Join dynamics of voluntary feed intake, glycaemia and insulinemia in growing pigs

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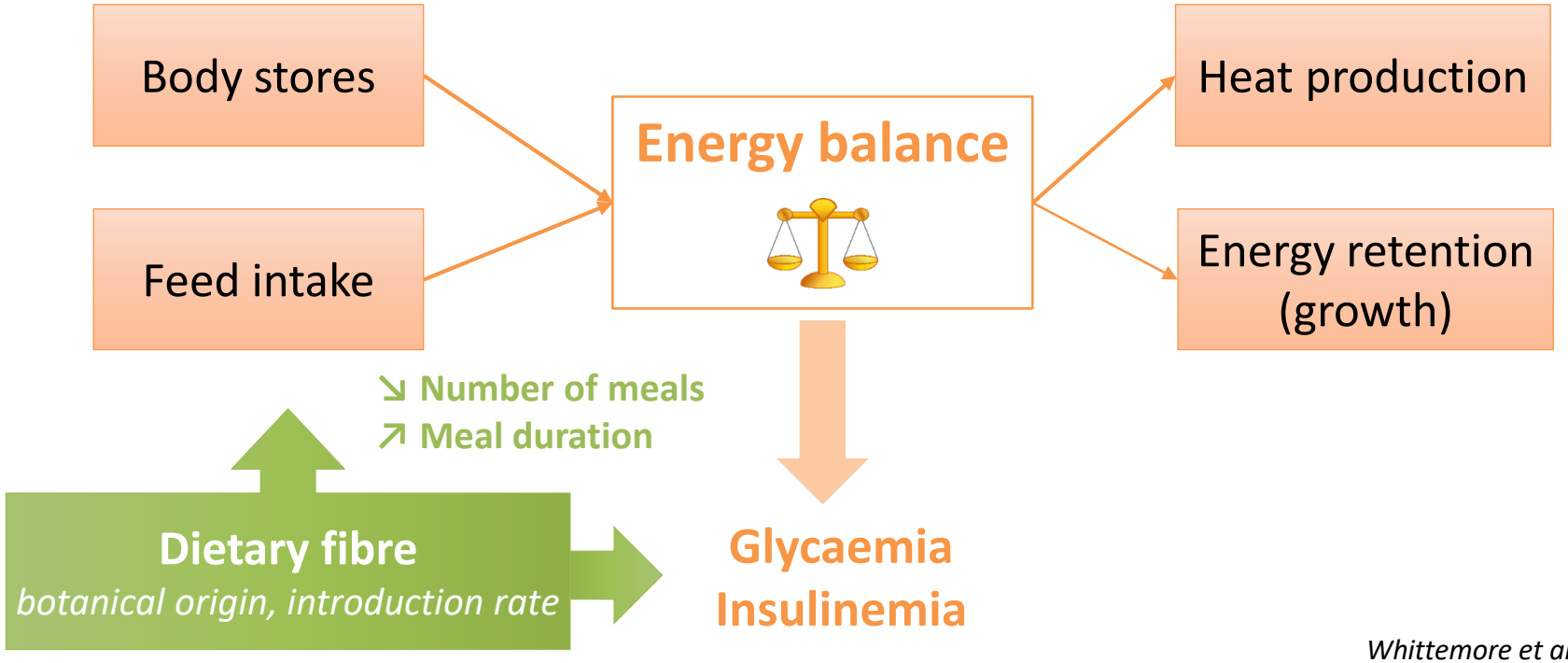
Introduction

