



Peat pellets as enrichment material had positive effects on growth and intestinal microbiota of weaned piglets



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Introduction

Environmental enrichment has been shown to increase the wellbeing of piglets.

Enrichment materials can be straw, wooden or rubber toys, ropes, chains, cloth bags or any safe items to chew on and play with.

Chewable and edible pellets are commonly used as enrichment materials for piglets.

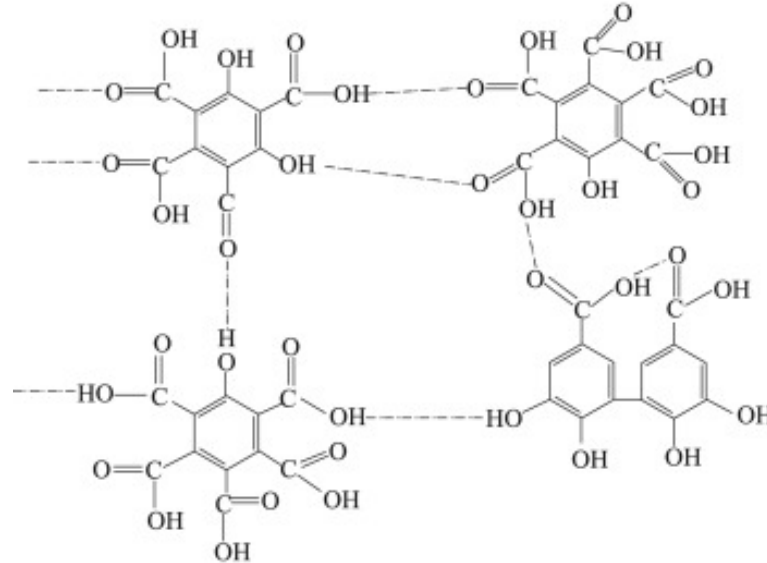
The present study evaluated peat pellets as enrichment material to weaned piglets.



Peat

- Peat is a fully natural source of prebiotic fibre and humic acids.
- Specific types of peat can beneficially modulate the colonic fermentation of piglets, *e.g.* by decreasing pH and reducing the amount of branched chain fatty acid (BCFA) production.
- Humic acids have been suggested to protect intestinal epithelium *e.g.* by binding toxins.
- Humic acids do not get absorbed, but are voided via feces.

Humic acid molecule





Test materials

Specific peat types were sourced from two geographical locations in Finland (Peat A and Peat B).

The chosen materials were high in water-soluble, prebiotic fibers and humic acids.

The materials were ground, heat-treated and processed into 2-mm diameter pellets.

Hygienic status was carefully analysed to exclude the presence of *Salmonella*, mycobacteria, or other harmful microbes.

Trial outline

- Weaned piglets, ~5 weeks old, with a mean weight of 10.2 kg
- Randomly divided into 30 pens, 19 ± 2 piglets/pen
- Fed with commercial piglet feeds for 28 days
- Sampled for feces on days 0 and 28

Enrichment material treatments, 10 pens/tr.

- 1. Control (no enrichment materials)
- 2. Peat A pellets
- 3. Peat B pellets

The pellets were served *ad libitum* from hopper pans, approximately 400 g/pen/day.

Faecal samples were analysed for

- Microbiota composition, by qPCR
- Volatile fatty acids (VFAs), by gas chromatography

All data was analysed by ANOVA and Tukey's test.



Results: pellet intake

Both pellet types stimulated the playing behavior of piglets.

