Effect of dietary energy level on performance and environmental sustainability in male pigs

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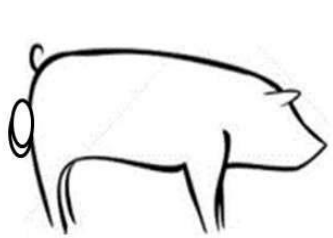
Sustainability in pork production with immunocastration

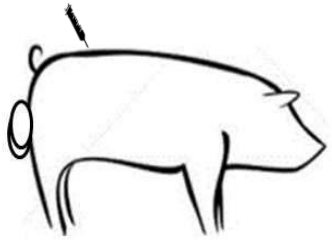
Background

Immunocastration (IC) can be used as alternative to surgical castration of piglets
It reduces boar taint and allows a more efficient growth in comparison with barrows

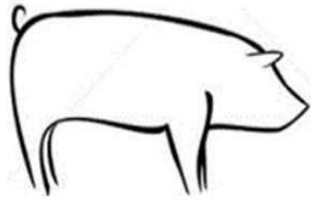
Knowledge about optimal **feeding strategies** for immunocastrates is still limited
ERA-net project SUSI aims to fill this knowledge gap



Entire males



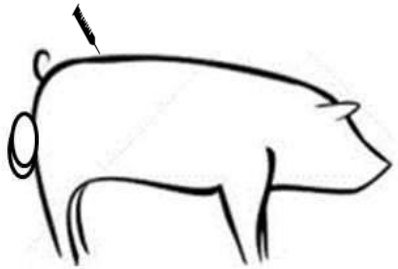
IC

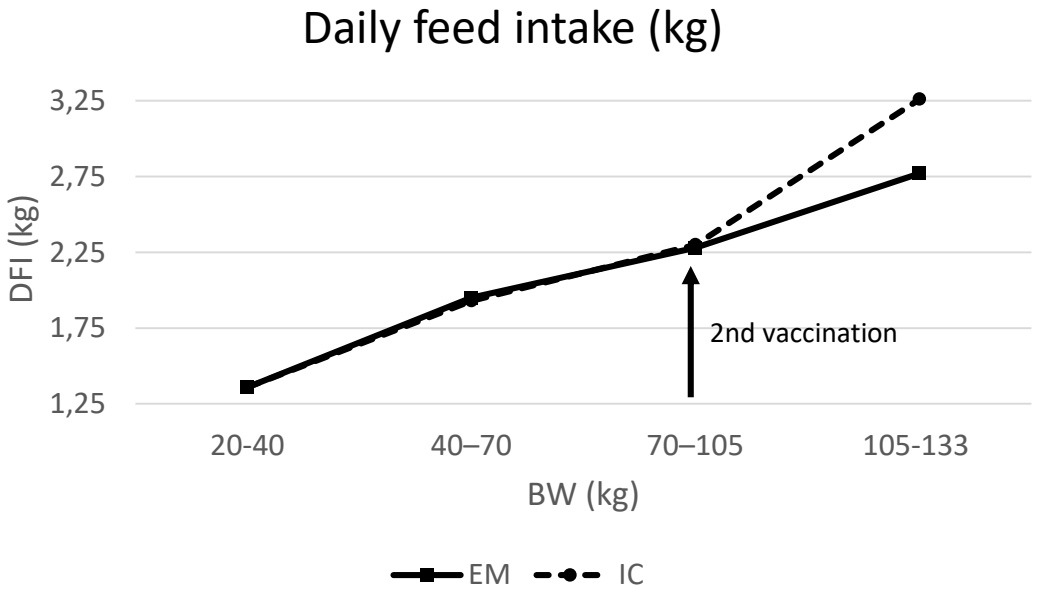


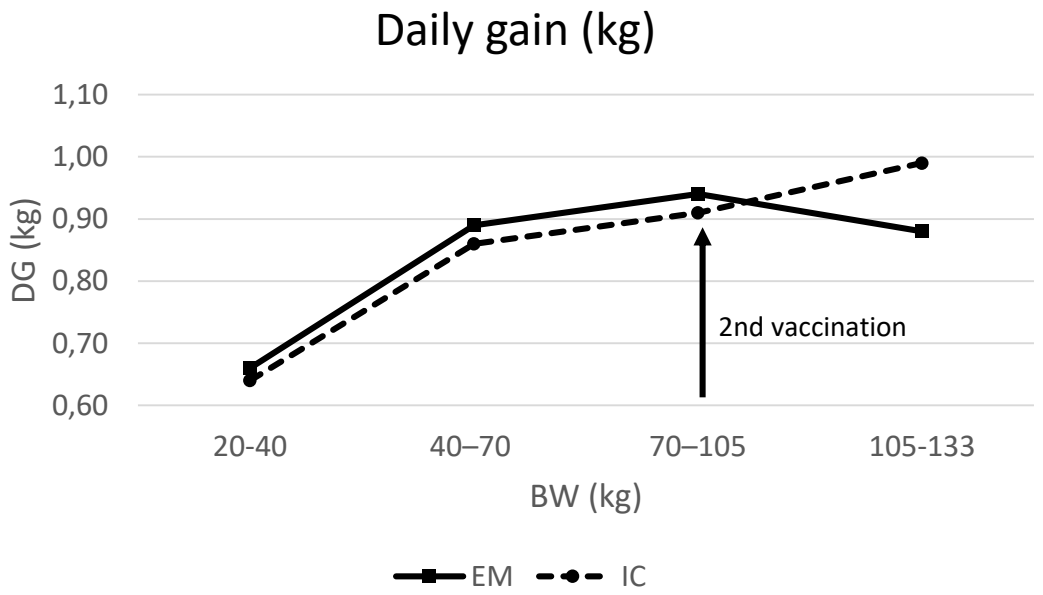
Barrows

Immunocastration

After the 2nd vaccination, voluntary feed intake **not limited** by feedback of negative sensory signals, resulting in an **increase** in feed intake and daily gain





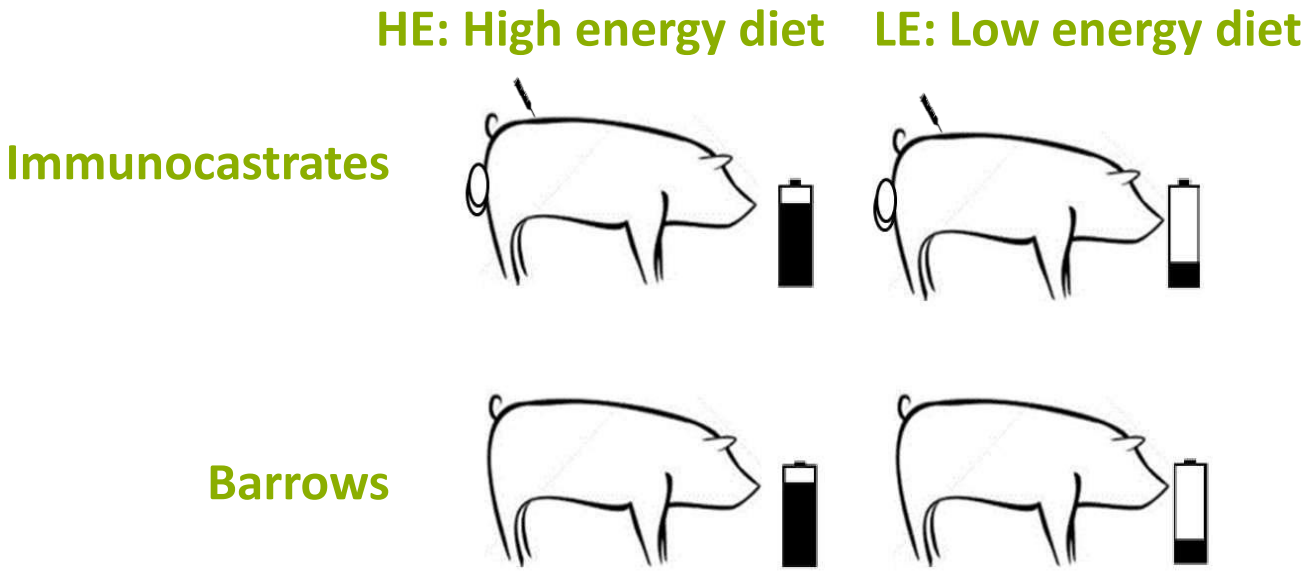


Van den Broeke et al. 2016 (JAS)

