

436-2 DYNAMICS OF BACTERIOPHAGES INTESTINAL CLEARANCE IN BROILER CHICKENS INFECTED WITH SALMONELLA

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Resumo:

Salmonellosis is a public health risk, causing diarrhea, fever, and stomach cramps in humans. It is often linked to consuming poultry-related products. Multi-drug resistant Salmonella Heidelberg strains in broilers and carcasses at slaughter have gained attention due to their high prevalence. To control this bacterium in broiler farms, alternative approaches like phage therapy have been explored. Determining phage intestinal clearance is crucial for successful oral treatment and dosage determination. We conducted a study on phage intestinal clearance in broilers after a single oral dose. Initially, specific pathogen-free (SPF) broiler chicks (n=21, 6-days-old) were inoculated with Salmonella Heidelberg (strain 42033, 5.6×10^6 CFU in 100 μ L) and housed in a negative pressure HEPA filtered isolator chamber with regulated temperature. They were provided with free access to water and feed. On the 34th day, 7 broilers were euthanized, and samples of the liver, spleen, and cecal tonsils were collected to detect Salmonella, and cecal content to quantify Salmonella and detect phages, thus confirming the Salmonella infection and absence of bacteriophages. Subsequently, a single dose of a cocktail containing three wild-type lytic phages (13312, 13313 and 13314, 1.29×10^{11} PFU/bird) was administered through the drinking water. On days 1, 4, and 7 post-treatment (pt), cecal content was collected to quantify the phages and Salmonella titers, whereas Salmonella was detected in liver, spleen, and cecal tonsils. The CFU/g and PFU/g values were log-transformed before statistical analysis. The Kruskal-Wallis test was used to evaluate days pt effect. Whenever significant differences were found ($p \leq 0.05$), the analysis was detailed by using the Wilcoxon test to compare days pt two by two. Salmonella positive tissues results were compared by the Fisher's exact test. As anticipated, the phages titer steadily decreased in the subsequent days following treatment (day 1 pt: $8.431 \pm 0.272 \log_{10}$ (PFU+1)/g; day 4 pt: $4.513 \pm 0.245 \log_{10}$ (PFU+1)/g; day 7 pt: $2.795 \pm 0.485 \log_{10}$ (PFU+1)/g). Regarding Salmonella, the titer significantly decreased ($p \leq 0.05$, Wilcoxon test) on day 1 pt ($5.706 \pm 0.342 \log_{10}$ (CFU+1)/g), day 4 pt ($3.717 \pm 1.041 \log_{10}$ (CFU+1)/g), and day 7 pt ($3.364 \pm 1.029 \log_{10}$ (CFU+1)/g) compared to the titer prior to treatment ($6.418 \pm 0.030 \log_{10}$ (CFU+1)/g). Although the phages titer was halved on day 4 pt compared to day 1 pt, the titer of Salmonella also decreased. However, on day 7 pt, the Salmonella titer remained unchanged, potentially due to the decline in phages titer on the same day. No significant differences ($p > 0.05$) were found in the detection of Salmonella in the evaluated tissues. Our findings suggest that additional phages dose administration should be conducted every 4 days to restore the bacteriophages titer in the ceca. However, further studies involving multiple doses are necessary to validate the proposed dosage. Overall, these findings indicate the potential use of the studied phages as an alternative approach to control Salmonella Heidelberg infections in poultry.

Palavras-chave:

poultry, salmonellosis, phage therapy, excretion curve

Agência de fomento:

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