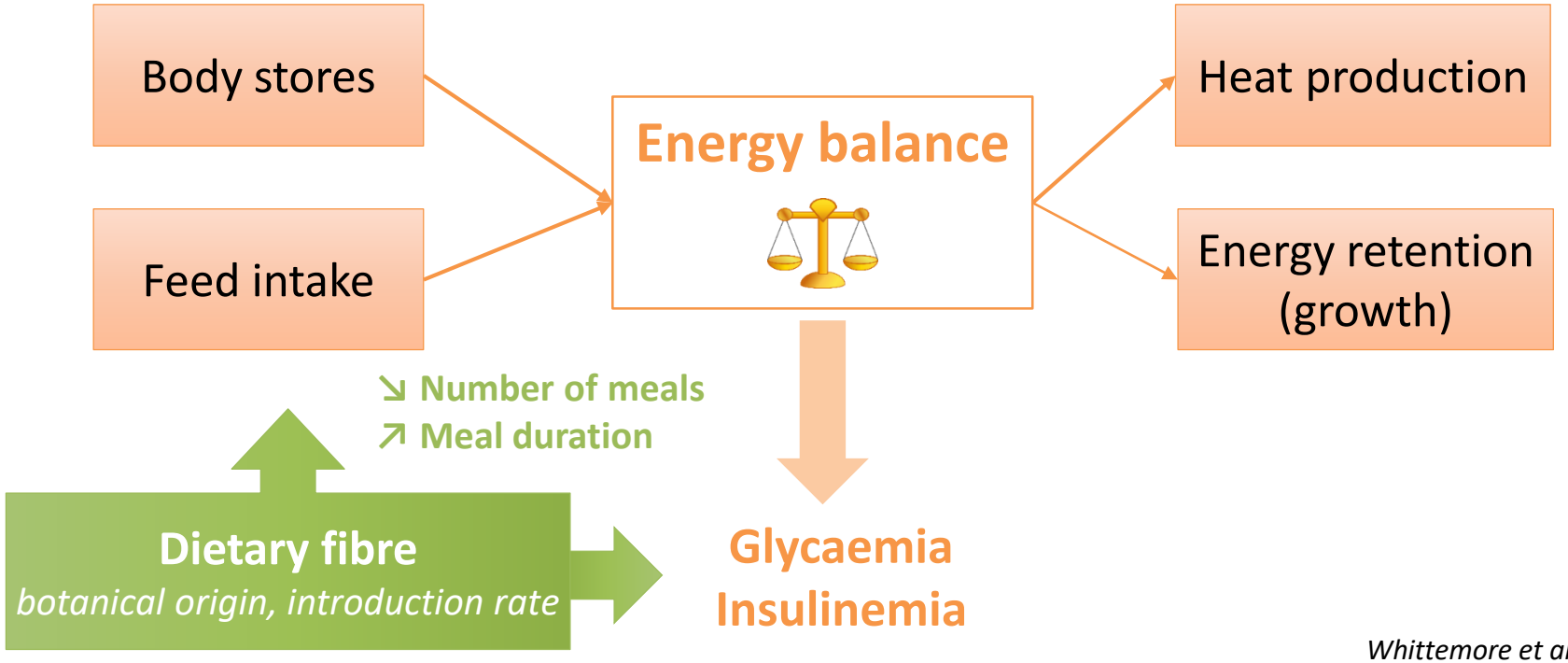
Effect of dietary fibre on energy balance



Whittemore et al, 2002
Bakare et al., 2013

Introduction

Effect of dietary fibre on energy balance



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Objective of the study

To link the within-day dynamics of voluntary feed intake and those of glycaemia and insulinemia in growing pigs *ad libitum* fed diets differing in dietary fibre concentration and aleurone supplementation

Materials and methods

Diets and feeding

- **6 experimental diets**

2 dietary fibre levels × **3 concentrations of aleurone**

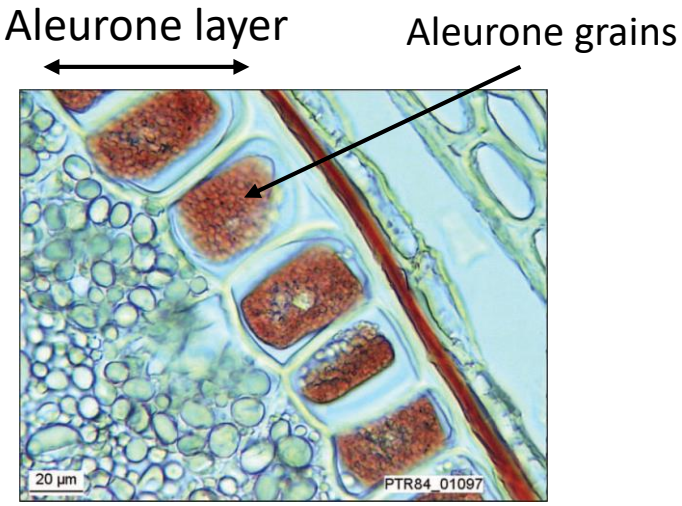
Global effect | *Functional effect*

Low
13% NDF
10 MJ NE/kg DM

High
18% NDF
9.3 MJ NE/kg DM

7.5% wheat bran
5.0% soyabean hulls
2.5% sugar beet pulp

0
2 (g/kg)
4



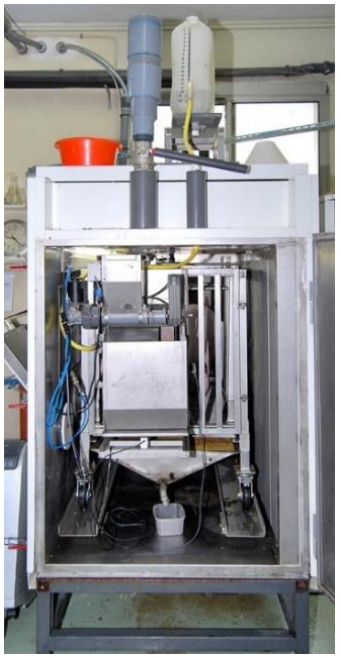
Brouns et al., 2012

- **Free access to feed** (20.5 h per day)