Aim trial

Evaluate the effect of a low (8.8 MJ/kg net energy, LE) versus a high energy (10.2 MJ/kg net energy, HE) diet on the performance and environmental sustainability of barrows (BA) and immunocastrates

Hypothesis:
IC: lower energy levels in IC feed after 2nd vaccination -> limits growth
BA: lower energy levels in IC feed 3rd phase-> higher feed intake for same growth



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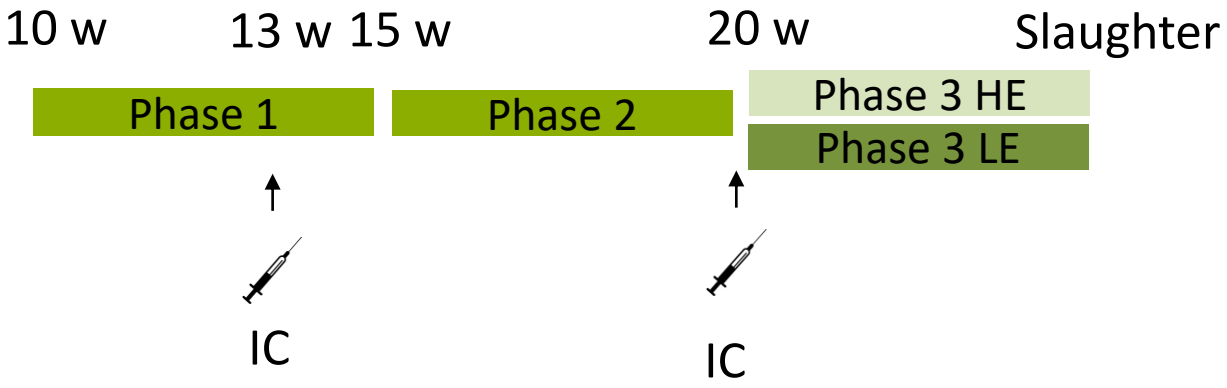
Experimental set up

- 2 X 2 trial
- 8 pens of 6 animals per treatment
- Genotype: Belgian Piétrain X Hybrid sow
- 3 phase feeding



Nutrient composition of the 3rd phase diets

	HE	LE
Dry matter (%)	89.3	89.7
Crude protein (%)	15.9	15.9
Crude fat (%)	5.1	2.0
Crude fibre (%)	4.2	6.1
Crude ash (%)	5.2	5.7
Net energy (MJ/kg)	10.2	8.8

