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Thyme oil as a zinc oxide alternative to protect cultured enterocytes from *E. coli* K88/F4 during an *in vitro* infection

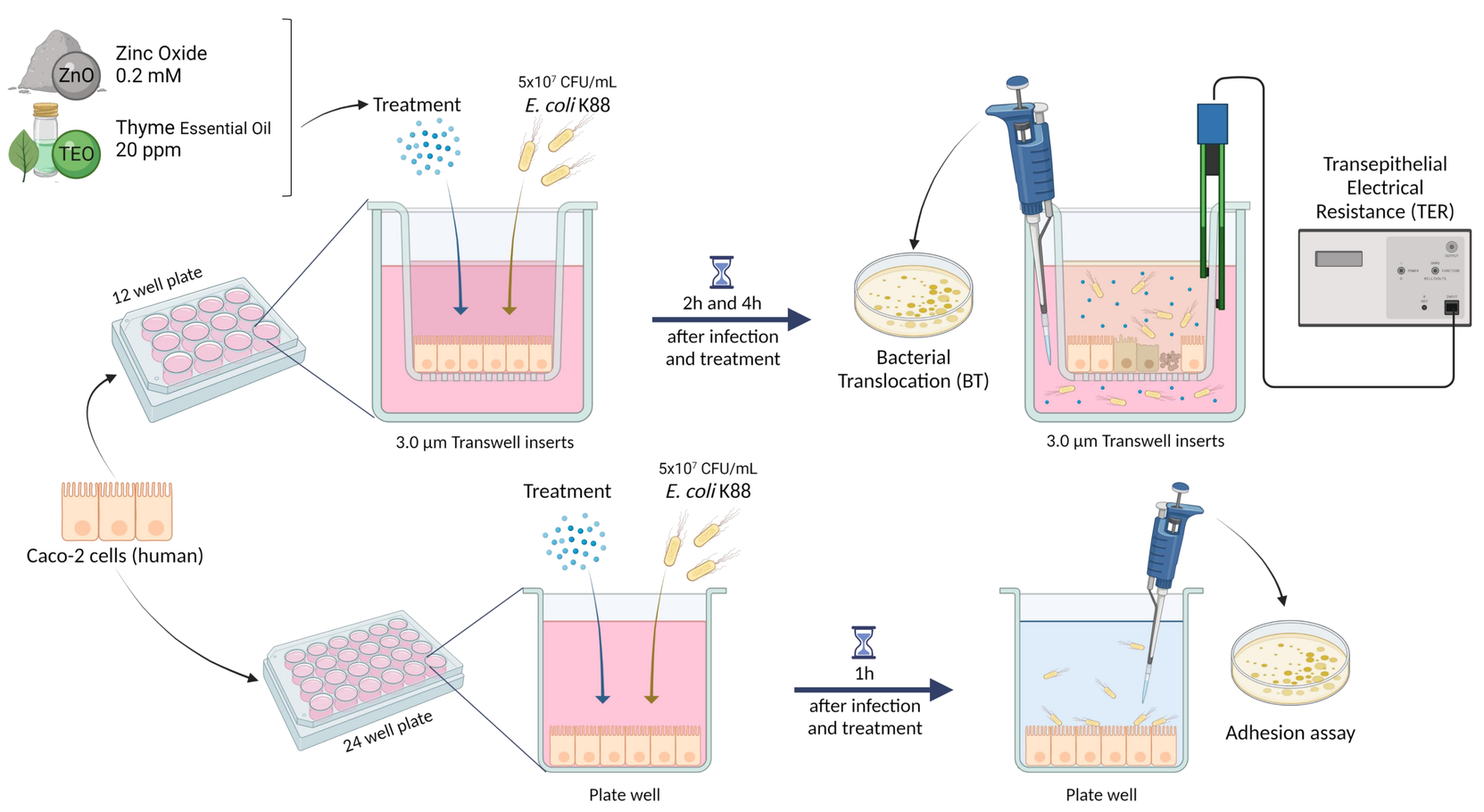
INTRODUCTION

***Escherichia coli* K88** (F4) is the primary factor that triggers **post-weaning diarrhea** (PWD) in piglets. The widespread utilization of **zinc oxide** (ZnO) led to worrying issues that encouraged European authorities to ban pharmacological doses of ZnO.
In a urgent research for novel alternatives, **thyme oil** represents a powerful alternative for its antimicrobial, anti-inflammatory, and antioxidant activity. Thus, it is considered a potential candidate to **substitute ZnO at weaning**.

