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# Effect of fermented rapeseed meal and seaweed on immunoprofiles in layers infected with *Ascaridia galli*

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# BACKGROUND

**Ban on the conventional cages for layers in the EU**



**Alternative housing system**  
**Floor, deep-litter, free-range, organic egg production**



**Increasing prevalence of helminth infections**

## STUDY AIM

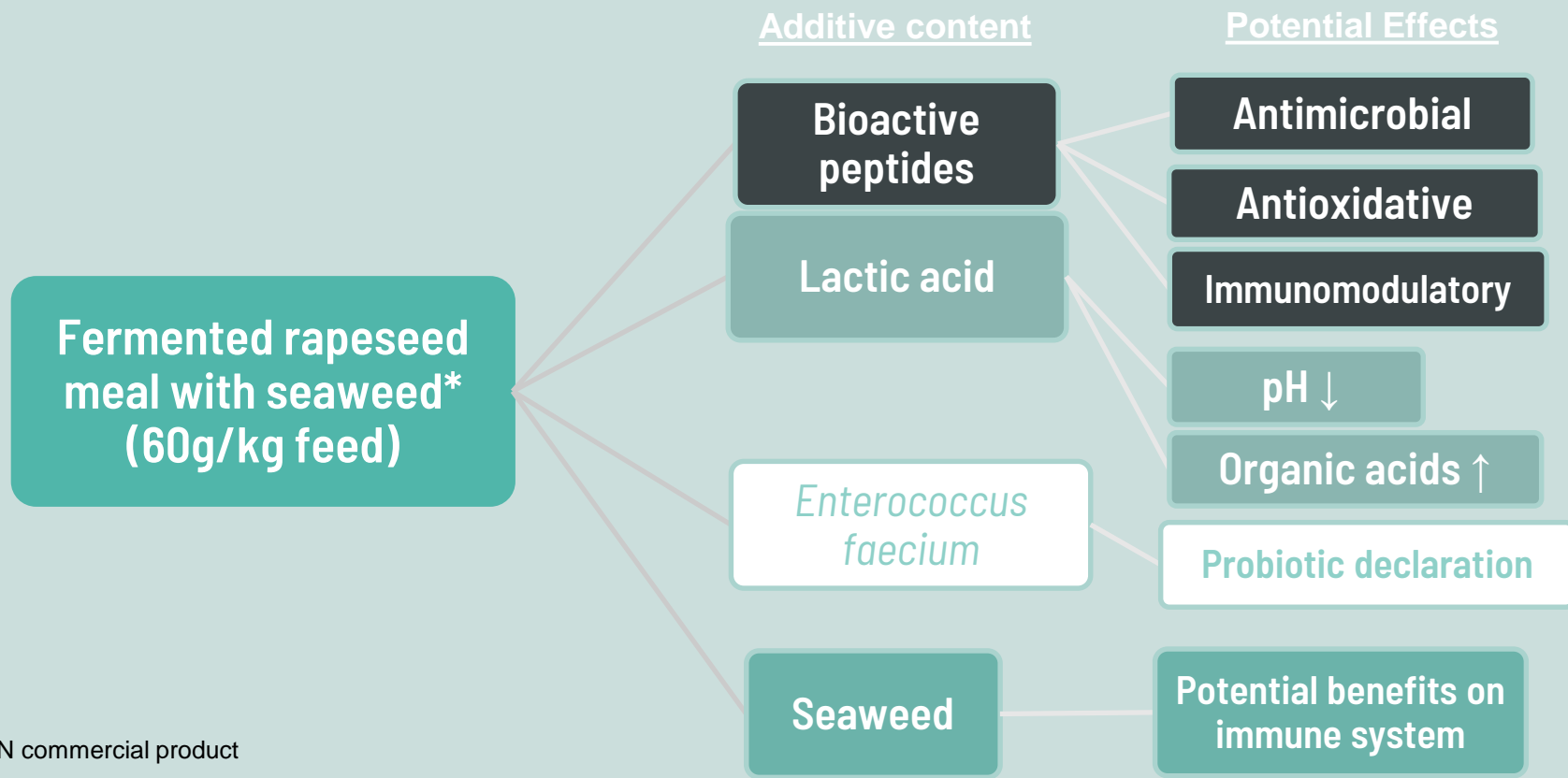
Development of strategies to limit parasite infection through feeding (plant additives e.g. extracts) to improve health and welfare of hens in organic outdoor systems

