Poultry nutrition

Challenges and opportunities

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Leading the way in Agriculture and Rural Research, Education and Consulting

Two parts

- Nutritional strategies to reduce Campylobacter carriage in broilers
  - Farina Khattak

- Home grown alternatives to soya bean meal for growing pigs and broilers
  - Jos Houdijk

Preharvest nutritional interventions potential to reduce Campylobacter colonization in broilers

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Campylobacter remains a challenge

Food borne pathogen

Poultry processors and retailers

Poultry producers

Bacteria within biofilm

Antimicrobial resistance

Campylobacter: target

- Ideally absence but realistically reduction

- “The incidence of campylobacteriosis associated with consumption of chicken could be reduced 30 times by introducing a 2 log reduction of the number of Campylobacter on the chicken carcasses”

Rosenquist *et al* 2003 International Journal of Food Microbiology

Campylobacter models (*in vivo*)

Natural challenge

Seeded litter challenge

Challenge via gavaging

Sandilands *et al* 2018 British Poultry Science; Khattak *et al* 2018 Poultry Science

Feed additive and *Campylobacter*

Natural challenge model

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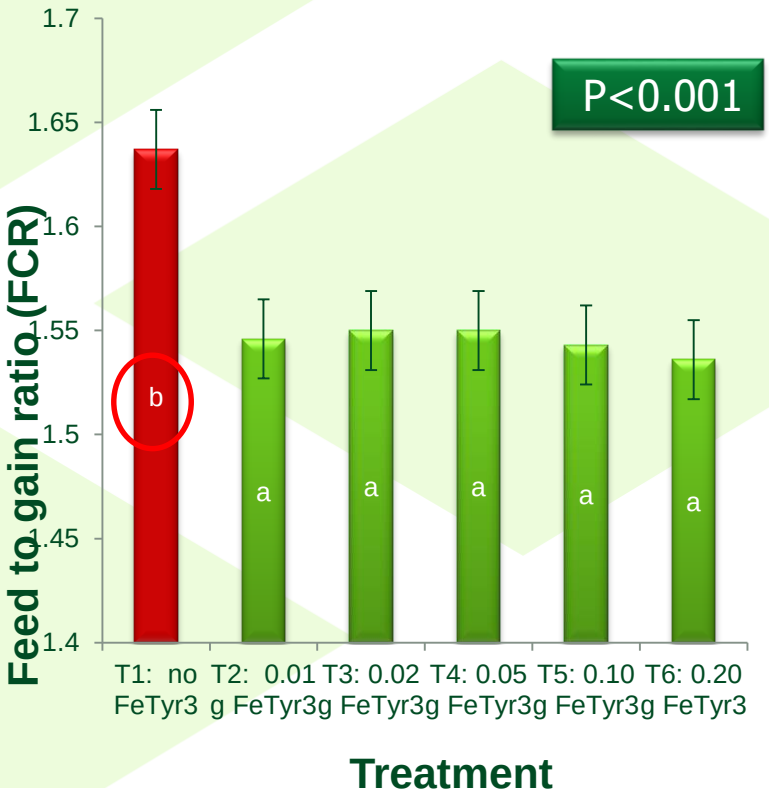
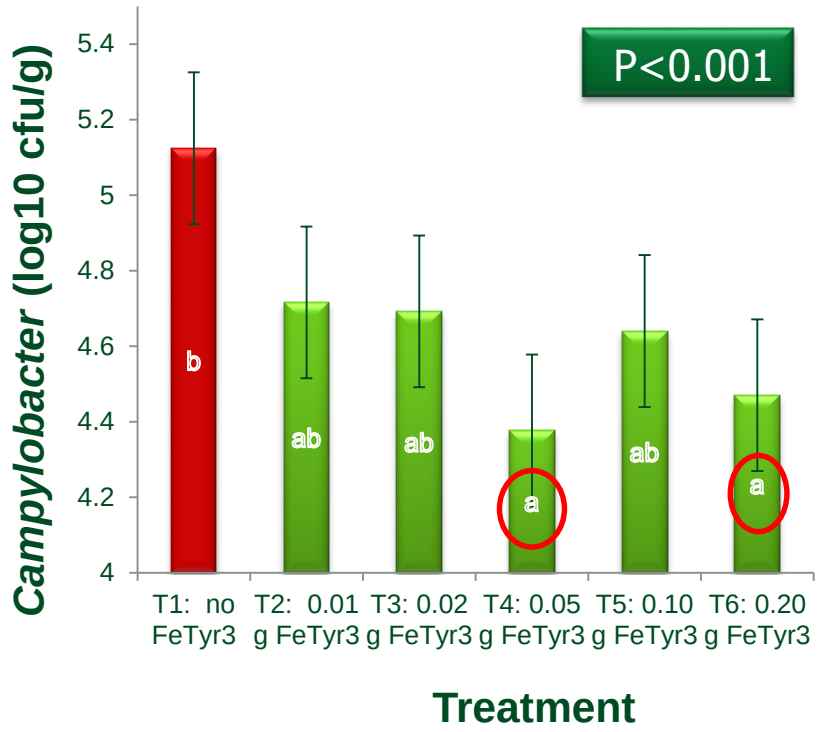
Effect of feed additive on FCR of challenged broilers