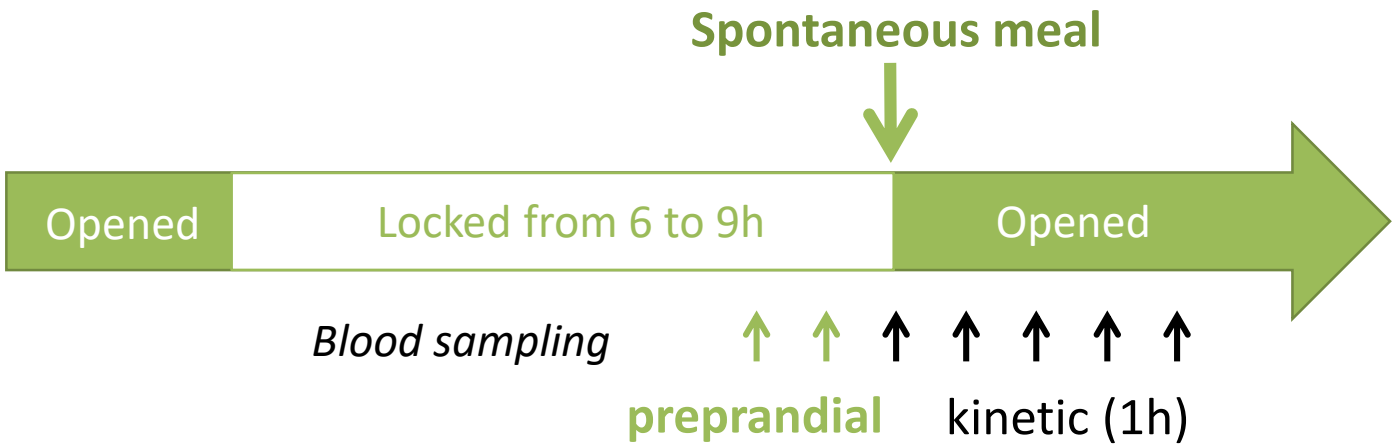
Materials and methods

Animals and design

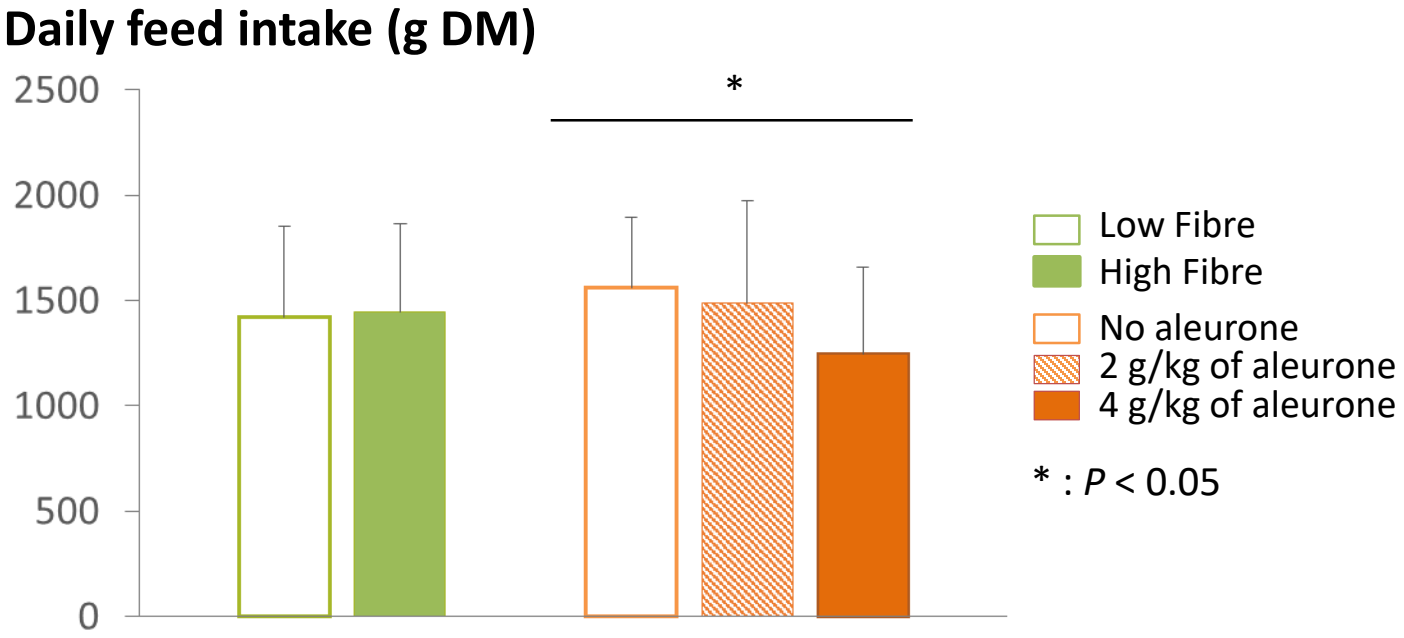
- 38 castrated growing pigs (70 d, 35 kg BW)
- Catheter in the external jugular vein
- Respiration chamber



