

Impact of high-wheat bran diet on sows' microbiota, performances and progeny's growth and health

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Objective



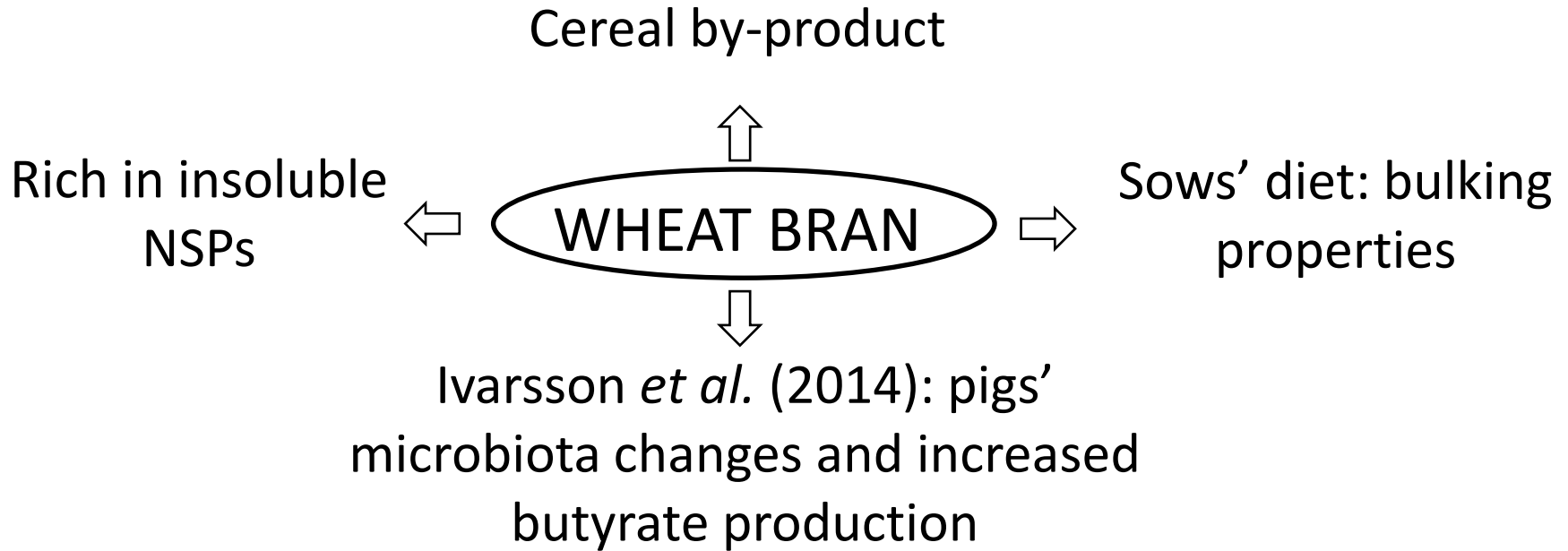
Improve piglets' health
without using antibiotics

HOW?