Effect of feed additive on *Campylobacter* counts



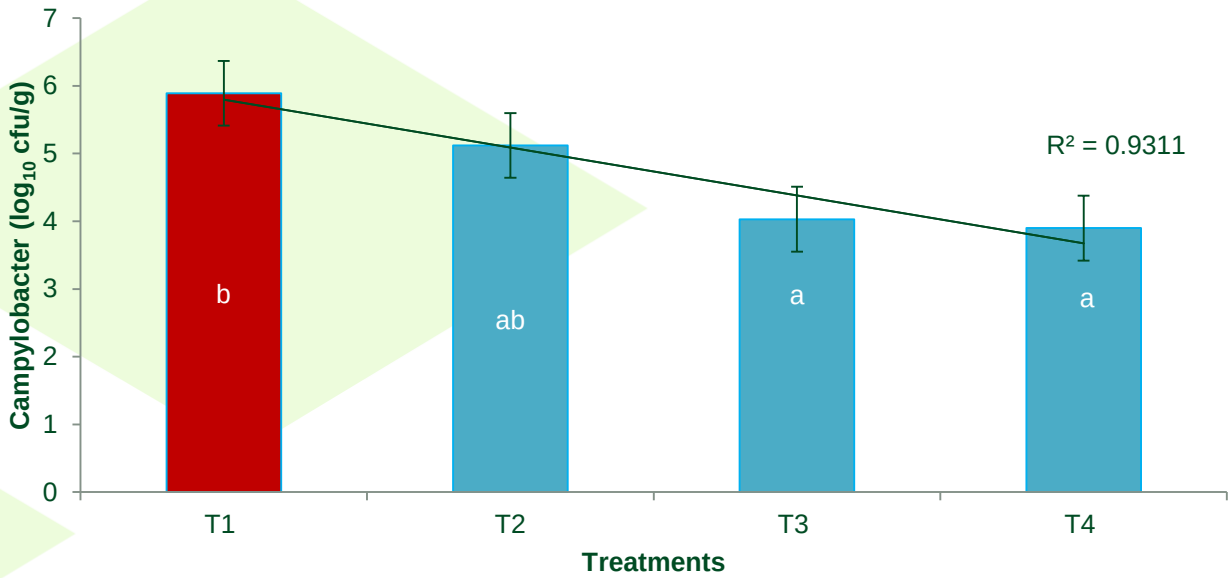
AKESO BIOMEDICAL

Khattak *et al* 2017 British Poultry Abstracts

Feed additive and *Campylobacter*

Seeded litter challenge model

Effect of treatment diets on caecal microbial counts at 42 days of age



T1 = Control ; T2 = 0.02 g/kg TYPLEX® Chelate ;
T3= 0.05 g/kg TYPLEX ® Chelate; T4 = 0.20 g/kg TYPLEX ® Chelate

Khattak *et al* 2018 Poultry Science

Take home message

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- Campylobacter remains the biggest cause of bacterial foodborne illness.
- Chicken-related *Campylobacter* strains continue to be most commonly identified in human illness (52-68%).
- *Campylobacter* does affect birds performance.
- Target still remains the same:
  - Develop strategies to continue fighting bad bacteria & reduce *Campylobacter* colonization in poultry and ultimately reduce human cases of campylobacteriosis.
- Emerging antibiotic resistance in *Campylobacter* urges for continuous search for new antibiotic free, anti-bacterial feed additives.

