

Dietary Supplements to enhance the Robustness of Piglets against Intestinal Dysbiosis caused by Salmonella Typhimurium

Résumé de l'affiche :

Problem: The weaning period of the pigs between 12th and 17th weeks whereas in modern production, weaning typically occur between 3 to 4th weeks of age. Early weaning is commonly performed to increase the pork production rate, but early weaning increases the risk of enteric dysbiosis due to immature intestinal and immunological functions. Thereby, antimicrobial strategies are needed but the use of traditional antibiotics increases antimicrobial resistance (AMR), which is a global health issue.

Hypothesis: Utilization of dietary supplements may enhance the robustness of piglets against enteric diseases to increase pork production, improve food safety and reduce antibiotic consumption.

Main Objective: To investigate the impact of Salmonella Typhimurium on piglets and evaluate the role of dietary supplements on piglets' health.

Specific Objectives:

- 1: To investigate the impact of dietary supplements on S. Typhimurium infection in piglets.
- 2: To investigate the impact S. Typhimurium on Pathogenic Escherichia coli and evaluate the role of dietary supplements on it.
- 3: To investigate the impact S. Typhimurium on Gut microbiota (Bacteriome and Virome) and evaluate the role of dietary supplements on it.
- 4: To investigate the impact S. Typhimurium on Gut Proteome and evaluate the role of dietary supplements on it.

Methodology: Study Design and Groups: A total of 64 piglets were divided into four equal groups (n=16 per group). Group 1: Commercial feed. Group 2: Commercial feed, Group 3: Commercial feed + 5% Bovine Colostrum Group 4: Commercial feed + 5% Bovine Colostrum, 0.1% MCFA, and 0.08% Yeast Extract.

Infection Challenge: After two weeks treatment, piglets were orally inoculated with S. Typhimurium. To prevent cross-contamination, the animals were housed in a specific containment facility (BSL-2) with a carefully controlled layout.

Sample Collection and Analysis: Half of the piglets from each group were euthanized at day 3 post-infection, and the remaining half at day 10. During necropsy, contents from the ileum, cecum, and colon were collected. These samples were immediately frozen at -80°C for subsequent analysis of proteomic, bacteriome and virome. Specifically, colon samples were used for the enumeration of Salmonella and analysis of pathogenic E. coli. For gut microbiota analysis using 16S rRNA and shotgun metagenomic approaches. For virome analysis using Miseq sequencing platform. For gut Proteome analysis Using LC-MS/MS analysis platform.