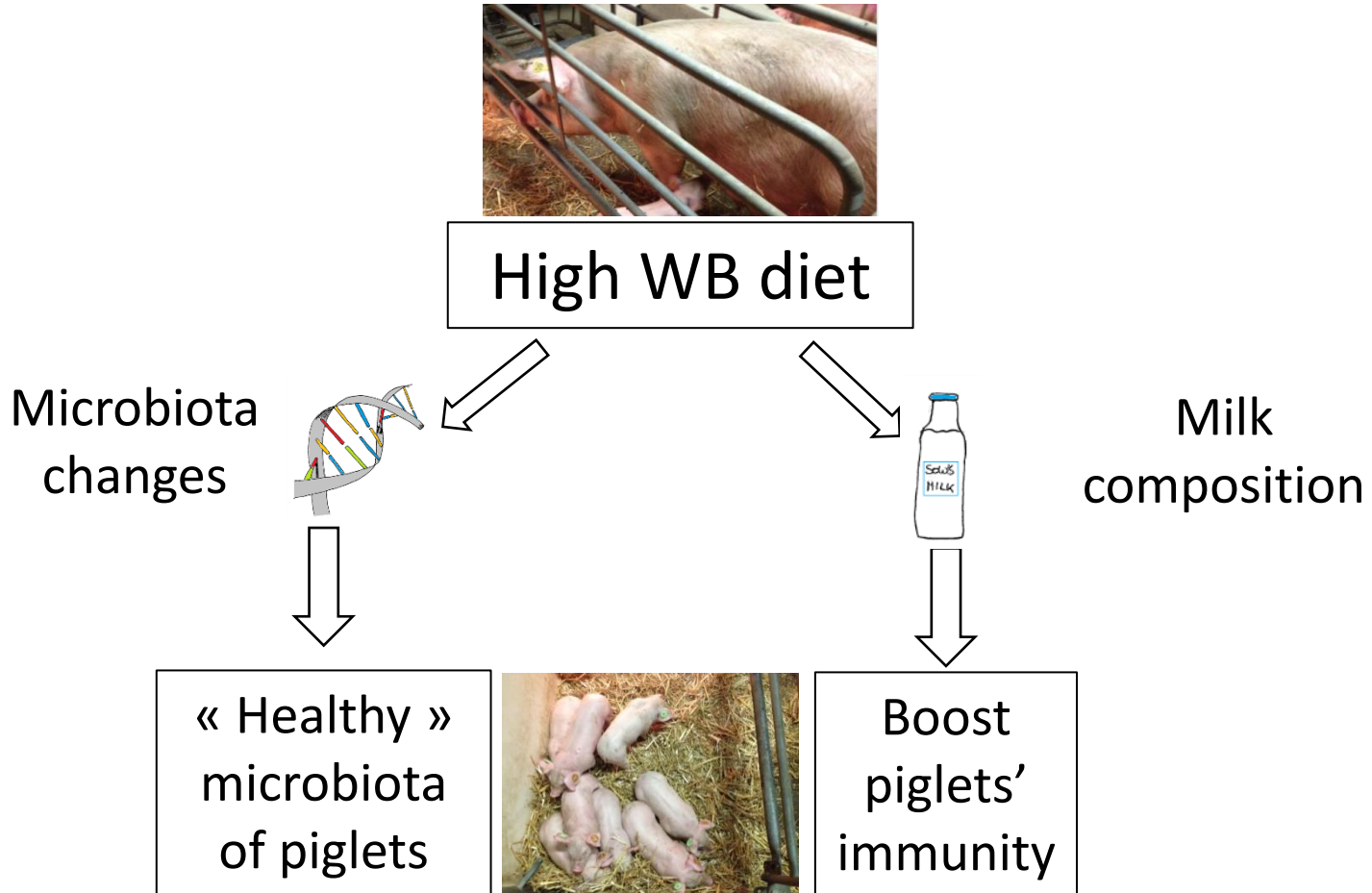


Acting on **SOWS' diet**
→ Use of high quantities
of wheat bran (**WB**)

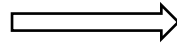
Objective



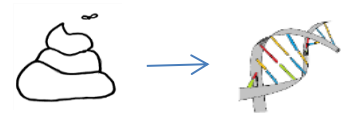
Hypothesis



Methods

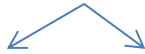


ELISA, mid-infrared



Sequencing

7 CON sows & 8 WB sows

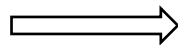


Gestation

240g/kg DM WB

Lactation

140g/kg DM WB



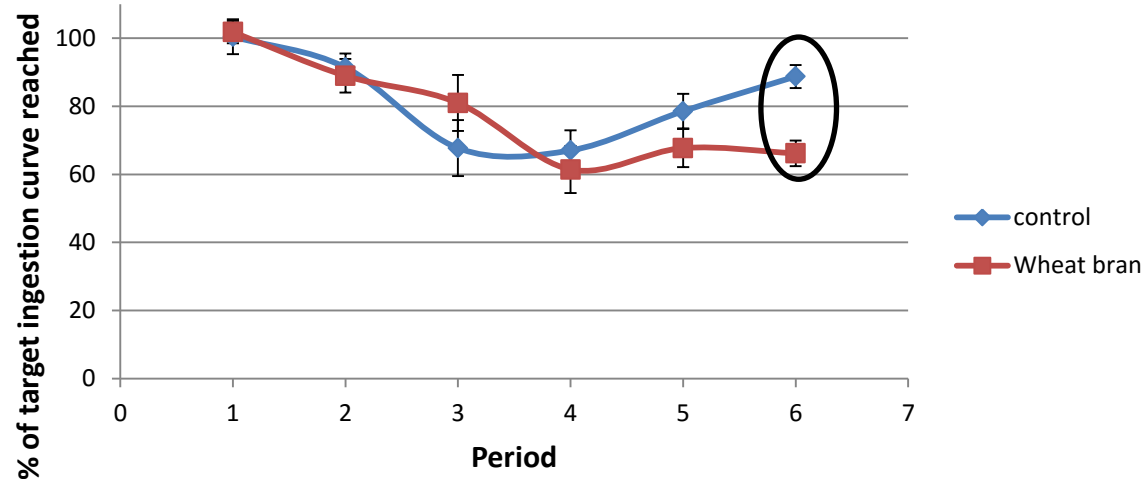
SCFA
Sequencing

Results: performances

- Backfat/bodyweight changes: no impact of treatment (p=0.60 and p=0.77, respectively)
- Litters' bodyweights: no effect of maternal treatment (p=0.51) from birth until weaning
- Ingestion of both groups similar except for the **last 4 days** of the lactation period (drop in WB ingestion), 66% of their planned feed intake-curve WB group vs 89% CON group