- 1 week of measurements
  - **Feeding behaviour**
  - **Heat production, respiratory quotient**
  - **7th day: plasmatic concentrations of glucose and insulin**



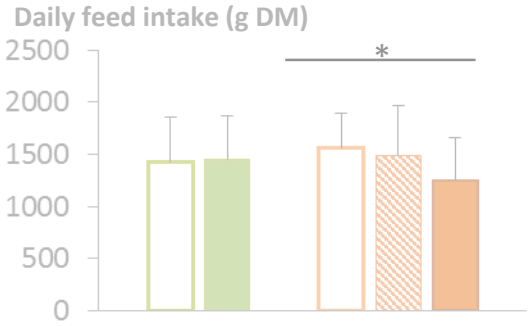
Daily feed intake and energy metabolism



Heat production (kJ/kg $BW^{0.60}$/day)	1355
Respiratory quotient	1.129

- Dietary fibre introduction did not modify daily feed intake.
- Aleurone supplementation decreased daily feed intake without effect on energy metabolism.

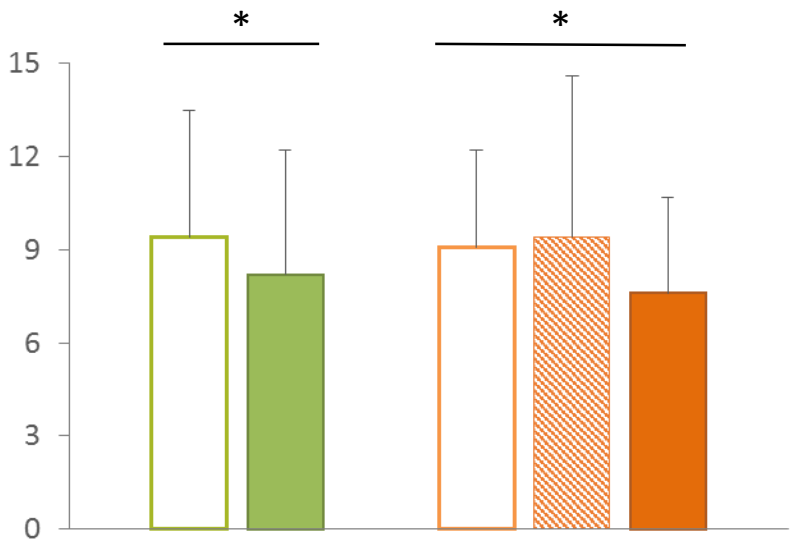