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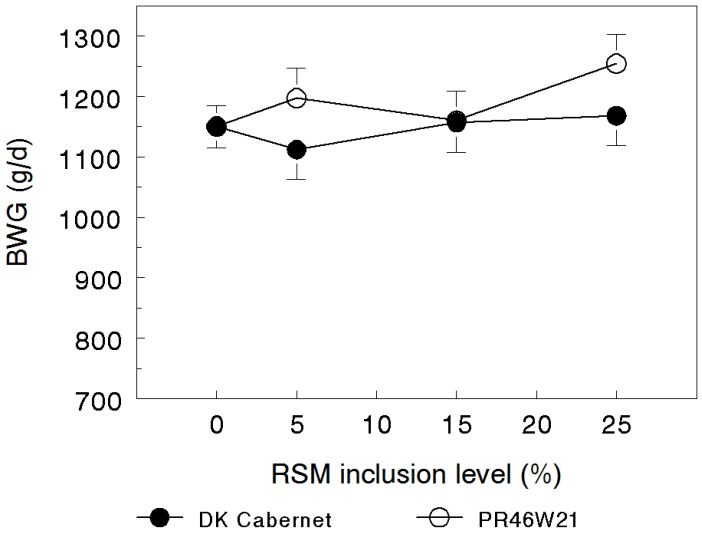
Alternatives to soya bean meal

- Pig and poultry nutrition relies heavily on soya bean meal (SBM)
  - Excellent nutritional value, great palatability
  - Year round availability
- Concerns of reliance on SBM
  - Environmental and ecological footprint
  - Economic constraints
- Can we use home grown alternatives to reduce reliance on SBM for pigs and poultry?
  - Some outputs from historic and ongoing projects

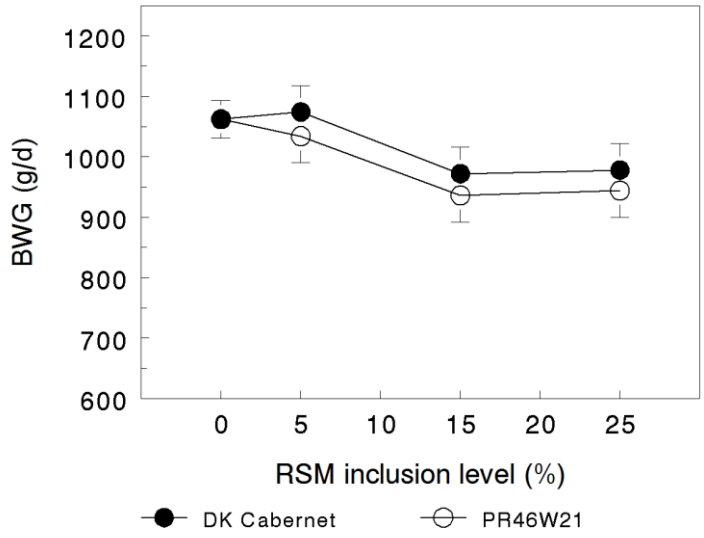
Pig performance: rapeseed meal

- Dose-response trials
  - complete replacement of SBM without impacting performance in finishers
  - reduced growth at similar FCR in growers 15% and above