Results: performances

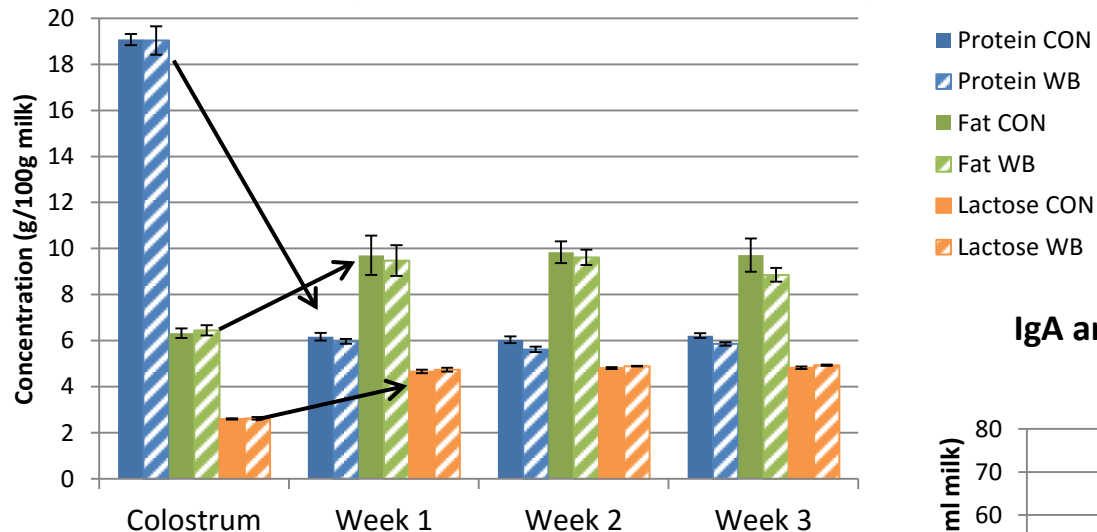
% of target ingestion curve by treatment



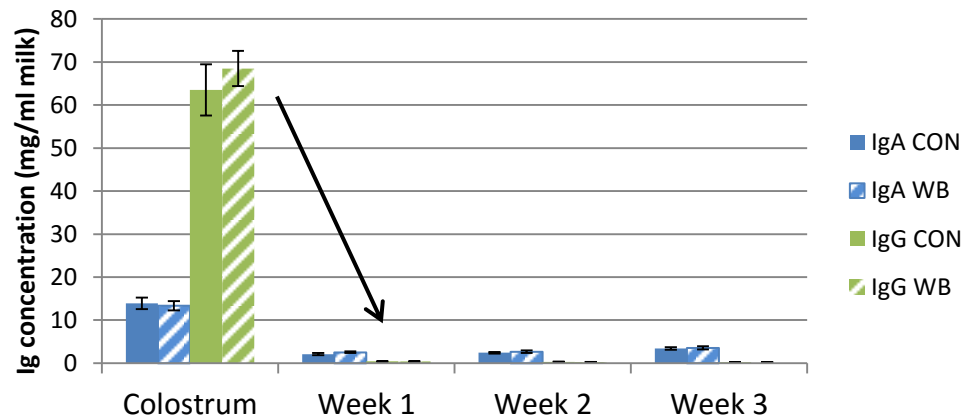
- Ingestion of both groups similar except for the **last 4 days** of the lactation period (drop in WB ingestion), 66% of their planned feed intake-curve WB group vs 89% CON group