Daily feed intake and feeding behaviour



Low Fibre
High Fibre
No aleurone
2 g/kg of aleurone
4 g/kg of aleurone

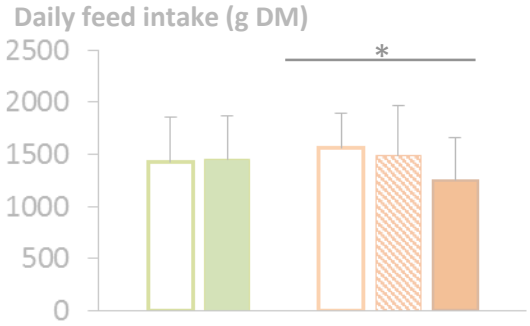
** : P < 0.05*

Number of meals



→ Increase of satiety

Daily feed intake and feeding behaviour



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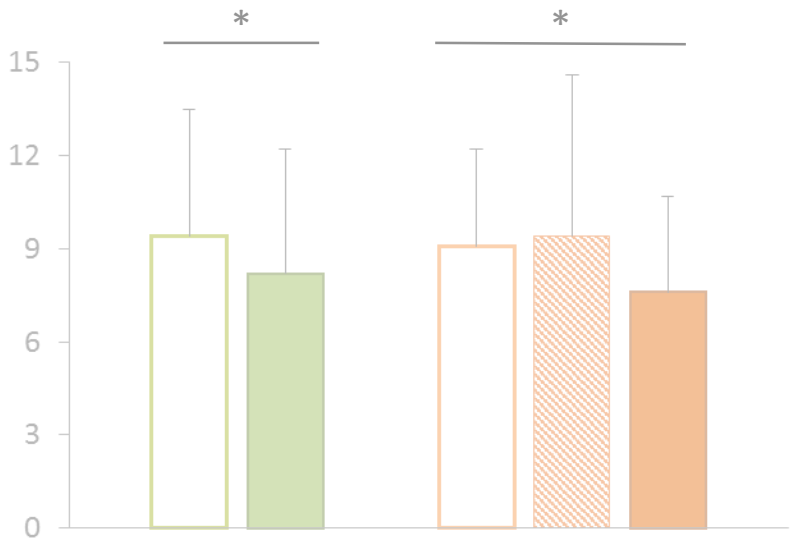
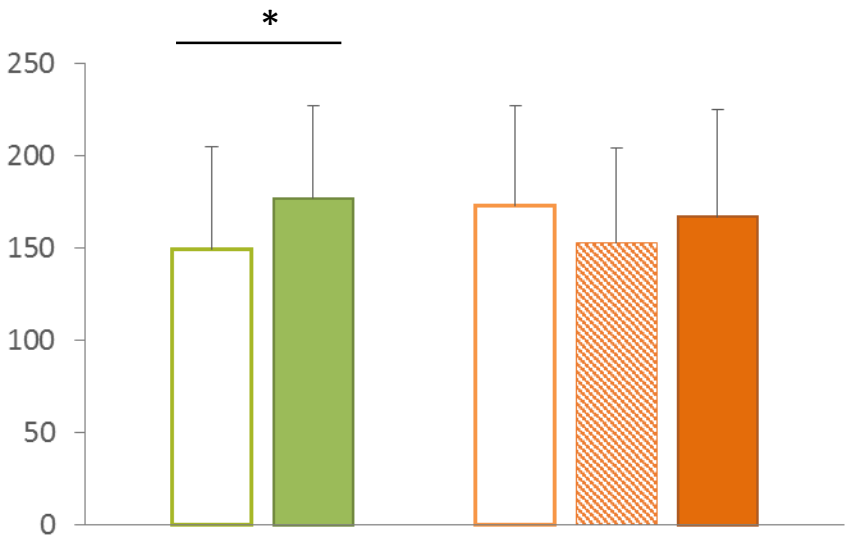


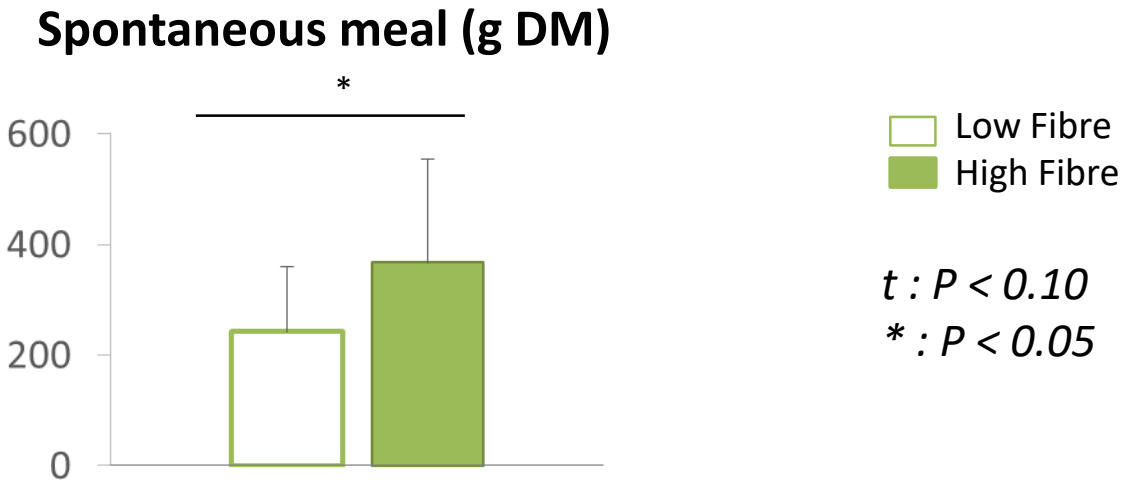
→ Increase of satiety

Meal size (g DM)



→ Delayed satiation Signals?

