



76° Convegno SISVET

Bari, 21-23 giugno 2023



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SICV



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IL CODICE ISBN ASSOCIATO AGLI ATTI DEL 75° CONVEGNO SISVET È

978-88-909092-5-2



HISTOCHEMICAL AND IMMUNOHISTOCHEMICAL EVALUATION OF THE EFFECTS OF A LOW INPUT DIET ON DIFFERENT CHICKEN BREEDS

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The reduction of the environmental impact in poultry farm, fitting in the goals of European Green Deal and in the concept of One Welfare, is possible considering different chicken breeds and diets. Local breeds are more resilient and their use enhances biodiversity [1]. These breeds are ideal for introducing low input diet based on national and local raw materials that are formulated for less demanding breeds [2].

This study aimed to compare the effects of the diet (standard vs low input in which soybean was partly replaced by fava bean (*Vicia faba*, var minor); 18.5% vs 17.5% CP; 3,050 vs 2921 kcal EM/kg) on the morphology response in the jejunum in a fast-growing genotype (Ross 308) compared with local breeds (Bionda Piemontese, BP, and Robusta Maculata, RM) and their crosses with a moderate-growth genotype (Sasso). Marker of jejunal inflammation were investigated with an immunohistochemical approach. Two days before the commercial slaughter, 6 animals per genotype per diet were used to sample jejunum mucosa. One sample was taken at the midpoint of the end of the duodenal loop and the Meckel's diverticulum, fixed in paraformaldehyde in PBS (0,1M; pH 7,4), dehydrated and embedded in paraffin. Serial sections of 4 μm were cut and stained with: haematoxylin/eosin for morphometric analysis, Alcian-PAS for counting goblet cells, and antibodies against CD3 intraepithelial T-cells and CD45 intraepithelial leukocytes. Villi length, crypts depth and goblet cells were measured with an image-analysis software (Aperio ImageScope, Leica GmbH)[3]. Significant differences among genotypes were recorded for jejunum morphology ($P < 0.001$) with the highest value for villi height/crypt depth ratio in chickens belonging to RM and the lowest value in Ross chickens (14.7 vs 7.80). Ross showed the highest density for Goblet cells (21.6 cells/300 μm) followed by BP and its cross (19.2 and 19.4 cells/300 μm) and RM with its cross (17.7 and 17.9 cells/300 μm). Compared to the standard diet, the low input diet decreased villi height (1179 to 1049 μm ; $P = 0.05$) and the villi/crypt ratio (11.7 to 10.4; $P < 0.05$) while tended to increase the density of CD3 cells (3092 to 3447 cell/ μm^2 ; $P < 0.10$). In conclusions, relationships between performance and gut morphology should be considered in the comparison of the genotypes, but the effect of the low input diet on jejunum morphology could be ascribed to the replacement of soybean with faba bean and, possibly, its content in antinutritional factors.

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