Results: milk composition

Chemical composition of milk at different time points

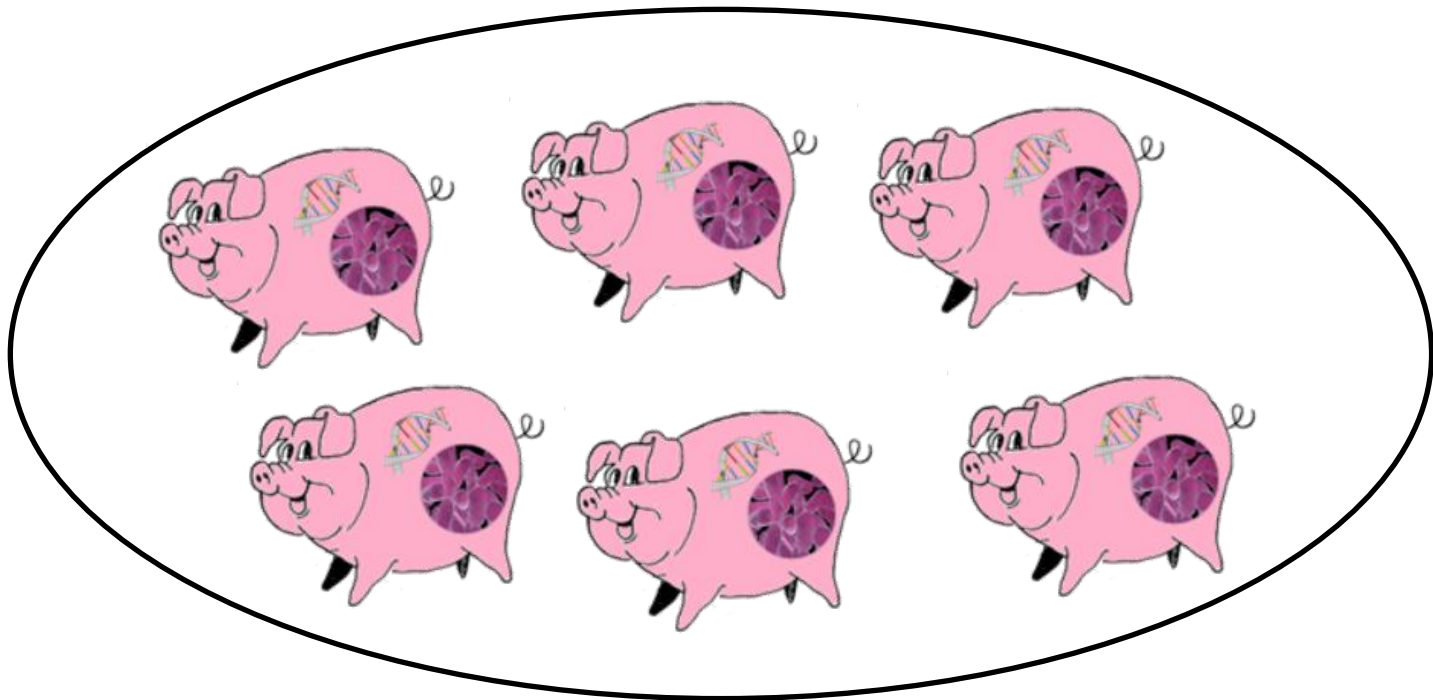


IgA and IgG concentrations of sow milk at different time points



Results: MICROBIOTA

THE BIG PICTURE...

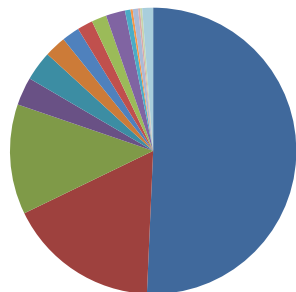


Gestation BEFORE diet
change (**G-**)

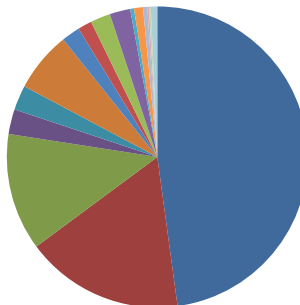
Gestation AFTER diet
change (**G+**)

Lactation (**L**)

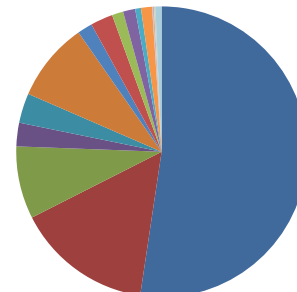
CON G-



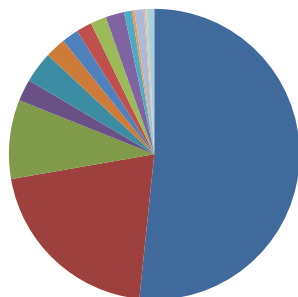
CON G+



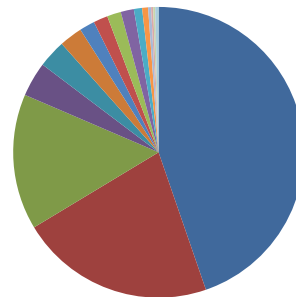
CON L



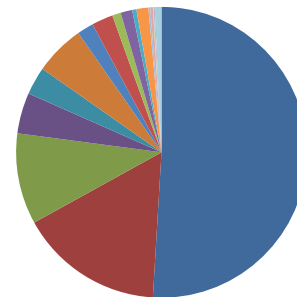
WB G-



WB G+



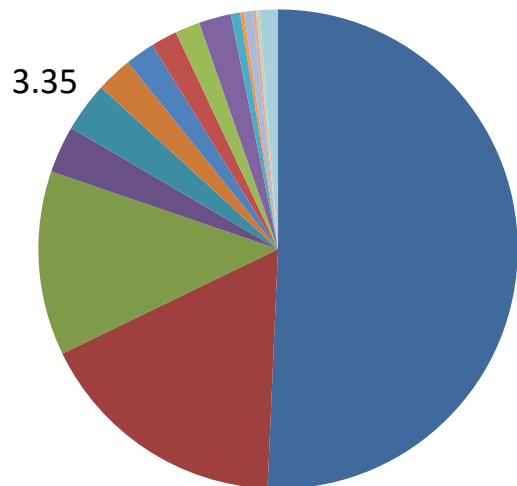
WB L



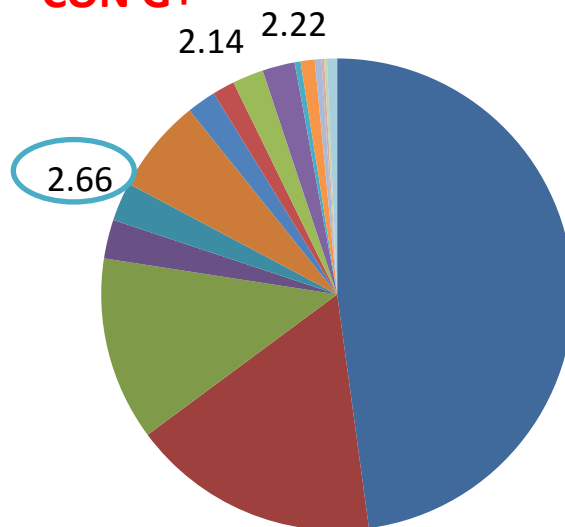
- Lactobacillus
- Treponema
- Phascolarctobacterium
- Streptococcus
- Oscillospira
- Ruminococcus
- Clostridium
- CF231
- Faecalibacterium
- Megasphaera
- Bifidobacterium
- Fibrobacter
- Roseburia
- Butyrivibrio
- Parabacteroides