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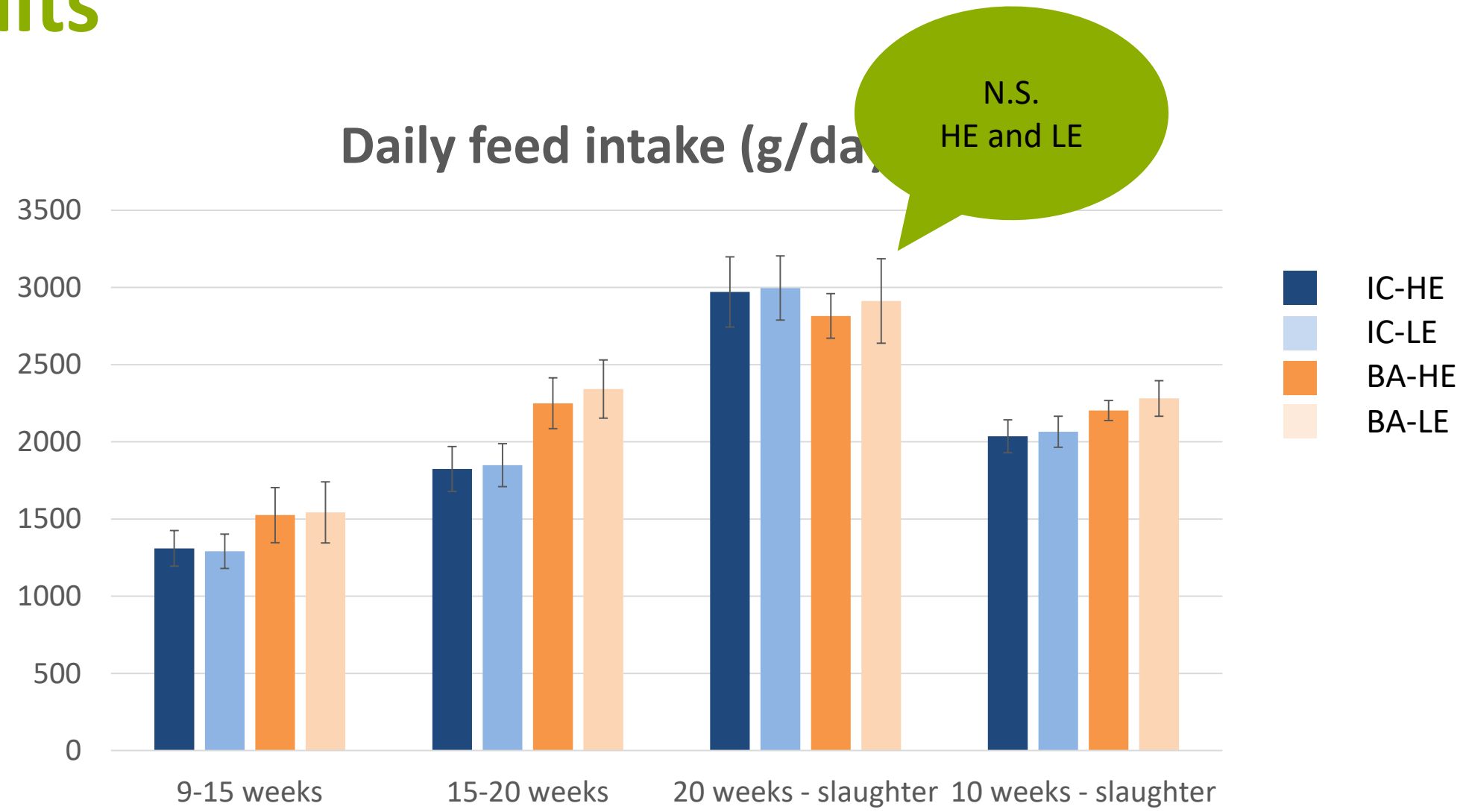
Results



[a,b,A,B]: values with no common superscript, differ significantly from each other within the same sex

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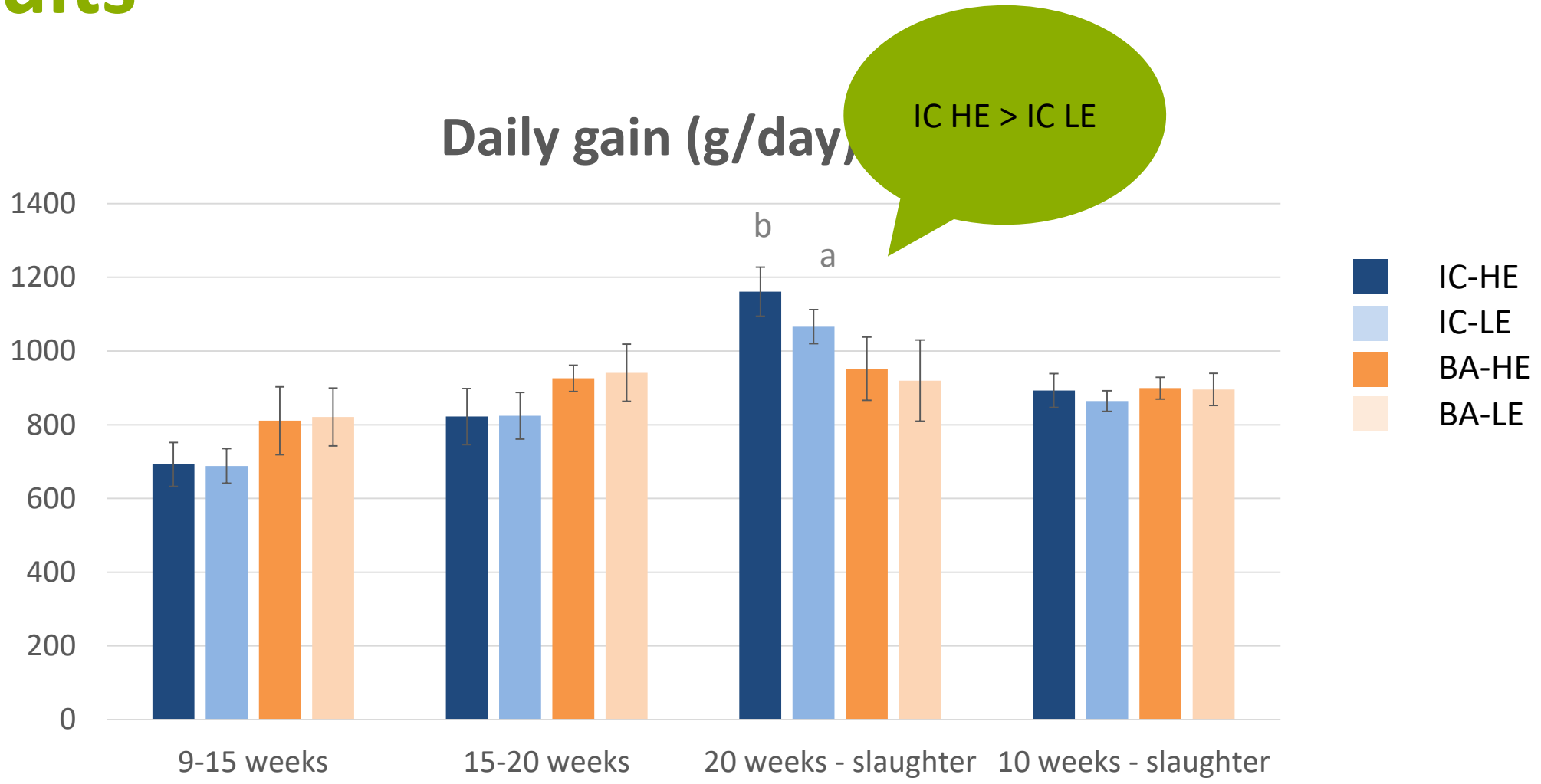
Results