Dietary fibre and glycemic status



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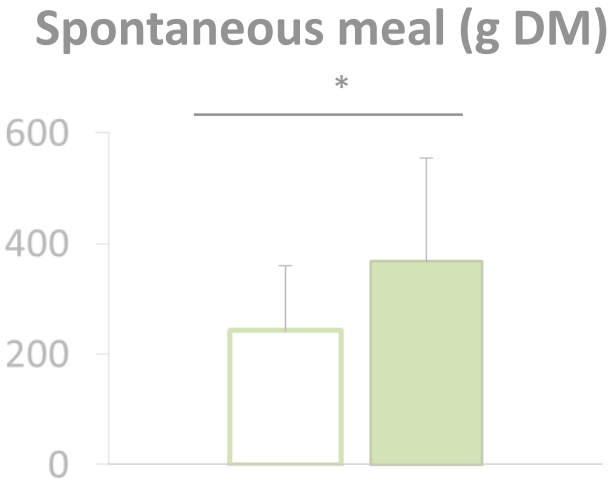
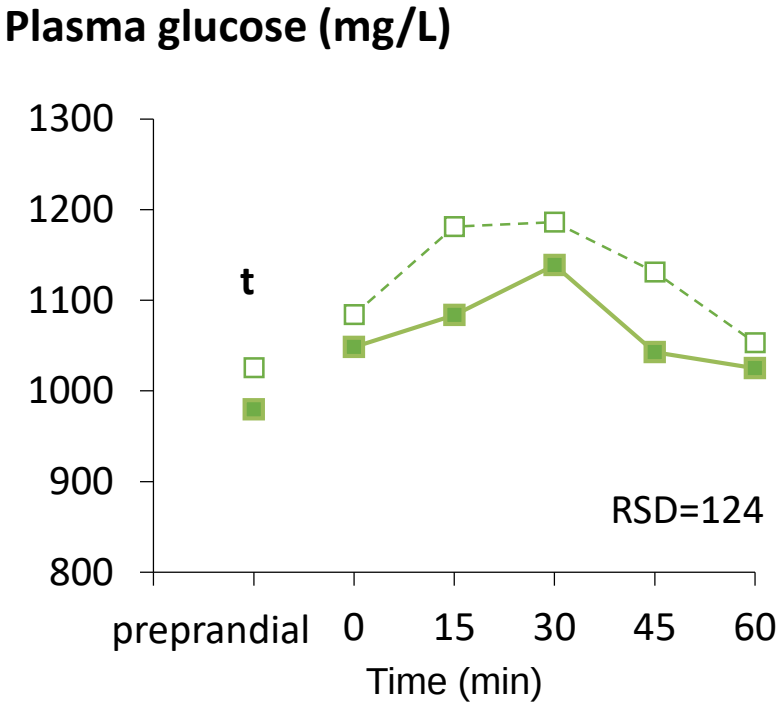
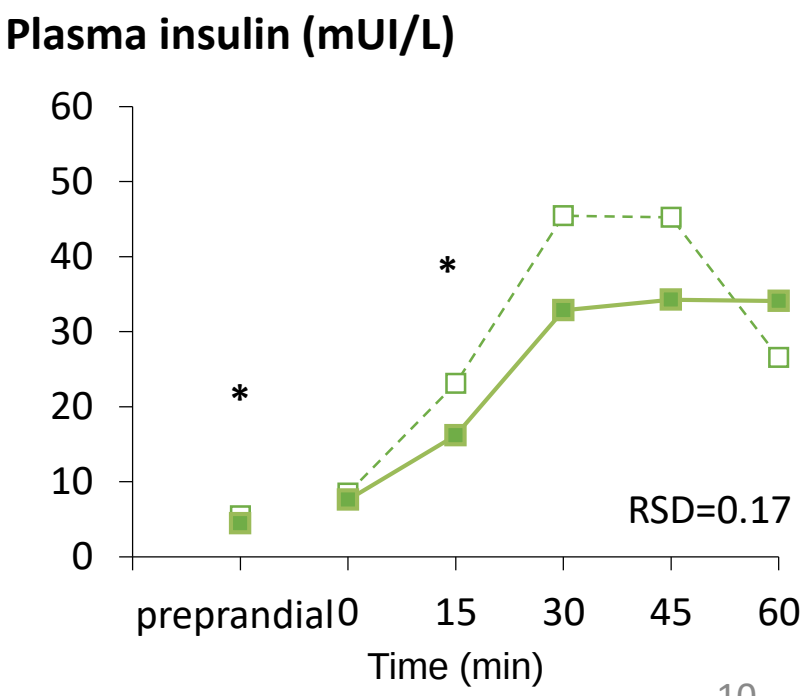
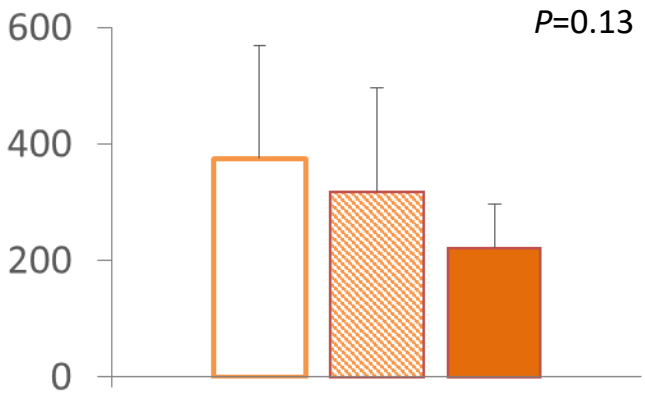