Infection trials with layers to study the specific effects of different plant material on the incidence of parasite infections and on intestinal microbiology and immunocompetence

*A. galli* infection model – used to study the effect of the diet on parasite load, gastrointestinal health, and bird welfare

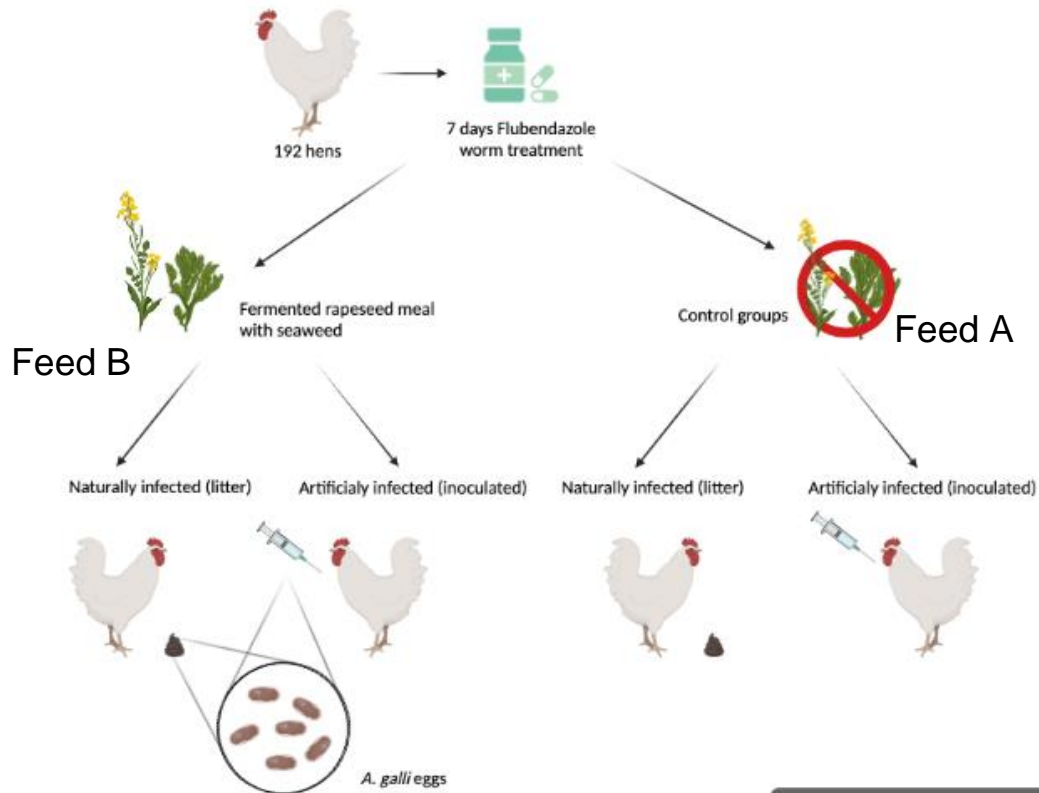


# POTENTIAL EFFECTS OF FERMENTED RAPESEED/SEAWEED?



\* NN commercial product

# EXPERIMENTAL SETUP



- 18 weeks old chickens were dewormed before experimental *A. galli* infection
- Blood and faecal samplings until week 12 post infection (p.i.)
- At termination, sampling of intestinal content and tissues