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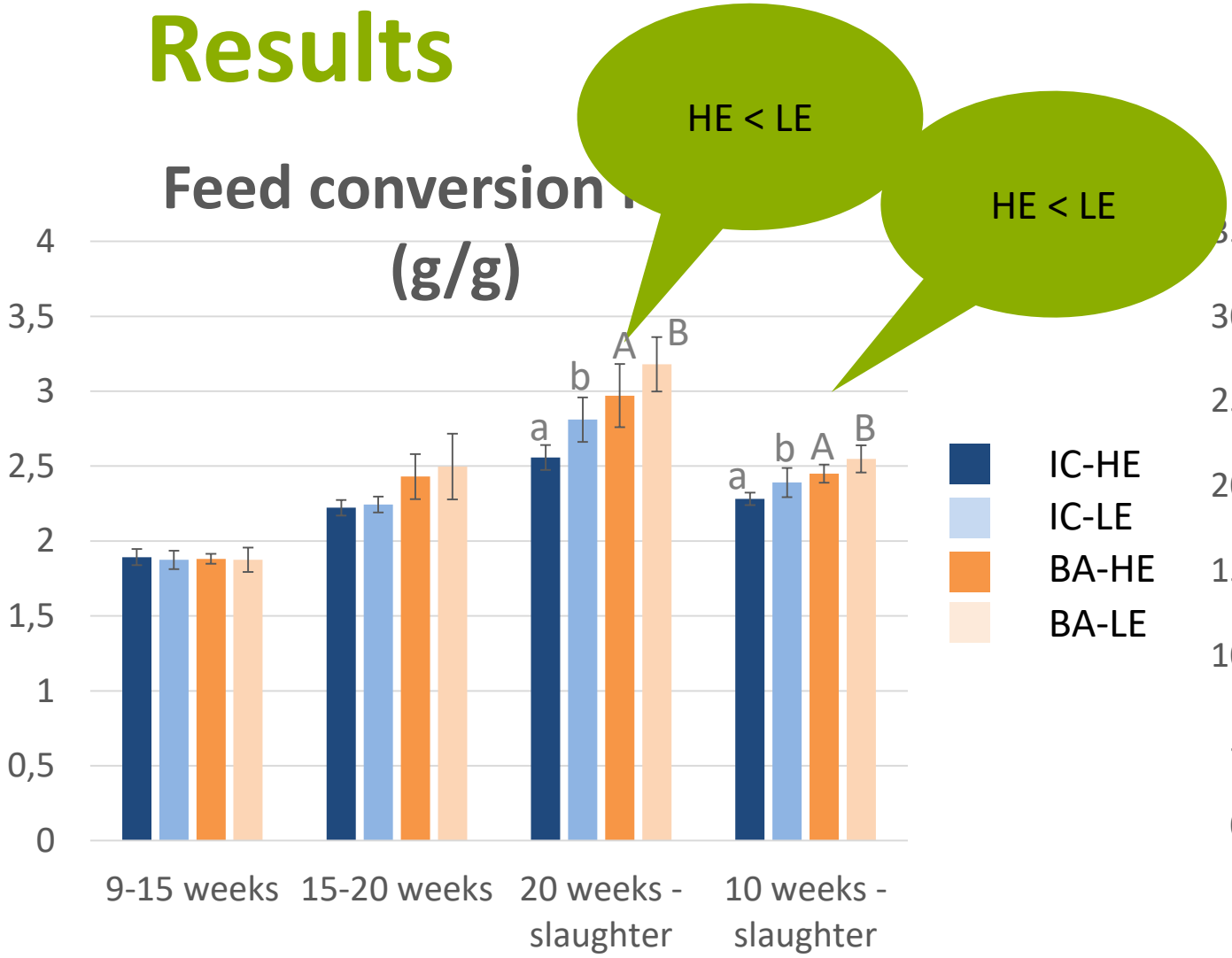
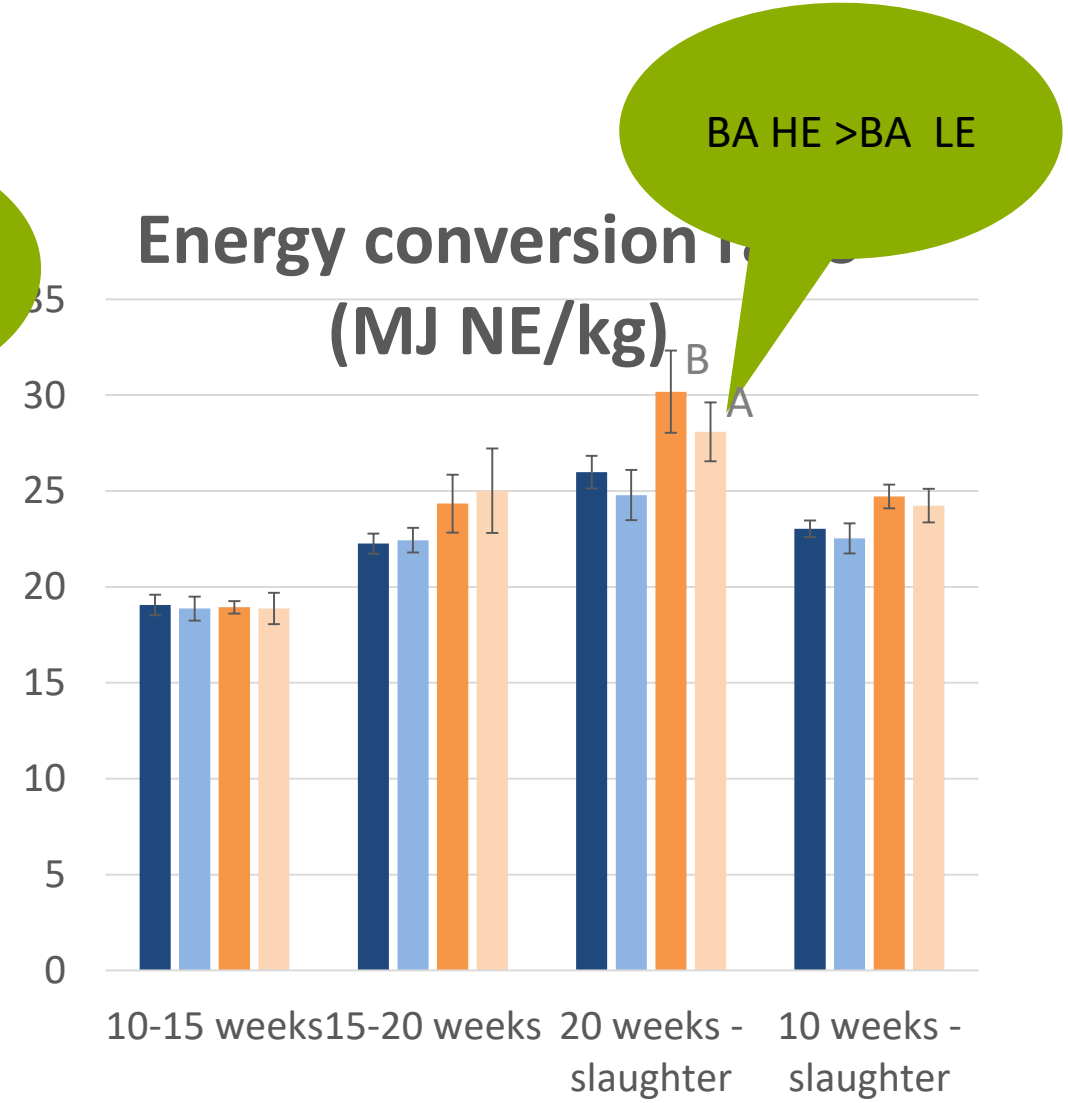
Results