AIM OF THE STUDY

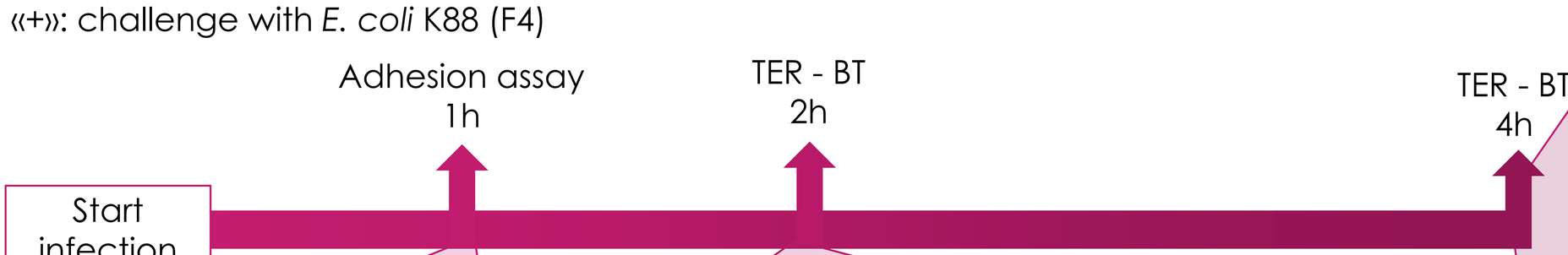
The aim of the study was to investigate the effectiveness of **ZnO** and **thyme oil** to prevent the damages exerted by ***E. coli* K88** (F4) by employing an *in vitro* **infection model** on Caco-2 cells.

