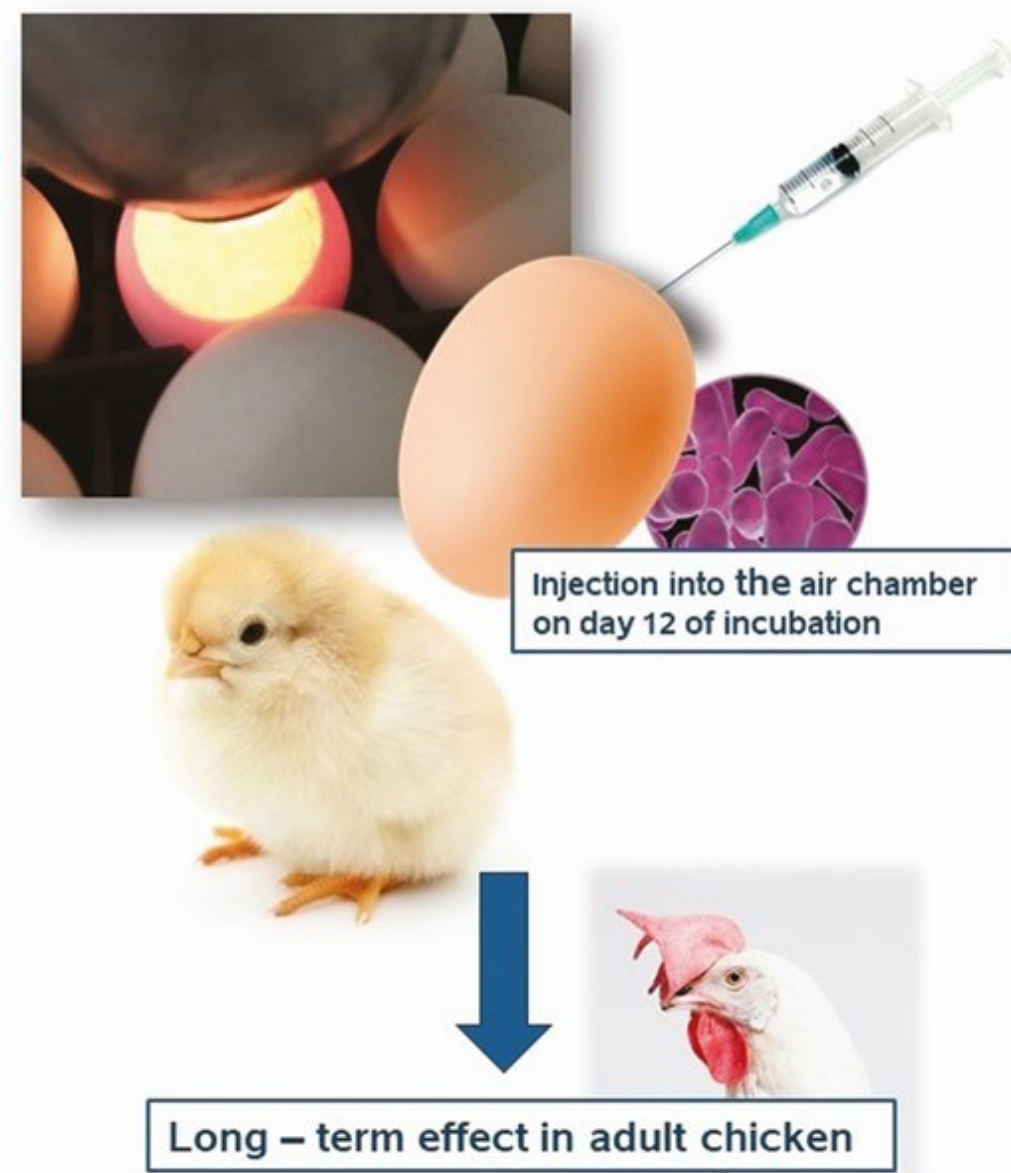


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Introduction

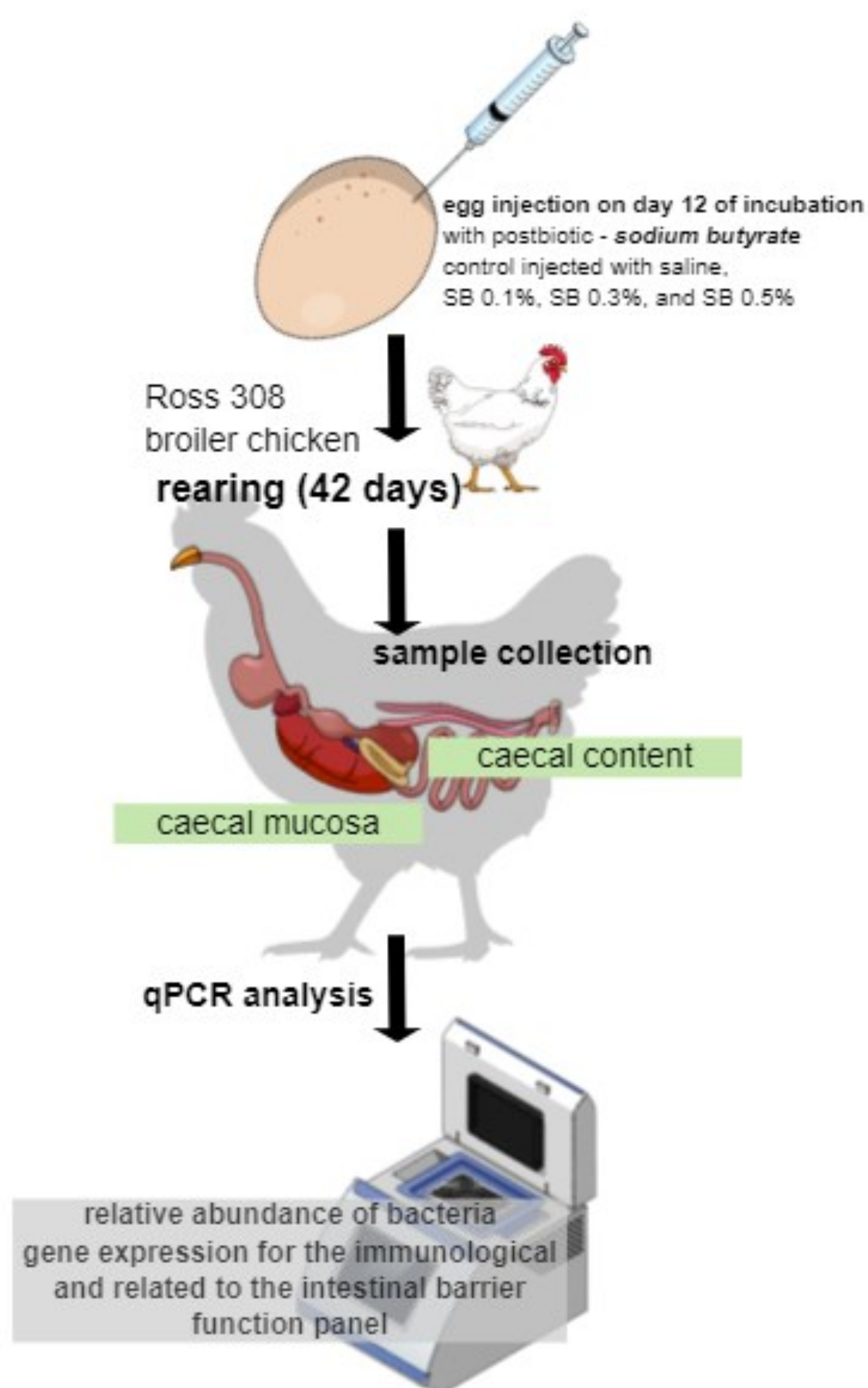
The **gut microbiota** plays a key role in keeping poultry healthy. It affects the host's organism by regulating the immune response, metabolic and digestive processes, and the absorption of nutrients. The substances that might actively support rebuilding and enhancing the intestinal microbiota are **bioactive components such as prebiotics or postbiotics delivered *in ovo* on day 12 of egg incubation**. These bioactives may eliminate intestinal dysbiosis, improve intestinal barrier and immune system.



The **peri-hatching period** is crucial for **programming the microbiota** to enable colonization of the embryo's intestines with beneficial bacteria before hatching.

The aim of the study is to analyze the effect of administering **sodium butyrate (SB)** during egg incubation on the intestinal microbiological profile and mucosal response.