Mean intake of pellets per piglet

- Peat A: 580 g
- Peat B: 480 g

Intake of pellets, % of feed consumption

- Peat A: 2.5% of feed consumption
- Peat B: 2.1% of feed consumption

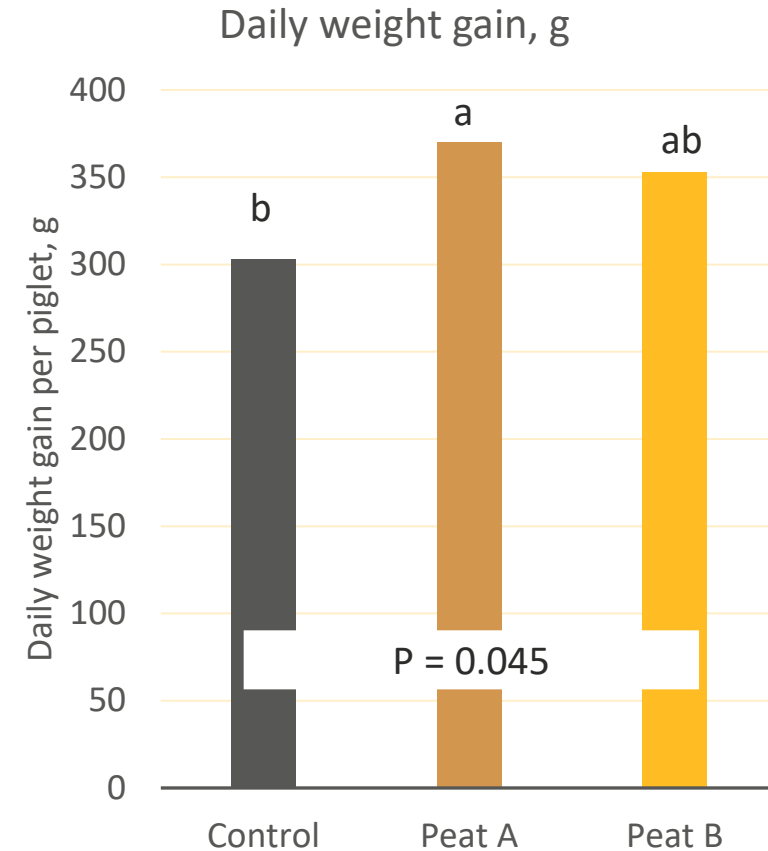


Results: Piglet performance

Weight gain of piglets was higher in the peat pellet groups, compared to the Control group.

- Peat A, daily weight gain + 22.1% compared to Control
- Peat B, daily weight gain + 16.5% compared to Control

Item	Control	Peat A	Peat B	<i>P-Value</i>
Piglet weight, day 0, kg	10.0	10.1	10.6	0.279
Piglet weight, day 28, kg	18.9	20.8	20.9	0.094
Weight gain, days 0-28, kg	8.8 ^b	10.7 ^a	10.3 ^{ab}	0.036
Daily weight gain, g	303 ^b	370 ^a	353 ^{ab}	0.045
Relative weight gain	100	122	117	