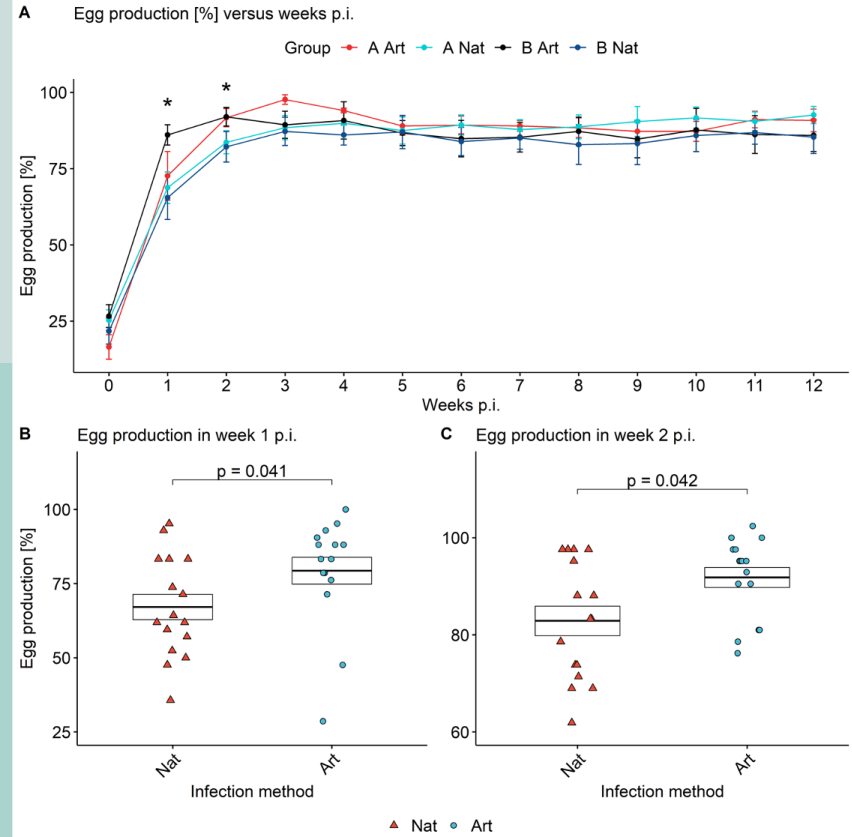
# NO ADVERSE FEED EFFECT ON LAYER PERFORMANCE

No effect of fermented feed (B) as compared to control feed (A) on:

- Body weight gain
- Feed intake

However small transient effect of infection method on egg production:

- Significantly higher in inoculated chickens (Art) as compared to litter infected (Nat) at weeks 1 and 2 p.i.



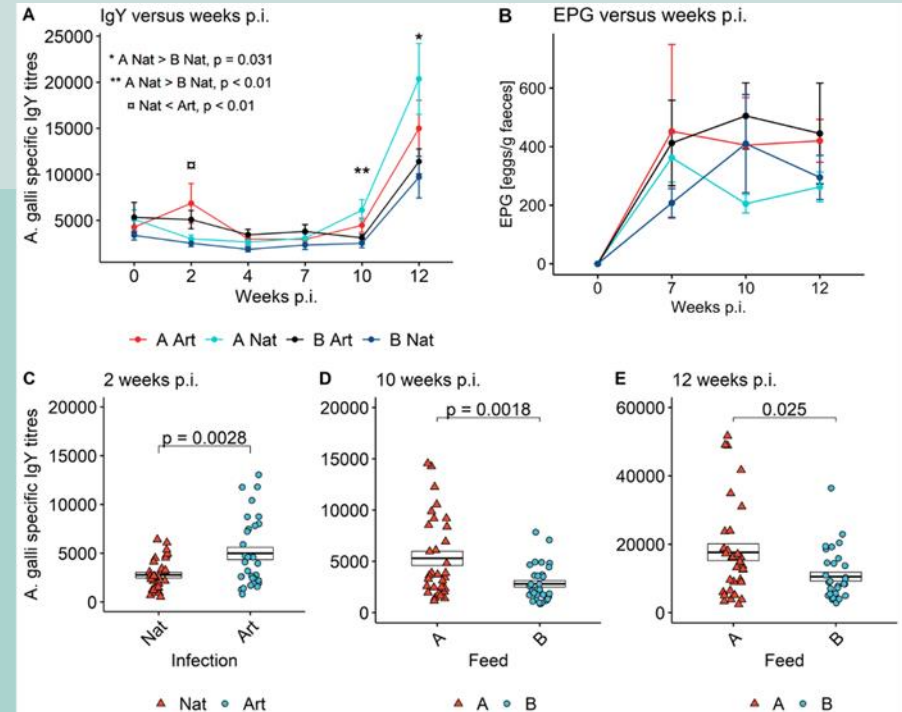
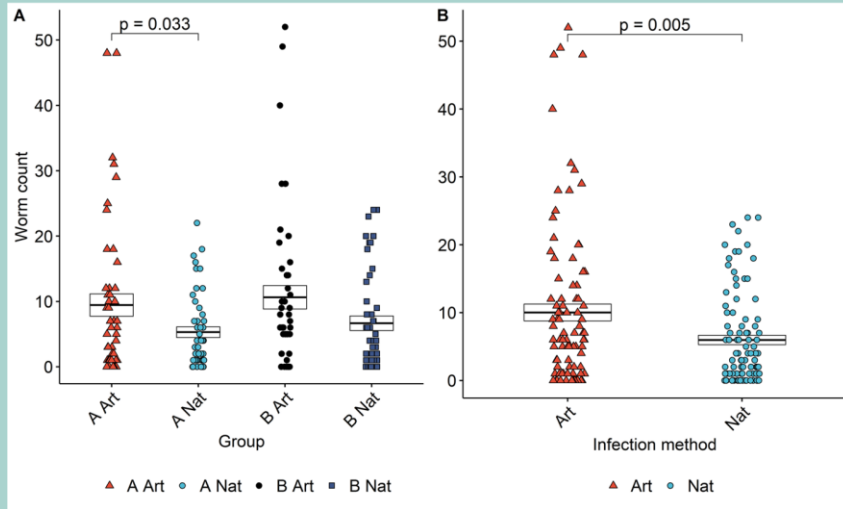