CONTROL GROUP

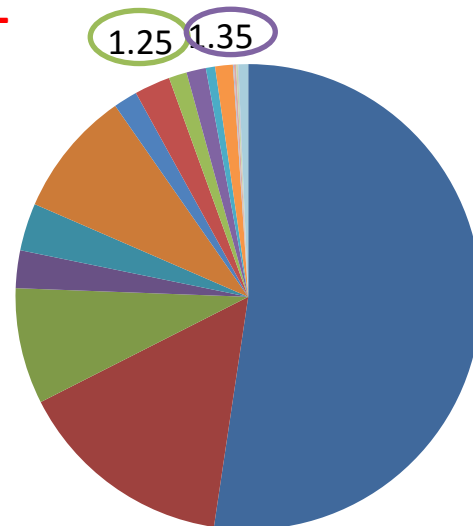
CON G-



CON G+



CON L



■ Phascolarctobacterium

3.35% → 2.66%

■ Clostridium

2.14% → 1.25%

■ CF231

2.22% → 1.35%

■ Bifidobacterium

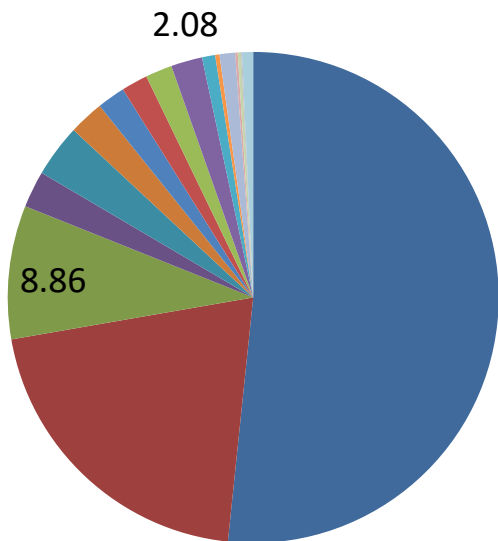
Anecdotal

■ Butyrivibrio

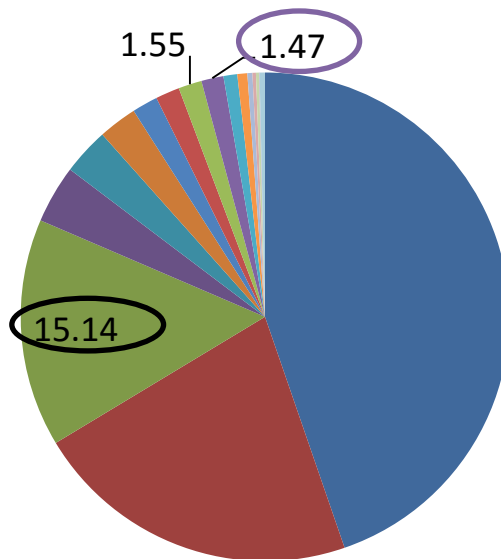
Anecdotal

WHEAT BRAN GROUP

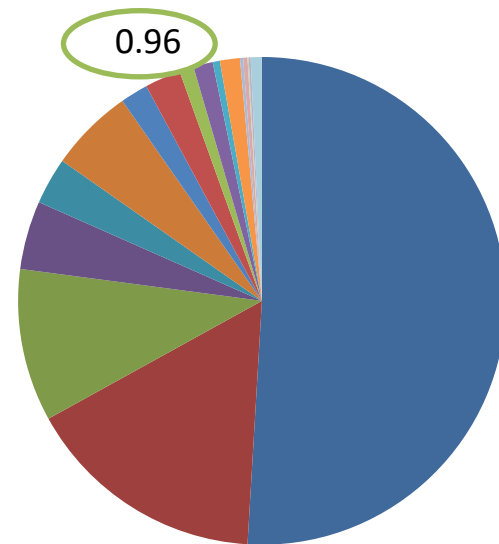
WB G-



WB G+



WB L



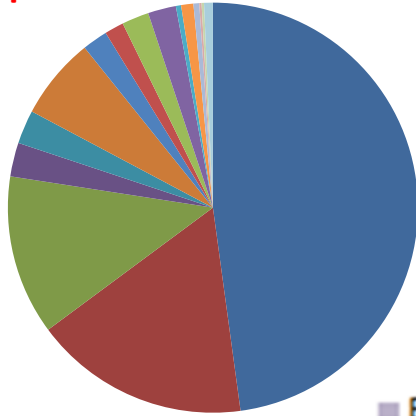
■ Lactobacillus 8.86% → 15.14%