Material and methods



FUNDING

The study was financed by grant UMO-2021/43/D/NZ9/01548 funded by the National Science Centre in Cracow (Poland)

Results

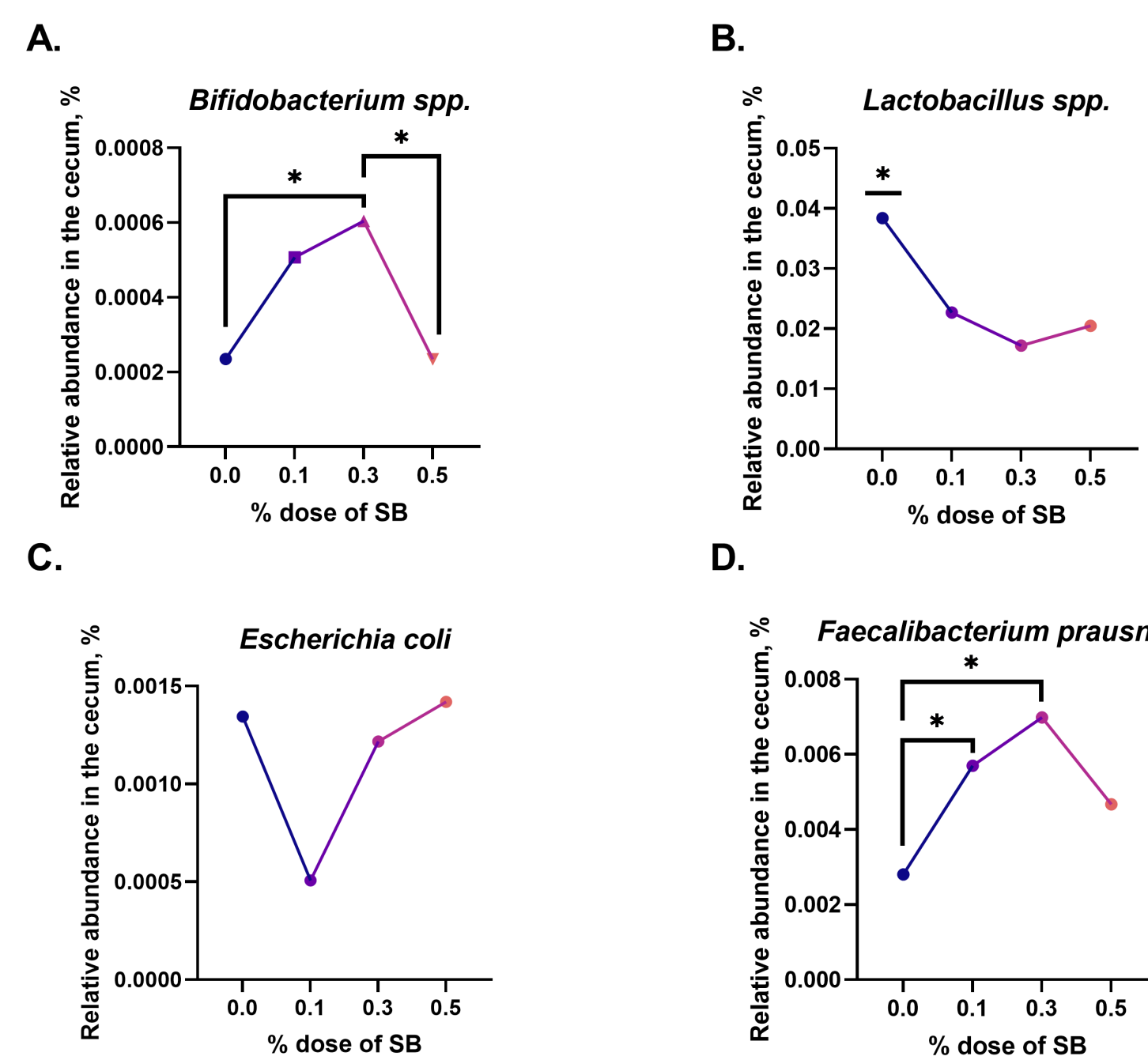


Fig 1. The relative abundance of bacteria in the cecal content in ROSS 308 chickens (n = 8) stimulated *in ovo* on day 12 of egg incubation with sodium butyrate (SB).