Finishers



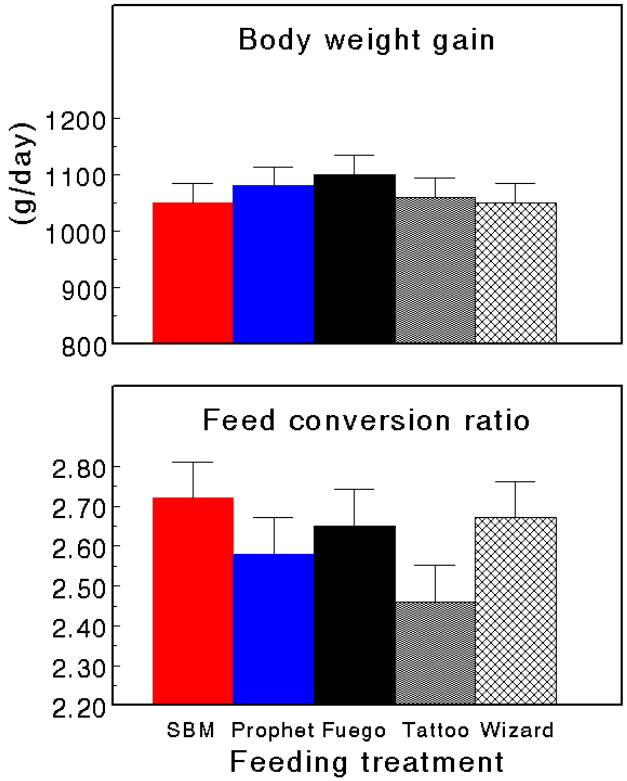
Growers



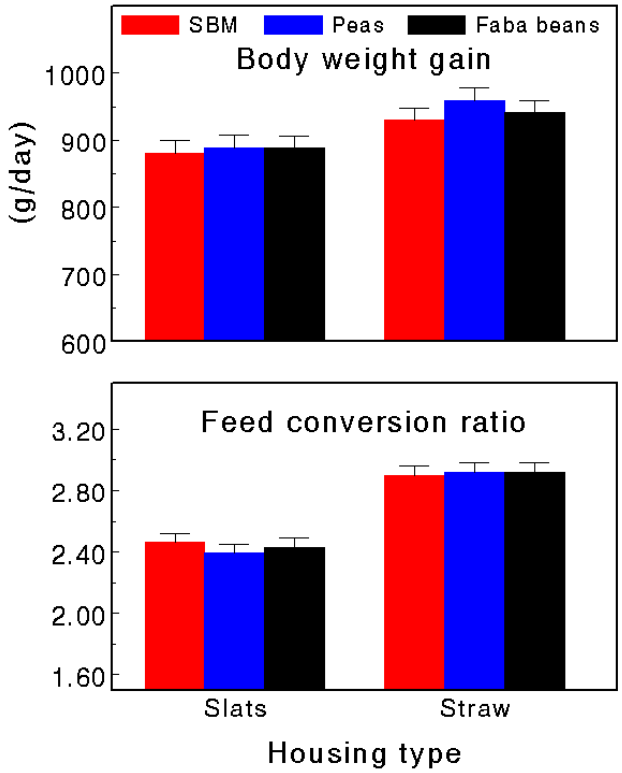
Houdijk *et al* 2016 EAAP Abstracts

Pigs performance: faba beans

- Similar performance following replacing SBM with peas or beans in nutritionally complete rations in small and large scale trials



Small scale (48 pigs)



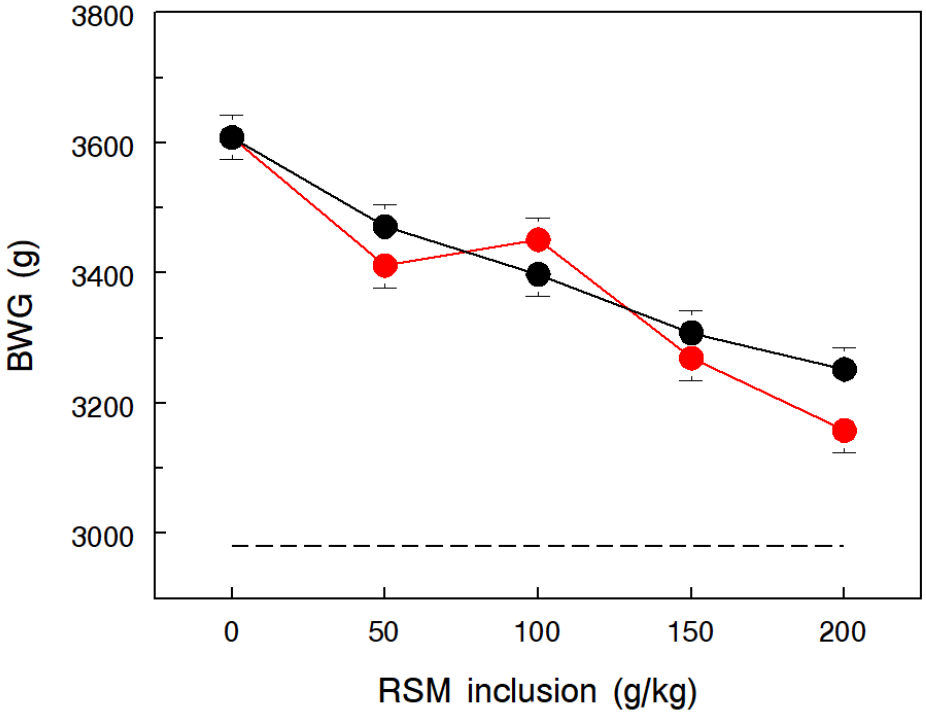
Large scale (1200 pigs)