■ CF231 2.08% → 1.47%

■ Clostridium 1.55% → 0.96%

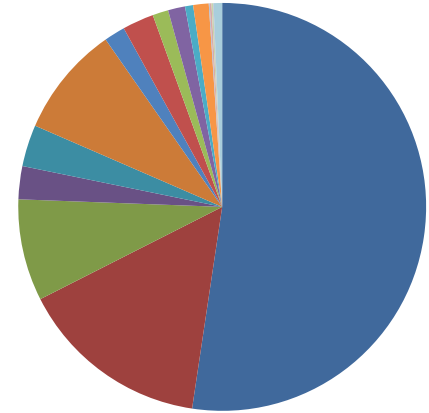
TREATMENT DIFFERENCES - NS

CON G+



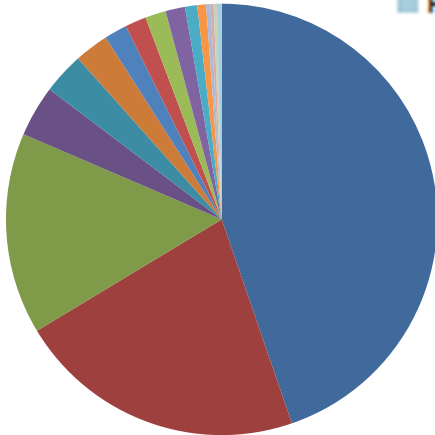
Gestation

CON L

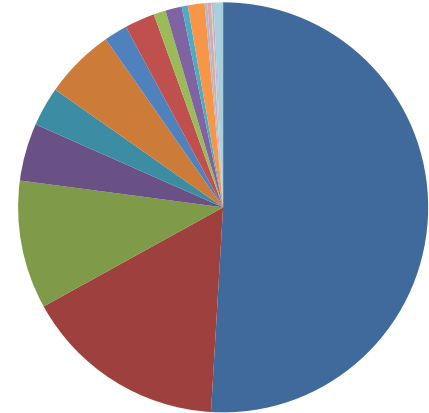


Lactation

WB G+



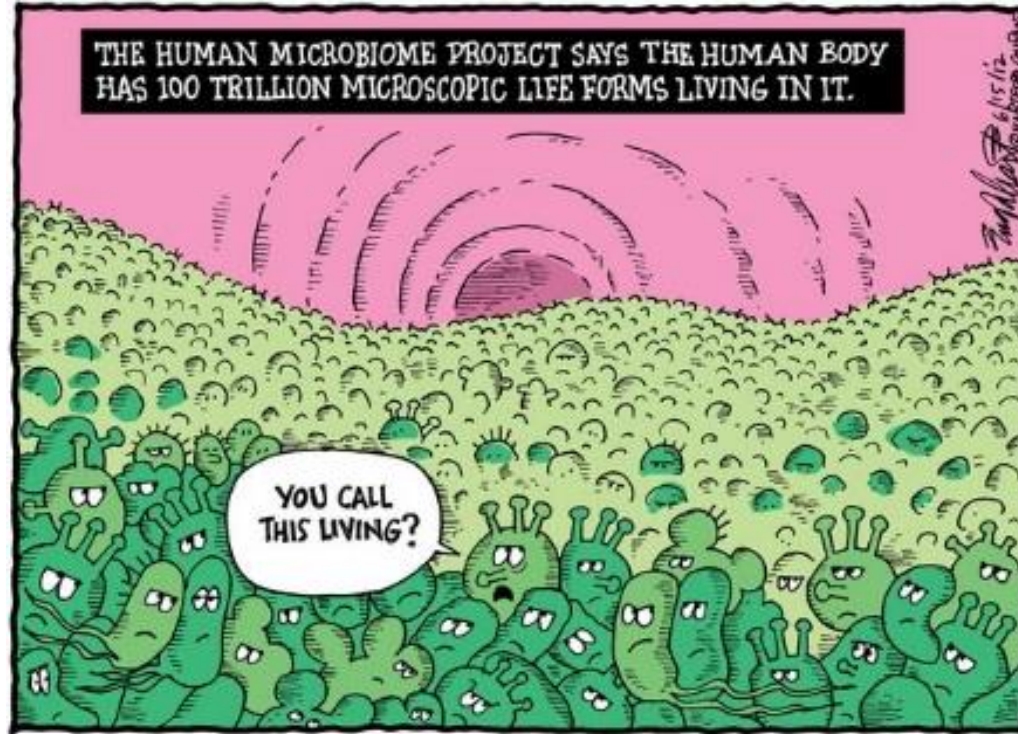
WB L



Butyrivibrio
Parabacteroides

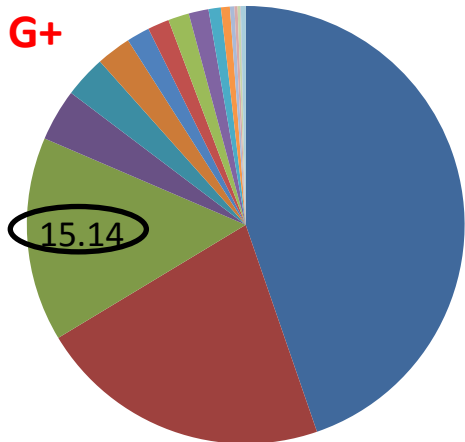
Results: MICROBIOTA

AND THE DETAIL...



(Duke University student affairs)