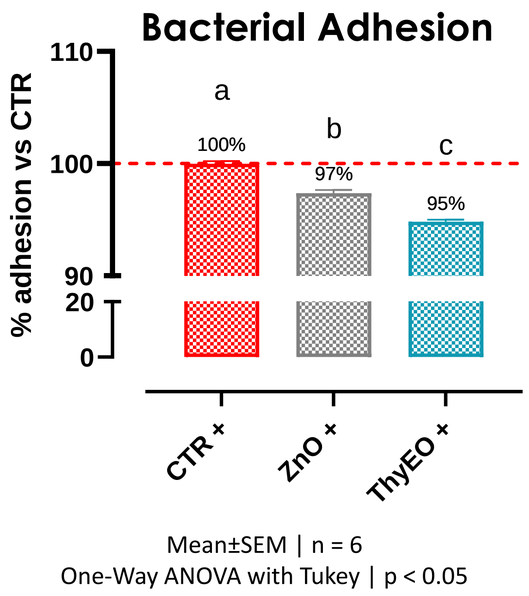
MATERIALS AND METHODS



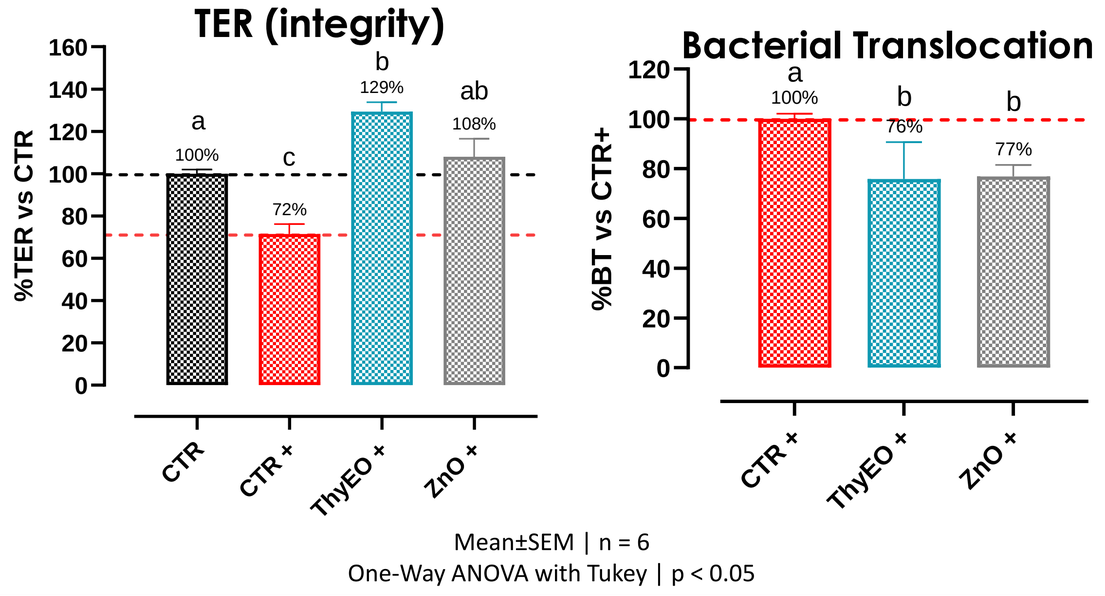
RESULTS

«+»: challenge with *E. coli* K88 (F4)

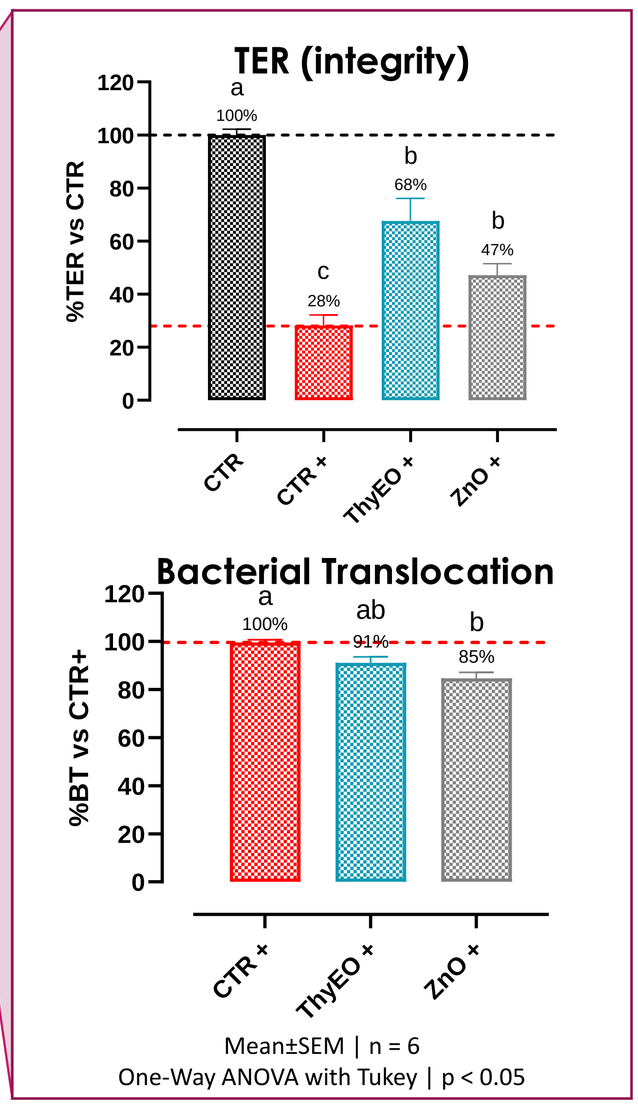




Mean±SEM | n = 6
One-Way ANOVA with Tukey | p < 0.05



Mean±SEM | n = 6
One-Way ANOVA with Tukey | p < 0.05



Mean±SEM | n = 6
One-Way ANOVA with Tukey | p < 0.05

DISCUSSION AND CONCLUSION

- **Thyme oil** was able to **protect cultured enterocytes** against an *E. coli* K88 (F4) infection *in vitro* by preventing the drop in **epithelial resistance** (TER) and thus reducing **bacterial translocation** at the same level of **ZnO**.
- The tested oil could also reduce **adhesion** similarly to ZnO. This effect could be mediated by the demonstrated capacity of thymol, one of thyme oil main bioactive components, to reduce pathogen's virulence gene expression *in vitro*.
- Thyme oil can be therefore considered a **powerful ZnO alternative** to manage **PWD** and control ***E. coli* K88** (F4) in piglets.