Results: feed intake, mortality, diarrhoea

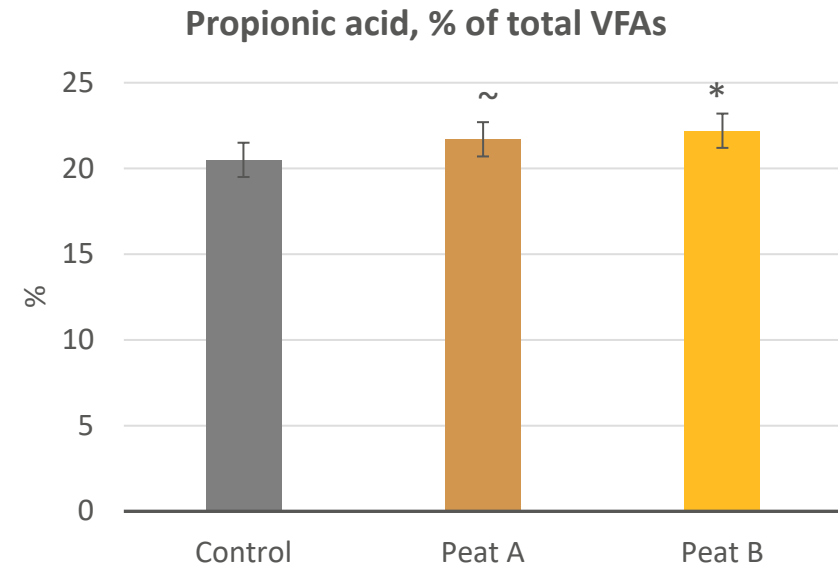
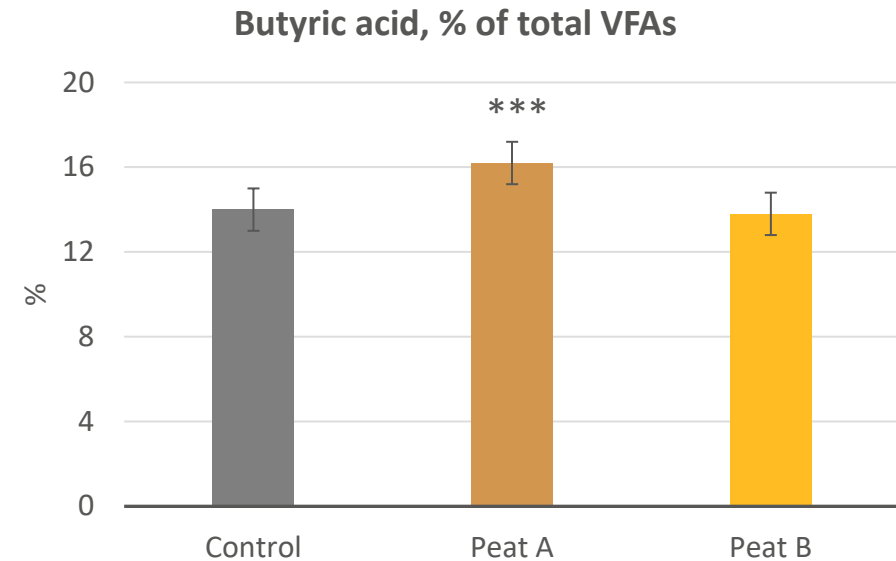
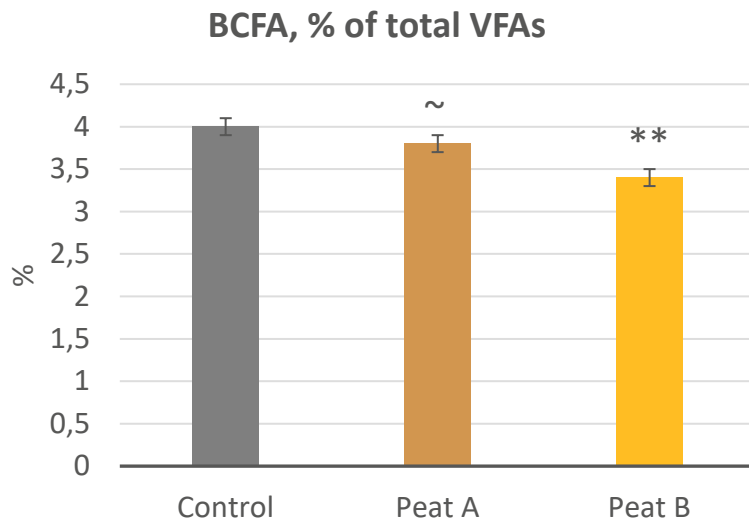
- Feed intake was similar in all treatments.
- Both pellet types numerically reduced piglet mortality.
- The main cause of death or culling in this experiment was post-weaning diarrhoea (PWD).
- The frequency of diarrhoea was similar in all groups.

Item	Control	Peat A	Peat B
Total feed intake per piglet, kg	15.7	15.4	15.5
Number of piglets, day 0	190	168	176
Number of piglets, day 28	178	164	170
Mortality, %	6.3%	2.4%	3.4%
Number of pens with signs of PWD	5	7	4