A. *Bifidobacterium* spp.,
B. *Lactobacillus* spp.,
C. *Escherichia coli*,
D. *Faecalibacterium prausnitzii*

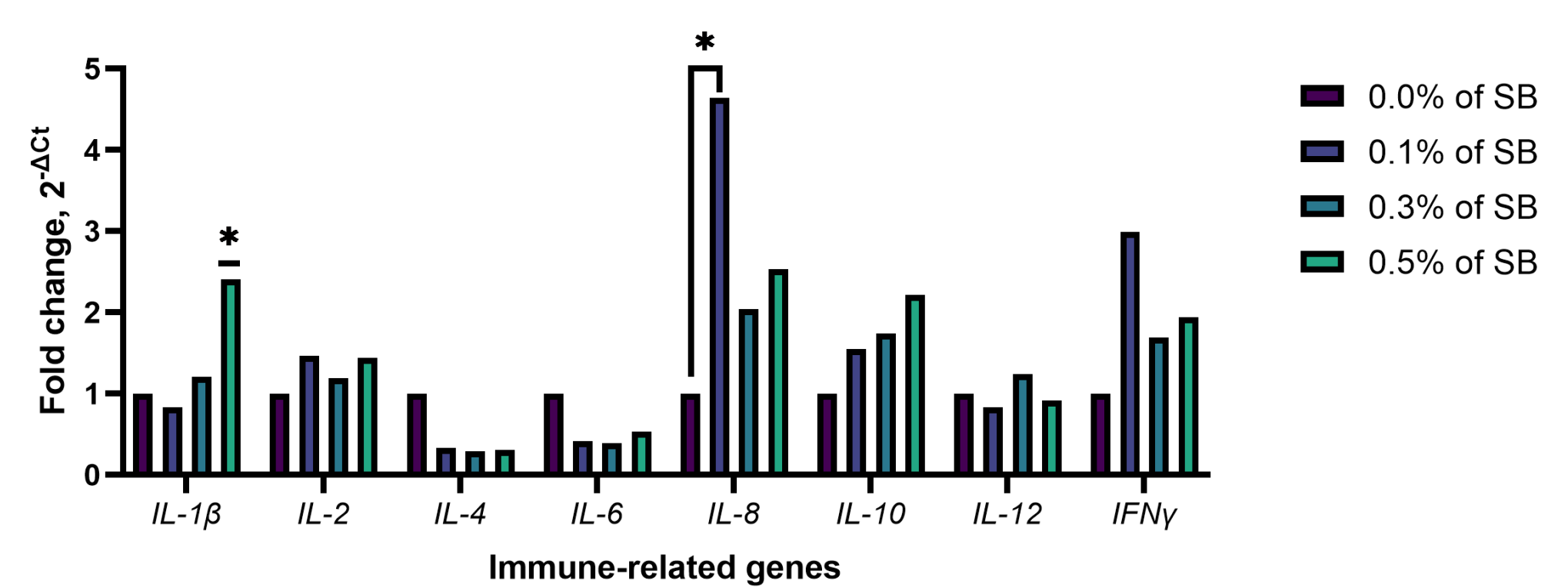


Fig. 2. The relative mRNA expression of immune-related genes in the cecum mucosa of ROSS 308 chickens stimulated *in ovo* on day 12 of egg incubation with sodium butyrate

