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BACKGROUND

- Normally, weaning period of the pigs between 12th and 17th weeks whereas in modern production, weaning typically occur between 3 to 4th weeks of age (1).
- Early weaning practices are commonly performed to increase the pork production rate, but early weaning increase the risk of enteric dysbiosis due to immature intestinal and immunological functions (2).
- Thereby, antimicrobial strategies are needed but the use of conventional antibiotics increases antimicrobial resistance, which is a critical global public health concern (3). Therefore, the pork industry needs alternative solutions to enhance the robustness of piglets without the use of antibiotics.

HYPOTHESIS

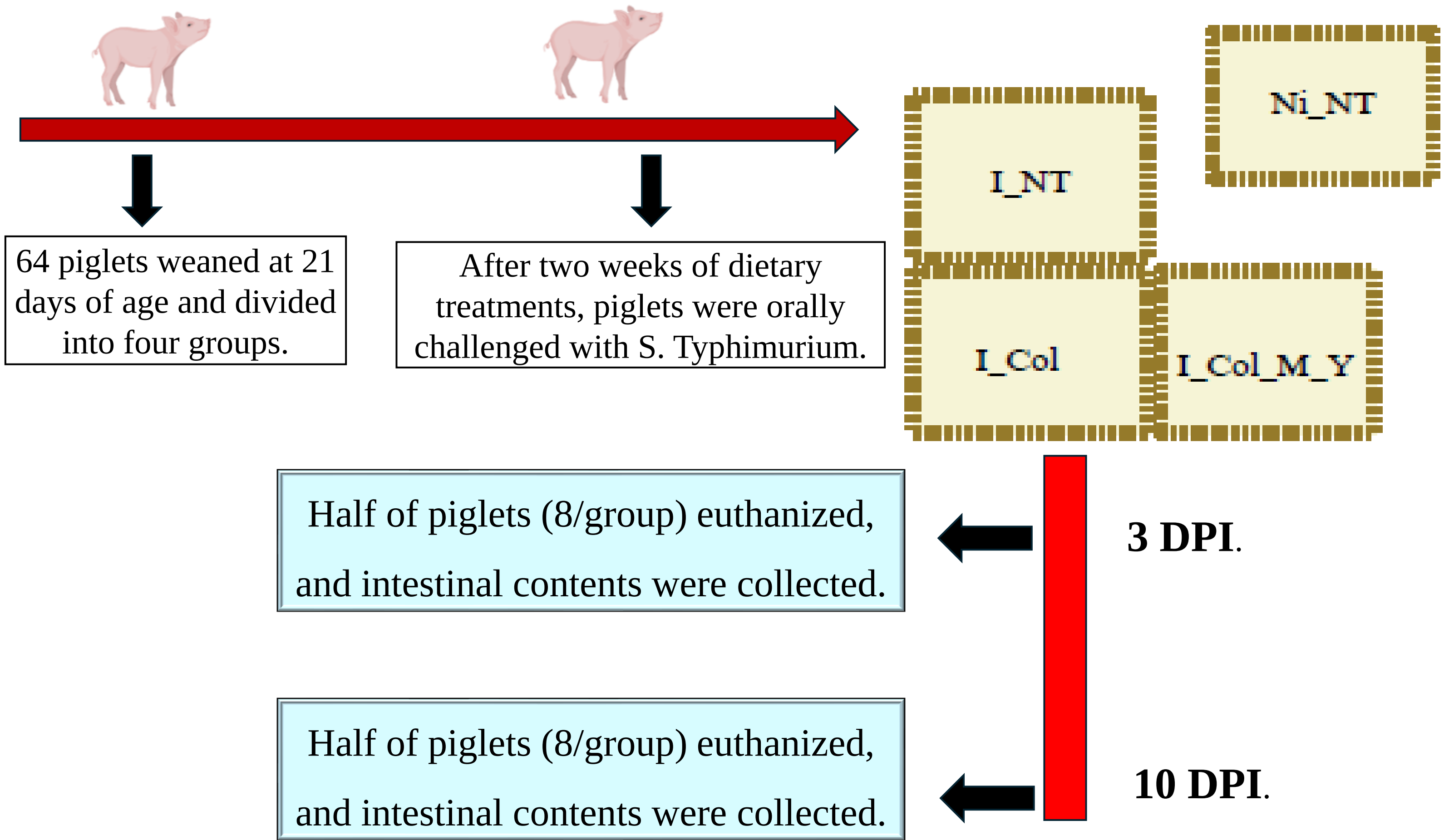
- Utilization of dietary supplements may enhance the robustness of piglets against enteric diseases to increase pork production, improve food safety and reduce antibiotic consumption