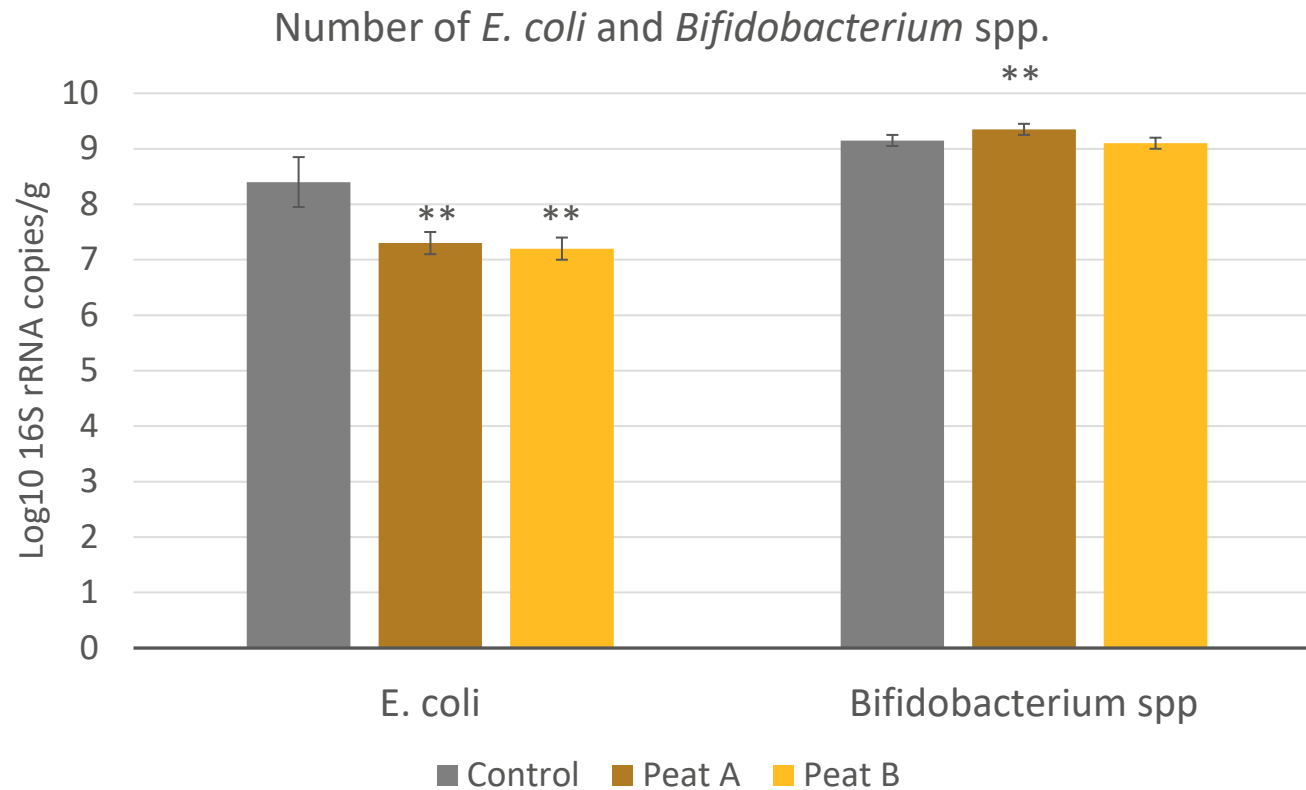


Results: Fecal volatile fatty acids

- Fecal VFA profile was positively modulated by the peat pellets.
- Peat A significantly increased the relative proportion of butyric acid.
- Peat B significantly reduced the proportion of branched-chain VFAs and increased the proportion of propionic acid.



Results: Fecal microbiota



Both peat types significantly reduced the numbers of *E. coli*.

Peat A significantly increased the numbers of bifidobacteria.



Summary and conclusions

- Both peat types were suitable as enrichment materials, and they were eaten by the piglets. Peat A was eaten more than Peat B.
- Piglets in peat groups had a higher daily weight gain than control piglets. Piglets in Peat A group had the best performance.
- Digesta samples indicated beneficial changes to colonic microbiota and fermentation by peat pellets.

In conclusion, peat pellets as enrichment material may be a useful strategy for improving intestinal fermentation and growth of weaned piglets.

Thank you!

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