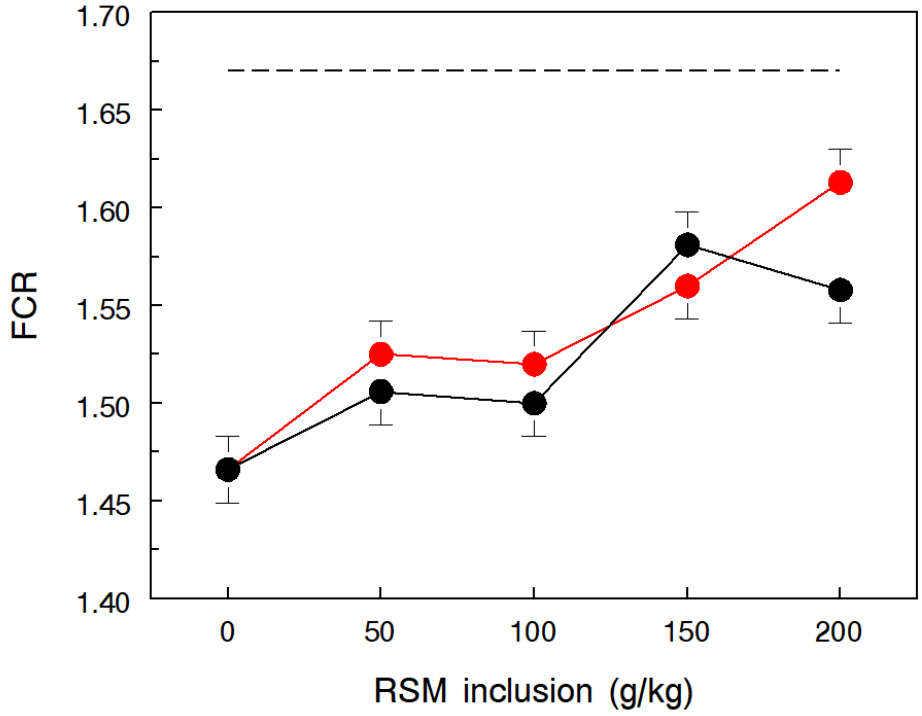
White *et al* 2015 Animal Feed Sci Technol

Houdijk *et al* 2013 Adv Anim Biosci

Broiler performance: rapeseed meal

(Ross 308 males; 42 days)