# NO FEED EFFECT ON *A. GALLI* WORM BURDEN OR EPG BUT SMALL EFFECT ON SERUM IgY

No significant effect of the feed on worm burden. However, larger worm burden in inoculated chickens (Art) at week 12 p.i.

Significantly higher *A. galli* specific IgY titres in:

- Art group, at week 2 p.i.
- Feed B group, at weeks 10 and 12 p.i.



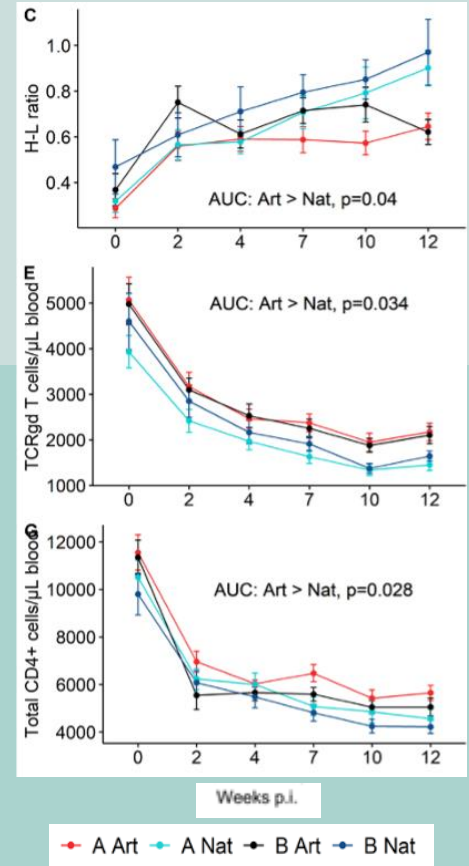
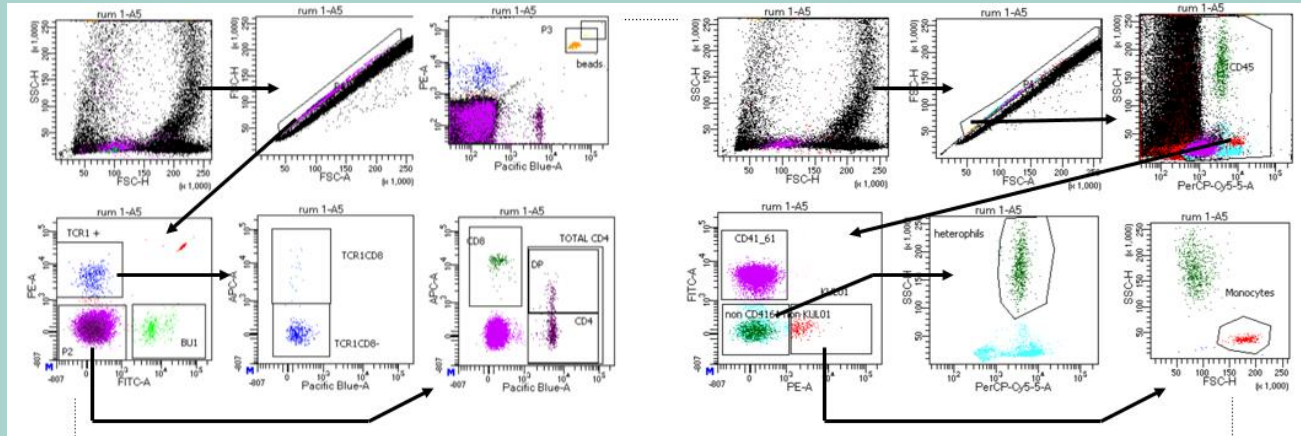
# NO FEED EFFECT ON LEUCOCYTE AND THROMBOCYTE COUNTS IN PERIPHERAL BLOOD