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Results

Carcass quality

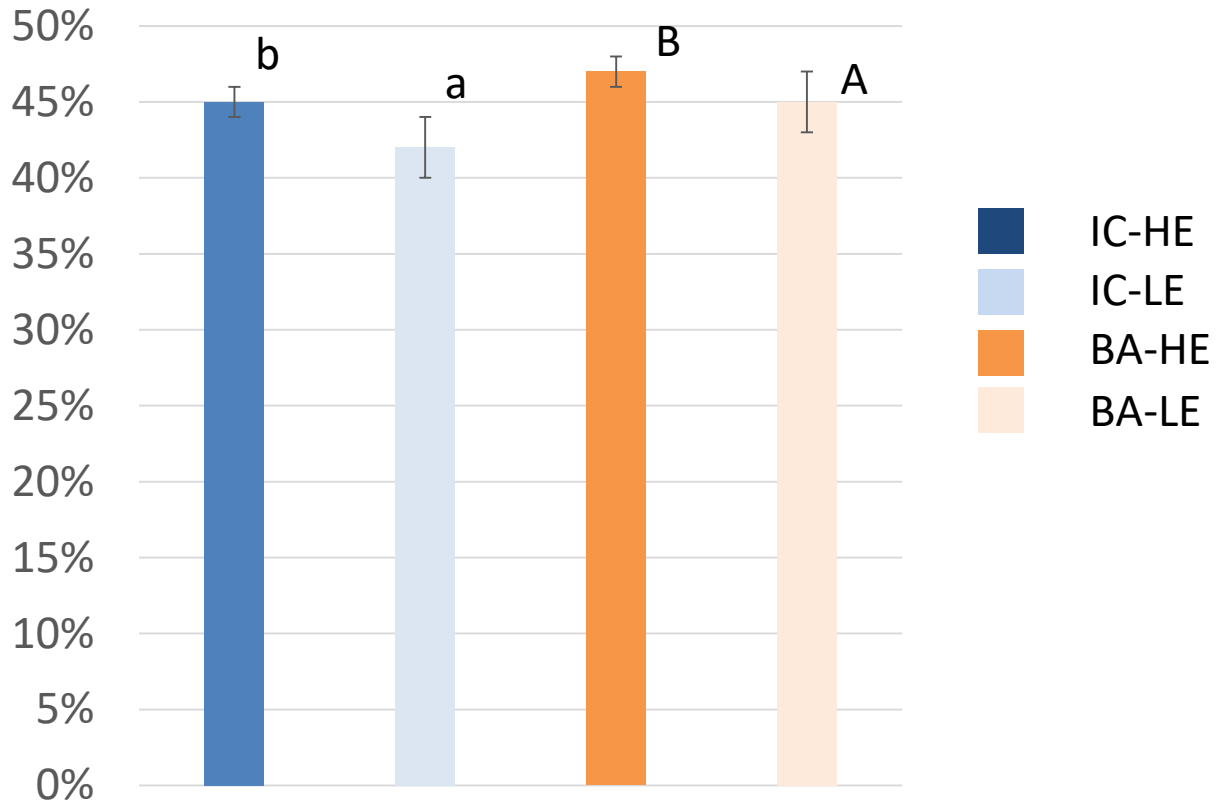
	IC		BA	
	HE	LE	HE	LE
Lean meat percentage (%)	**63^{A}**	**64^{B}**	60	61
Ham thickness (mm)	**16^{A}**	**14^{B}**	20	19
Muscle thickness (mm)	63	60	66	65
Fat thickness (mm)	**9^{A}**	**8^{B}**	**11^{a}**	**10^{b}**
Loin (kg/100 kg cold carcass)	17,9	17,7	18,2	18,1
Shoulder (kg/100 kg cold carcass)	13,6	13,7	13,6	13,6
Belly (kg/100 kg cold carcass)	**10,1^{A}**	**9,9^{B}**	10,4	10,3
Ham (kg/100 kg cold carcass)	25,3	25,4	25,1	25,1

