

# Oregano-based feed additive as an alternative approach to reduce Salmonella in poultry

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## Introduction

Salmonella is a major cause of foodborne illness worldwide, presenting significant public health risks and financial strain on the poultry industry. To address this, regulatory bodies like the USDA and EFSA enforce strict controls on Salmonella in poultry products, prompting producers to seek antibiotic-free solutions.

With the industry's shift towards No Antibiotics Ever (NAE) production, controlling Salmonella has become more challenging. Ecodiar®, an essential oil of oregano, offers a promising alternative. Its active compounds work synergistically to provide antibacterial, antiviral, antifungal, and immunomodulatory effects. Thus, Ecodiar® may offer a sustainable strategy that not only promotes flock health and performance but also mitigates the risk of bacterial contamination.

## Study Objective

Assess the impact of continual feeding of Ecodiar® (E00) on Salmonella invasion within the gastrointestinal tract, alterations in cytokine and chemokine expression profiles, and overall improvements in bird health.



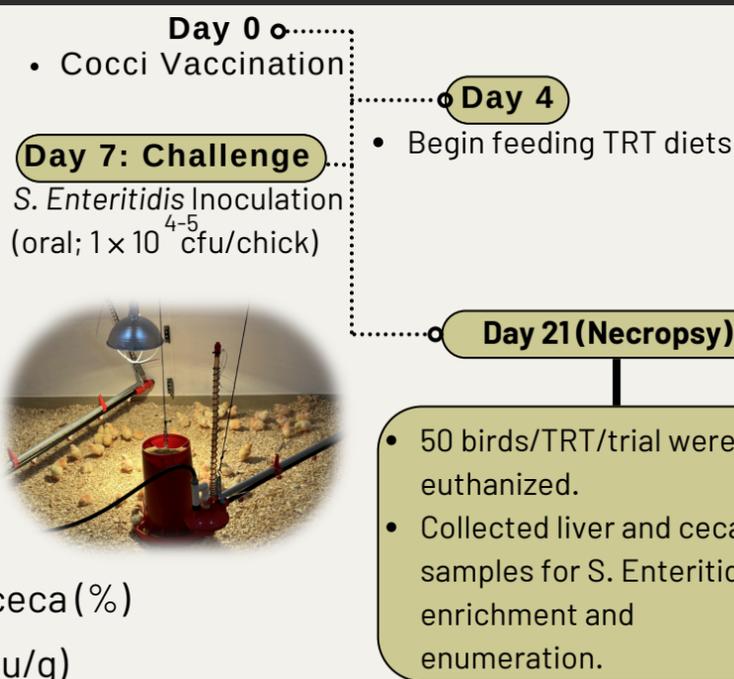
## Materials & Methods

Two identical trials using a total of 200 Ross 708 broiler chicks were randomly assigned to 2 dietary treatments (TRTs), each with 2 replicate pens (n=50 chicks/TRT/trial):

- **Control (CON):** Basal diet.
- **Experimental (E00):** Basal diet supplemented with 300 g/ton of Ecodiar® Powder.

### Aspects assessed:

- Salmonella infection in the liver and ceca (%)
- Salmonella count in cecal content (cfu/g)
- Cytokine and Chemokine mRNA expression

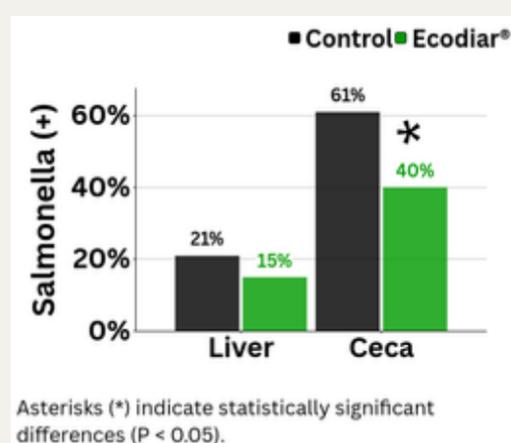


**Statistical Analysis:** Data were analyzed using a Student's T-test to determine if there were differences in the *S. Enteritidis* recovered between TRTs with  $P < 0.05$  as significant.

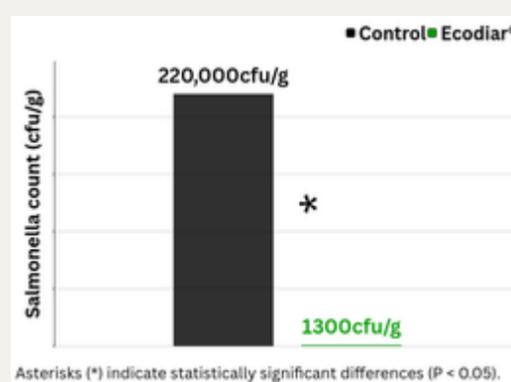
## Results

**Graph 1** shows the incidence of Salmonella in liver and cecal tissues between TRTs.

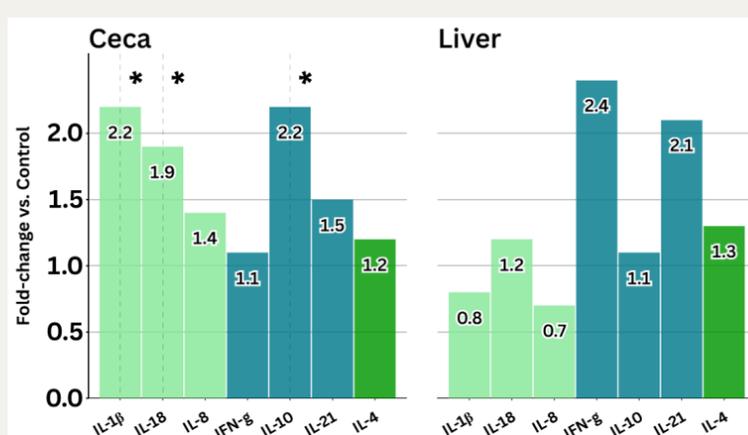
While Salmonella recovery in liver tissues was numerically lower with Ecodiar, the cecal Salmonella levels were significantly reduced by 20% ( $P < 0.05$ ).



**Graph 2** showcases the remarkable impact of Ecodiar® in Salmonella levels. Birds supplemented with Ecodiar® reported almost 170 times lower levels of Salmonella vs. the control group ( $P < 0.001$ ).



**Graph 3** illustrates that cytokine/chemokine expression between TRTs. Fold-change values above 1 reflect higher expression in the Ecodiar® group. Thus, these immune markers were more actively expressed than in the control, particularly in the cecal tonsils. Significant increases were observed in IL-1 $\beta$  and IL-18 (pro-inflammatory) and IL-10 (regulatory), indicating an enhanced local immune response in the gut to combat Salmonella. The lack of significant changes in liver cytokines suggests Ecodiar's action is localized to the gut, effectively boosting defense without causing widespread systemic inflammation.



## Conclusions

Ecodiar® supplementation helps birds better withstand Salmonella challenges by reducing colonization and enhancing gut immunity. With fewer positive birds and lower Salmonella levels, Ecodiar® strengthens the local immune response and supports balanced inflammation control. This oregano-based feed additive offers a promising, natural solution for improving bird health and reducing Salmonella risks in poultry production.