Aleurone and glycemic status

Spontaneous meal (g DM)



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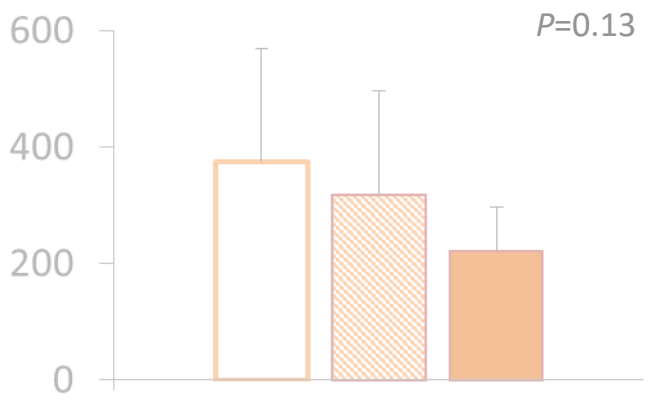
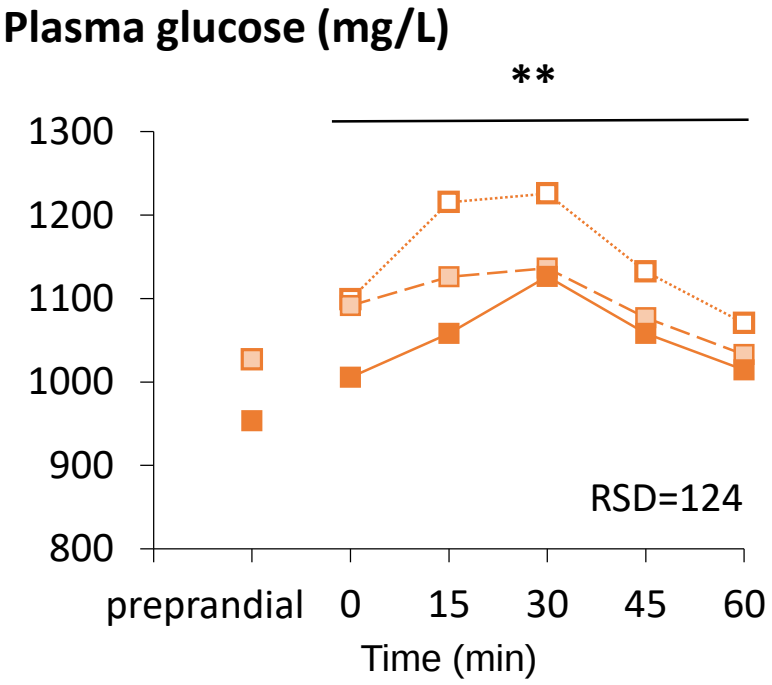
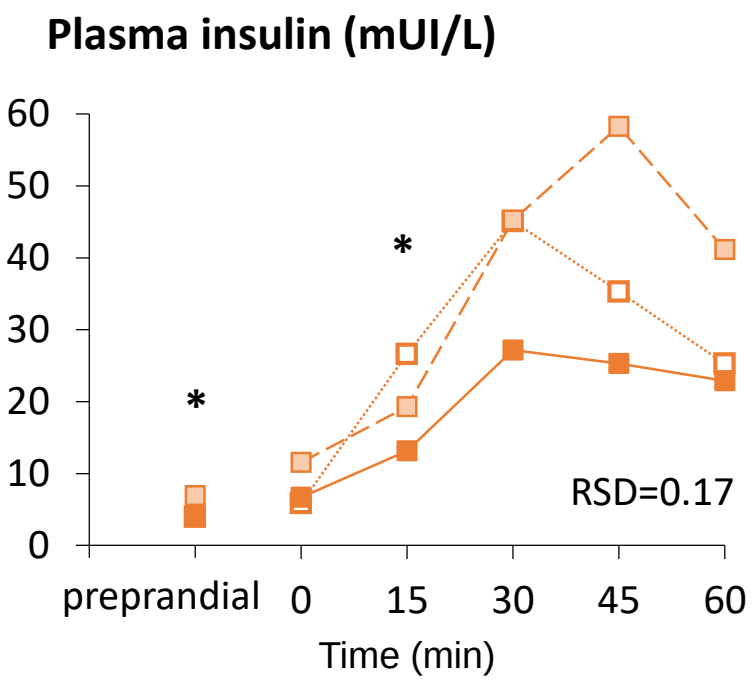
Aleurone and glycemic status