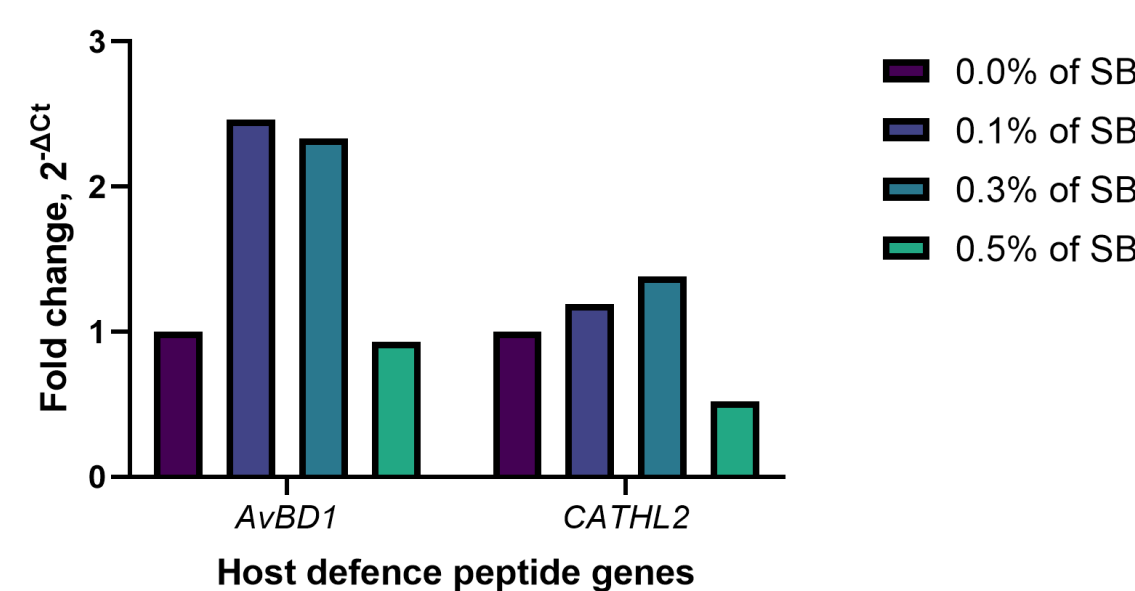
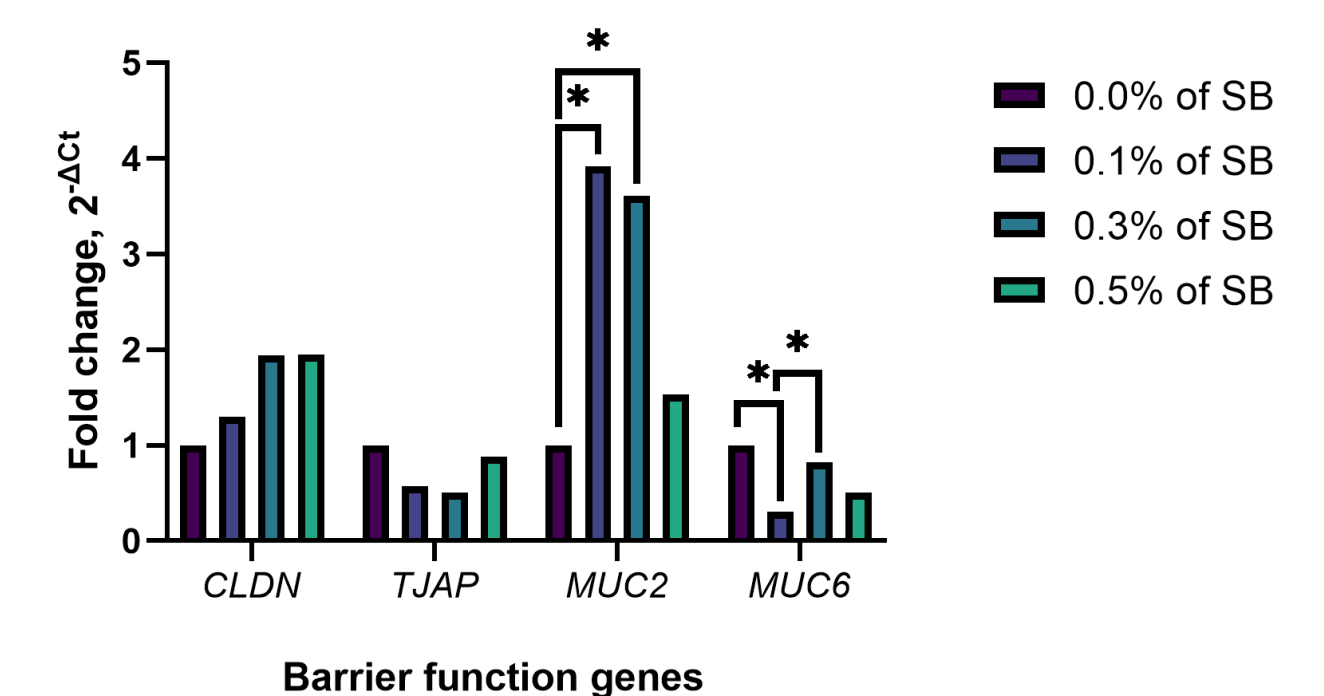


Fig. 3. The relative mRNA expression of host defence peptide genes in the cecum mucosa of ROSS 308 chickens stimulated *in ovo* on day 12 of egg incubation with sodium butyrate

Fig. 4. The relative mRNA expression of barrier function genes in the cecum mucosa of ROSS 308 chickens stimulated *in ovo* on day 12 of egg incubation with sodium butyrate



Conclusion and discussion

SB in each dose significantly **reduced the abundance of *Lactobacillus* spp.** Adding 0.3% affected the promotion of *Bifidobacterium* spp. and *Faecalibacterium prausnitzii*. An increase in the abundance of *F. prausnitzii* was also determined at a dose of 0.1%. The analysis of relative gene expression showed a significant increase in the level of *IL-1β* (SB 0.3%), *IL-8* (SB 0.1%), and *MUC2* (SB 0.1% and 0.3%). The lowest dose of SB resulted in a lower relative *MUC6* level. Lower doses of SB may positively affect the bacterial profile of the cecum. The lower dose of SB resulted in a greater response from the cecal mucosa. This was reflected in activating some pro-inflammatory factors and down-regulating the anti-inflammatory response.



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