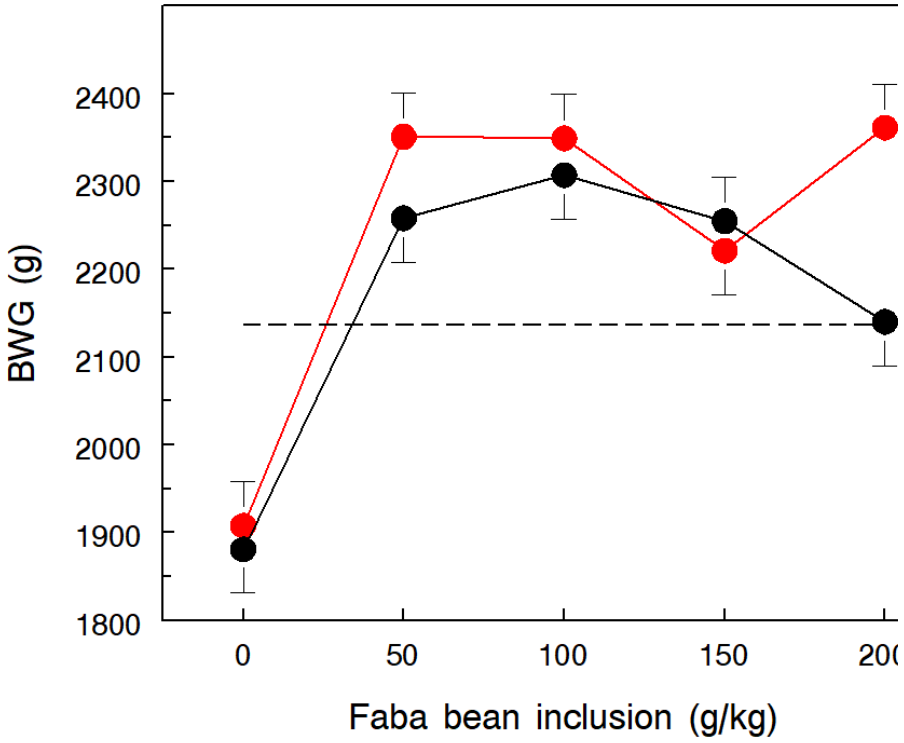


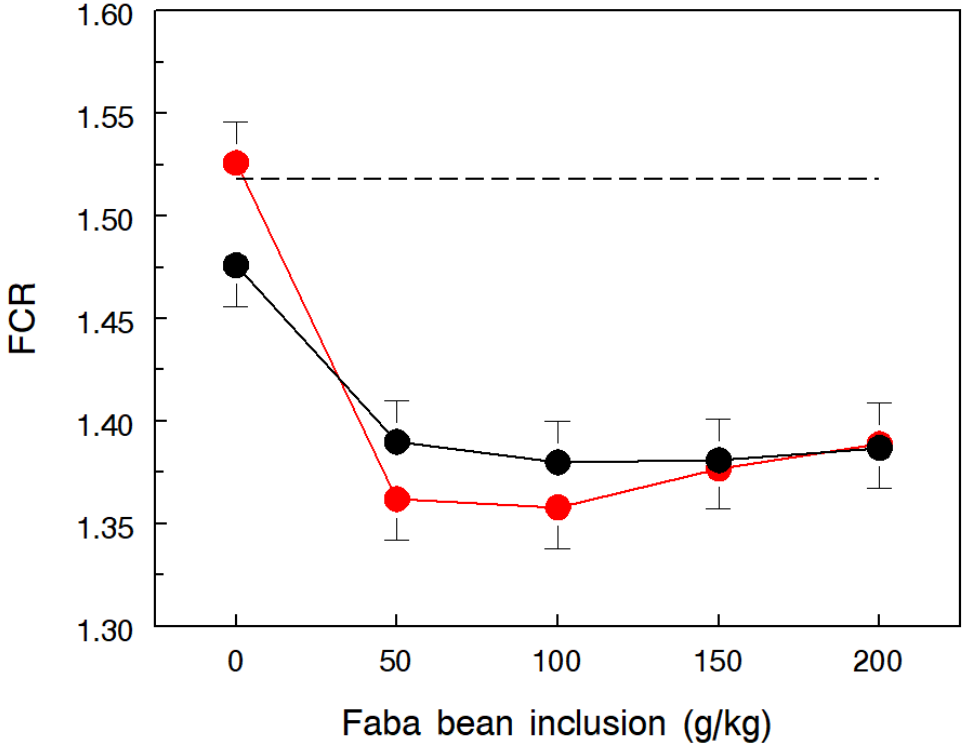


Olukosi *et al* 2017 Poult Sci

Broiler performance: faba beans

(Ross 308 males; 34 days)





Grower-finisher treatments

Houdijk and Walker 2020 WPSA (submitted)

Take home message

- Opportunities to assess home grown alternatives for soya bean meal from small through large scale
  - Within SRUC pig and poultry units
  - In partnership with commercial producers (especially pigs)
- Beans for pigs and poultry as SBM alternatives
  - Health benefits of beans are under study
- Rapeseed meal
  - Pigs: complete SBM replacement in finishers; upper limit for growers
  - Detrimental outcomes for broilers but growth and FCR still better than commercial targets
- Framework to assess SBM alternatives
- Using home grown protein sources may assist the increasingly desired slower growing broilers

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