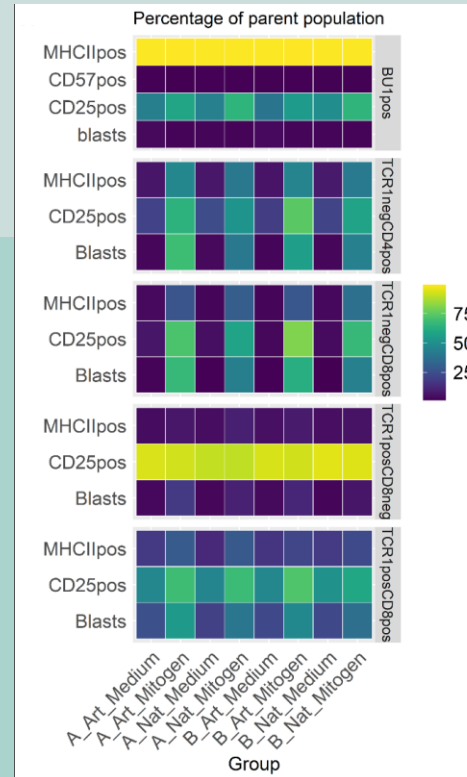
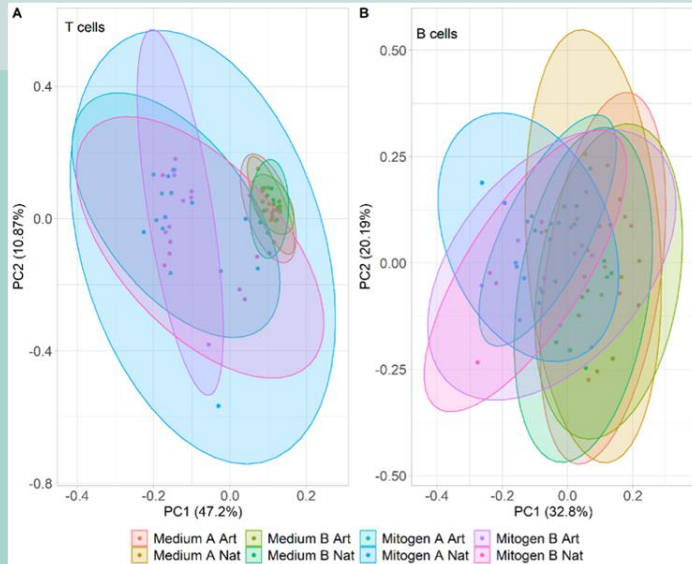
No differences in area under curve (AUC) of the concentrations of:

- Monocytes, Thrombocytes, B cells, Cytotoxic T cells (CD8+), or Double-positive T cells (CD4+CD8+) (data not shown)

Inoculated chickens (Art) had significantly higher counts of:

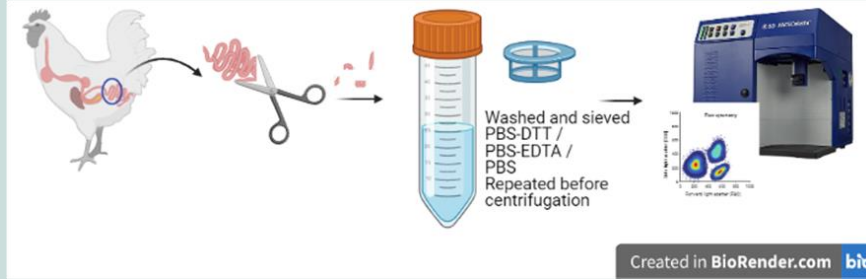
- TCR $\gamma\delta$  cells, T helper cells (CD4+) & heterophil/lymphocyte (H-L) ratio







# FEED EFFECT ON CD25 EXPRESSING INTRA EPITHELIAL CELLS

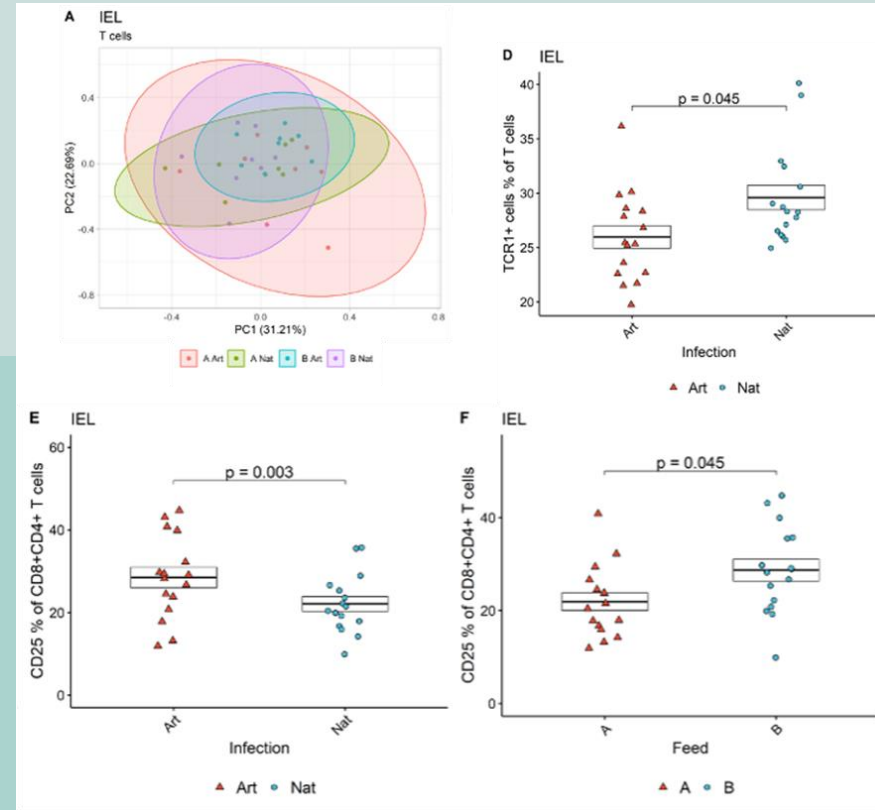


Larger proportion of CD4+CD8+ T cells expressing the CD25 marker in:

- Chickens fed fermented rapeseed (B feed)
- Inoculated chickens (Art)

Larger proportion of TCR $\gamma\delta$  cells in:

- Litter infected chickens (Nat)



## Conclusion

It was not possible to prove that dietary inclusion of fermented rapeseed meal/seaweed (60g/kg feed) had a direct anti-parasitic effect.

A limited immunomodulatory potential was found, but more studies are needed to investigate a potential health promoting effect under production conditions.



Poultry and Pig Low-input and Organic production systems' Welfare

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## Thank you