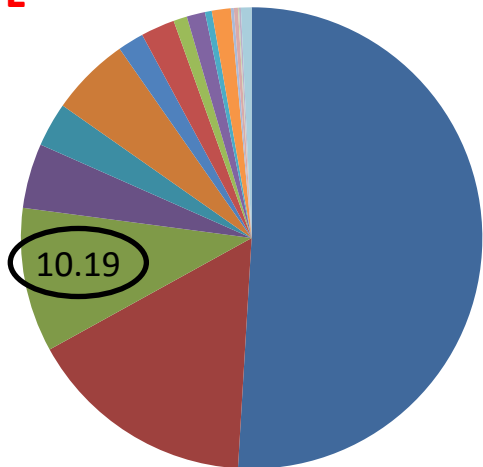
WB G+



Lactobacillus

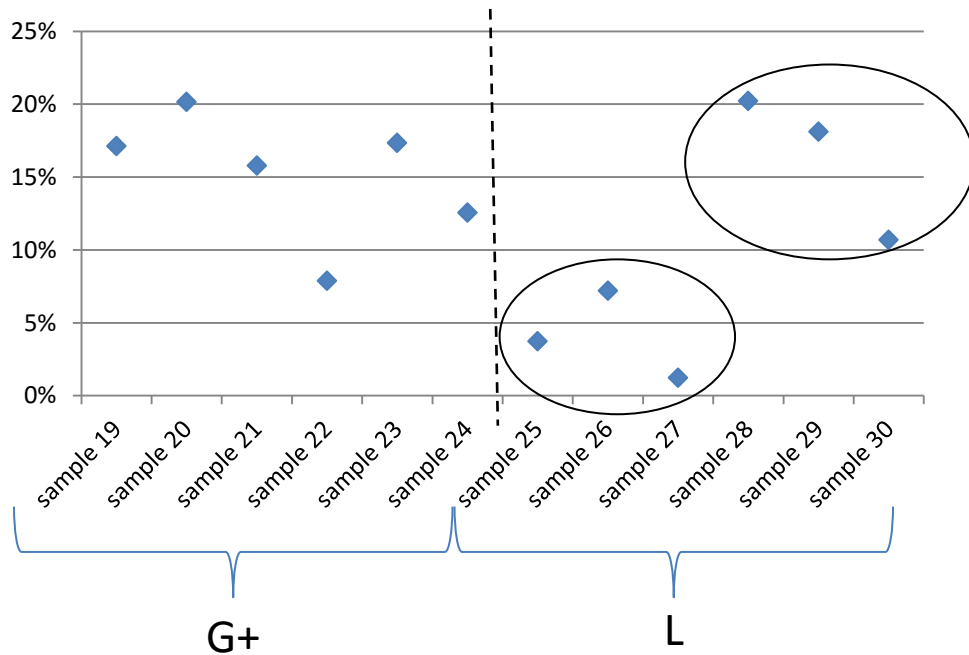
15% → 10%

WB L

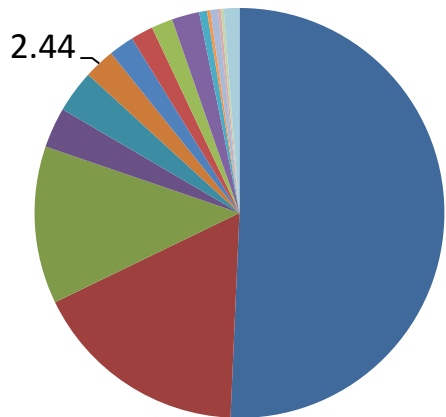


NS

Lactobacillus WB G+/L



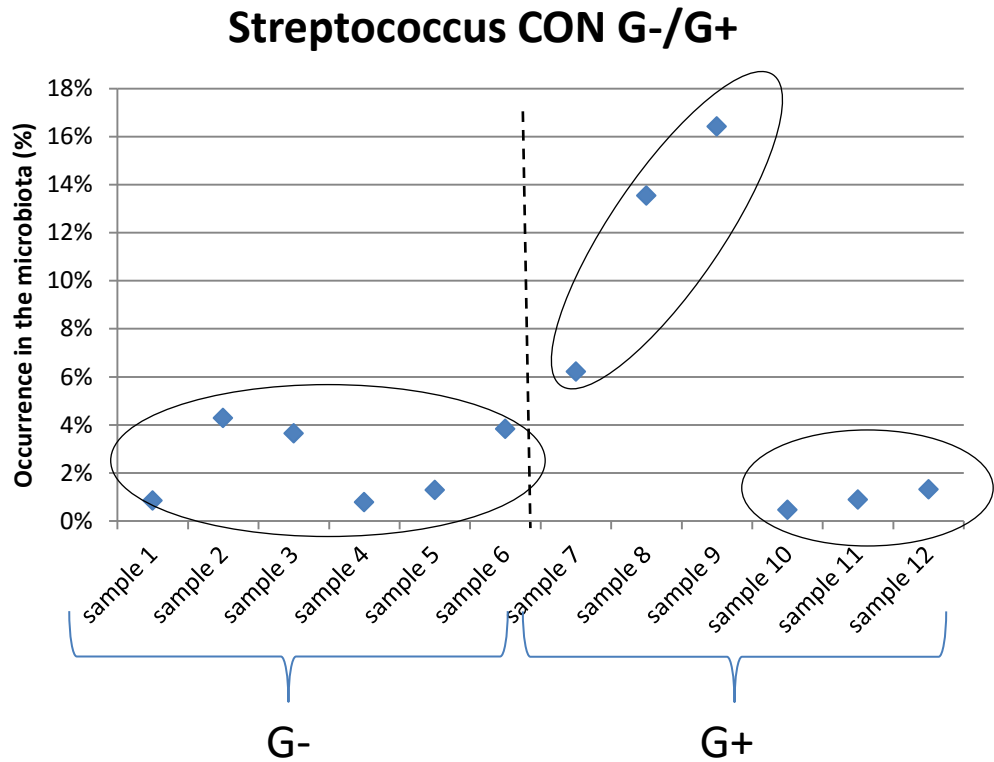
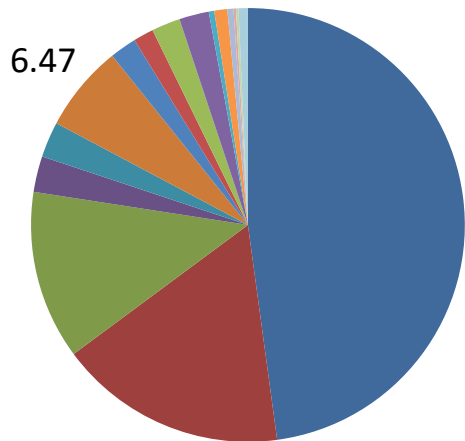
CON G-



Streptococcus

CON G+

NS



Conclusion

- No impact of dietary treatment on **performances** except for ingestion (last period)
 - No impact on **milk** composition
- ➔ Increasing WB proportion is not detrimental
- Conclusions concerning **microbiota** hard to draw due to high variability between individuals

Next step

- Microbiota and short-chain fatty acids (**SCFA**) of piglets
 - Related to sows?
 - Microbiota vs SCFA correlation?
 - Less variability for piglets' microbiota?

Acknowledgments

- For financial support:
 - National Fund For Scientific Research (FNRS-FRIA)
 - COST (European Cooperation in Science and Technology) Action PiGutNet FA1401
 - University of Liège



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