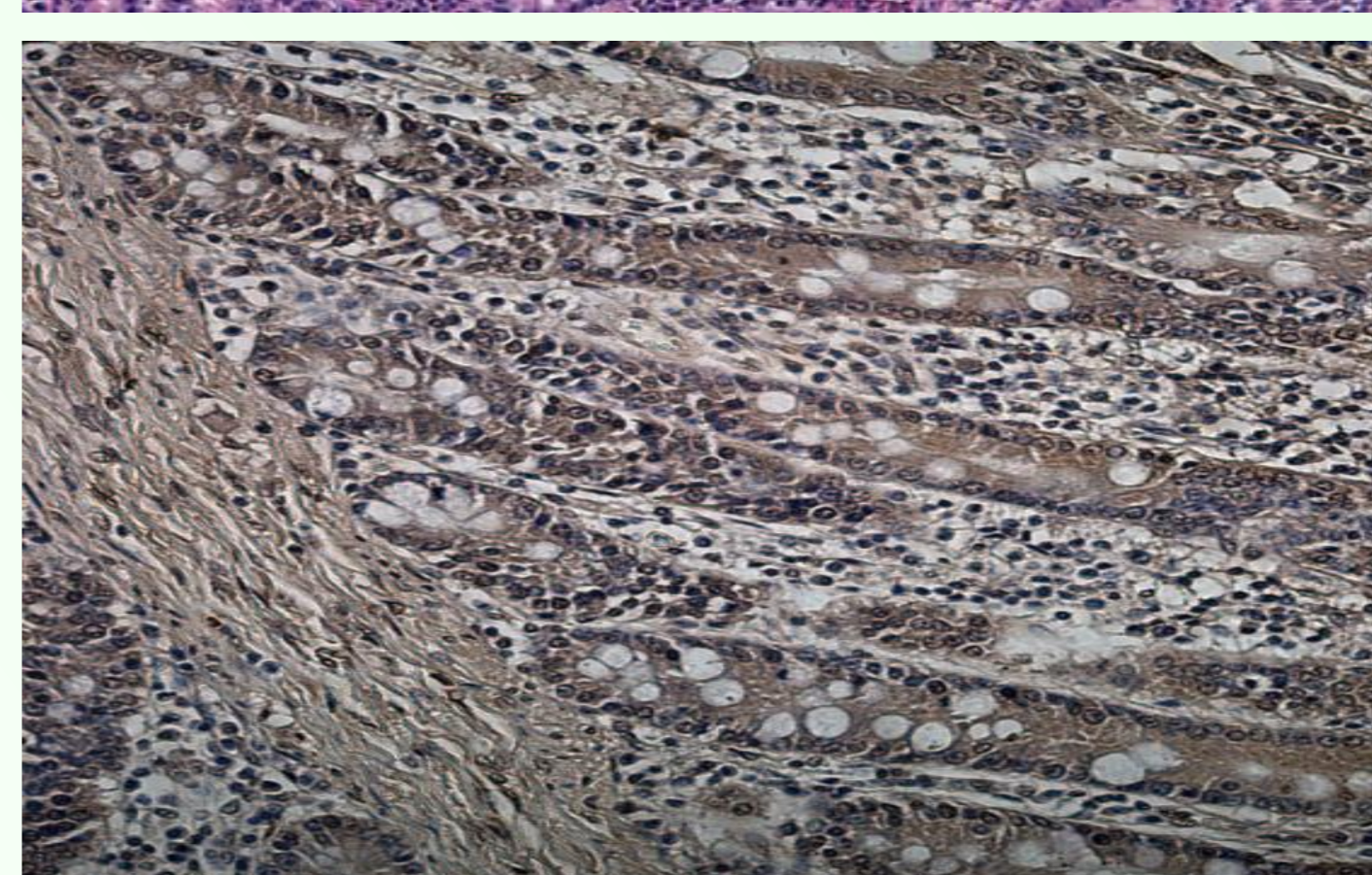
Items	JA	LPJA	BD
Daily weight gain in 30th day, kg	9,06	8,96	9,1
Daily weight gain in 50th day, kg	15,33	15,76	15,24
comparison with the control group, %	0,6	3,4	0
Daily weight gain in 65th day, kg	22,87	26,76	22,24
comparison with the control group, %	2,8	20,5	0



We established necrosis of villi in jejunum of BD group pigs. Crypts are survived only focally. H/E, X200



Results showed that no extrusion process on the surface of enterocytes. Jejunum of BD group piglets, H/E, X100



Insignificant apoptosis was seen only in jejunal enterocytes, crypts and muscle cells of experimental pigs while in BD group it was absent. TUNEL, X250