OBJECTIVES

- To investigate the impact of dietary supplements on *Salmonella* Typhimurium infection in piglets.
- To investigate the impact *Salmonella* Typhimurium on Pathogenic *Escherichia coli* and evaluate the role of dietary supplements on it.
- To investigate the impact *Salmonella* Typhimurium on Gut microbiota (Bacteriome and Virome) and evaluate the role of dietary supplements on it.
- To investigate the impact *Salmonella* Typhimurium on Gut Proteome and evaluate the role of dietary supplements on it.

MATERIAL AND METHODS

Experimental design:



DPI indicate day post infection; Ni_NT, non infected and no treatment; I_NT, infected and no treatment; I_Col, infected and treated with bovine colostrum; I_Col_M_Y, infected and treated with bovine colostrum, MCFA and yeast extract.

MATERIAL AND METHODS

Analysis of collected Samples.

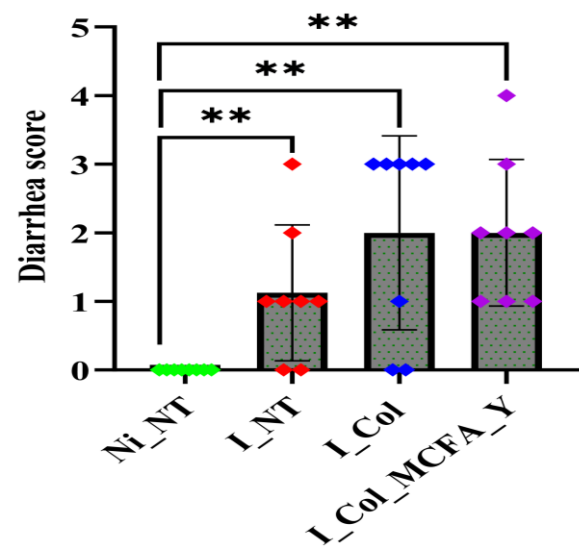
- Pathogenic *E. coli*:** Using culturing method and Multiplex PCR for molecular screening.
- S. Typhimurium*:** Using culturing method.
- Microbiota (Bacteriome):** Using 16S rRNA and shotgun metagenomic sequencing approaches.
- Virome:** Sequencing was performed using the MiSeq platform.
- Gut proteome:** Using LC-MS/MS analysis platform.

OBTAINED RESULTS

Group	Animal (n)	Total tested isolates (n).	Positive isolates (n)	Proportion	P Value
Ni_NT	8	16	10	62.50%	
I_NT	8	14	8	57.14%	0.99 ^{ns}
I_Col	8	18	3	16.66%	0.01*
I_Col_MCFA_Y	8	17	2	11.76%	0.03*
Overall	32	65	23	35.38%	

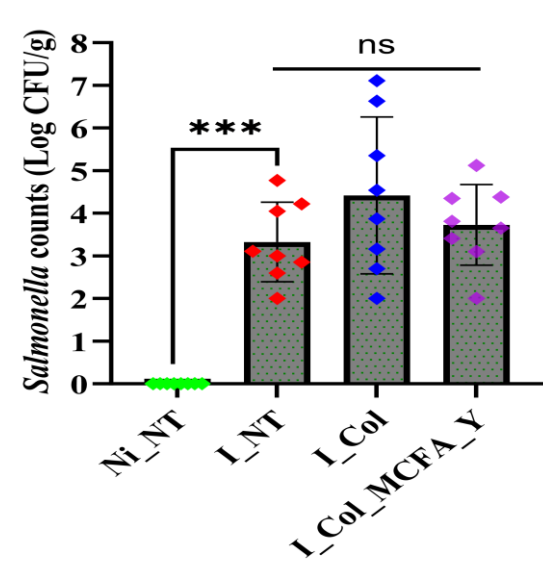
Pathogenic *E. coli* at day 3.