Feeding behaviour and glycaemia

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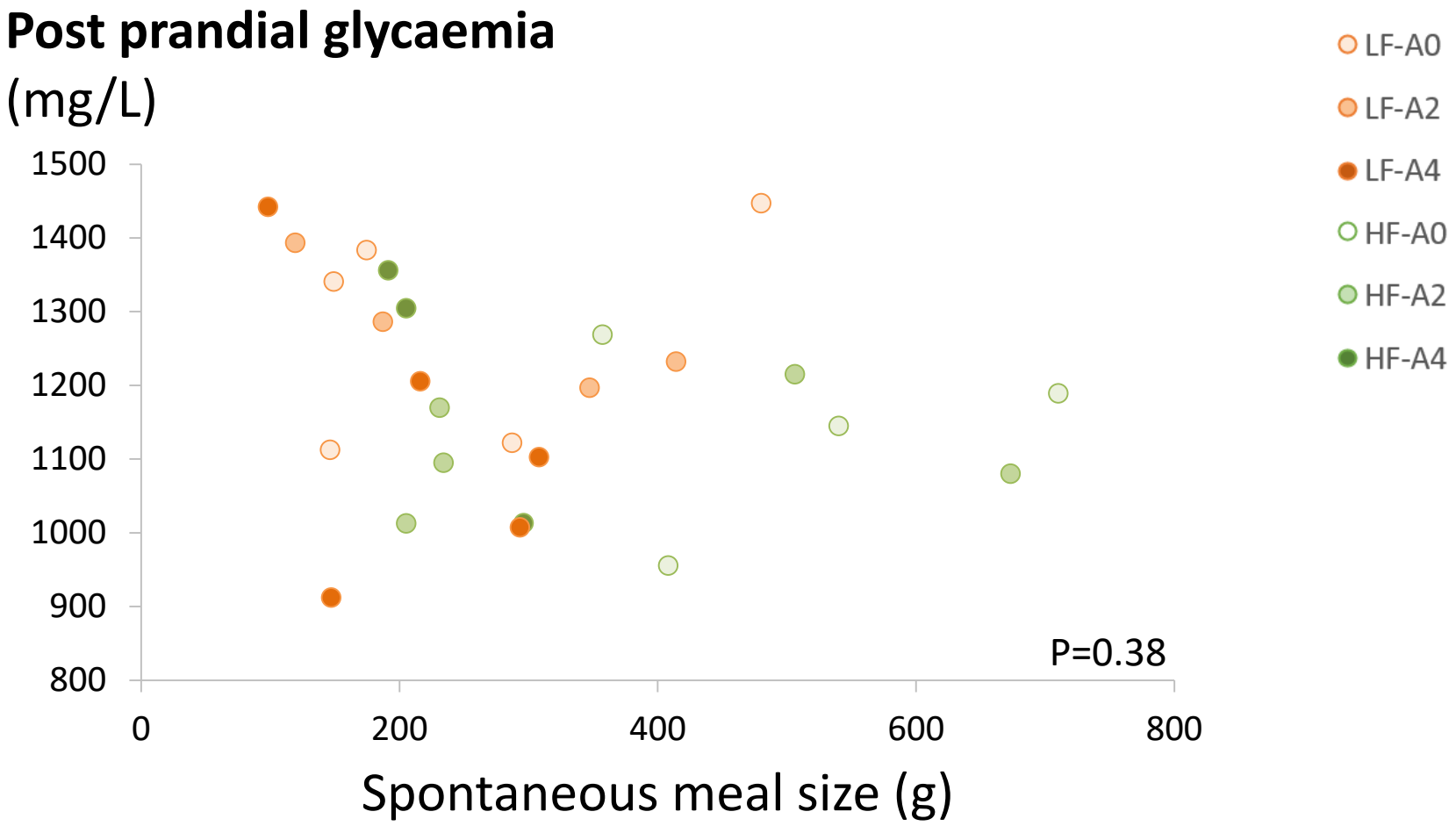

→ High variability of glycaemia peak

Conclusions and perspectives

- **Dietary fibre** reduced number of meals per days but increased their size

→ no impact on daily feed intake

- **Aleurone supplementation** (4 g/kg) decreased number of meals per days

→ reduction of daily feed intake

- **High variability between pigs** due to free access to feed

→ Variability of metabolic responses

→ Glycaemia variation

- **Multivariate analysis** to study individual variability

Thank you for your attention!