Pathogenic *E. coli* was significantly reduced in the colostrum (I_Col) and colostrum, MCFA, yeast extract (I_Col_MCFA_Y) treated piglets.



Clinical sign at day 3.

Diarrhea score was significantly increased in challenged piglets, and the treatment had no effect.



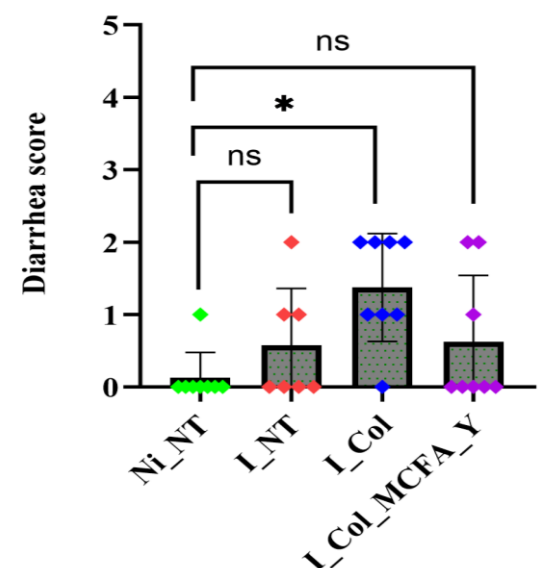
S. Typhimurium counts at day 3.

Dietary treatment had no effect on *S. Typhimurium*.

Group	Animal (n)	Total tested isolates (n).	Positive isolates (n)	Proportion	P Value
Ni_NT	8	14	8	57.14%	
I_NT	7	16	4	25.00%	0.13 ^{ns}
I_Col	8	17	5	29.41%	0.15 ^{ns}
I_Col_MCFA_Y	8	15	2	13.33%	0.02*
Overall	31	62	19	30.64%	

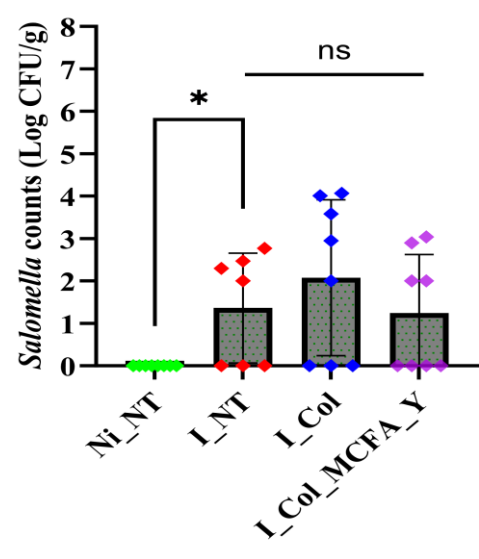
Pathogenic *E. coli* at day 10.

Pathogenic *E. coli* was significantly reduced in colostrum, MCFA and yeast extract (I_Col_MCFA_Y) treated piglets.



Clinical sign at day 10.

A significant difference was observed in colostrum-treated piglets



S. Typhimurium counts at day 10.

Dietary treatment had no effect on *S. Typhimurium*.

CONCLUSION

- The use of MCFA and yeast extract with bovine colostrum seemed a good strategy for lowering intestinal carriage of pathogenic *E. coli*.
- It therefore seems interesting to try the bovine colostrum, MCFA and yeast extract combo in a strict *E. coli* piglet diarrhea model.

ACKNOWLEDGEMENTS

Centre de Recherche en
Infectiologie Porcine et Avicole
Swine and Poultry Infectious
Diseases Research Center



REFERENCE
LABORATORY FOR
ESCHERICHIA COLI



Groupe de recherche sur
les maladies infectieuses
en production animale



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