^{a,b,A,B}: values with no common superscript, differ significantly from each other within the same sex

Results

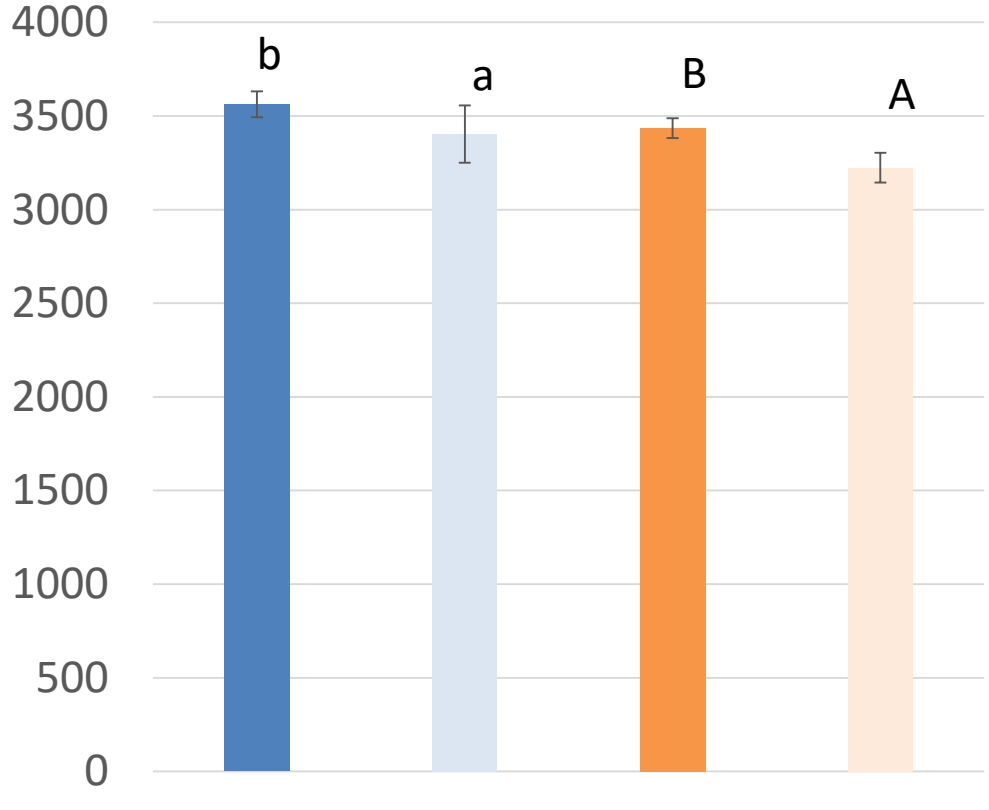
HE > LE

N efficiency (%)



HE > LE

CFP per kg carcass gain (CO_2 eq./kg)



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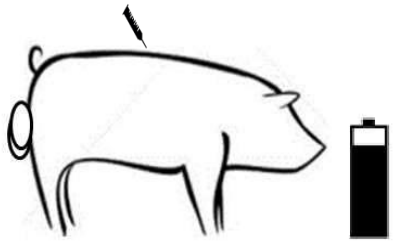
Conclusions

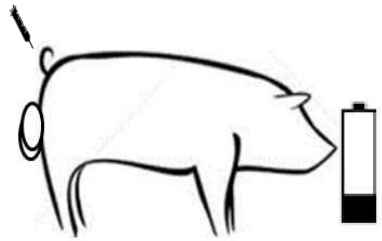
HE: High energy diet

LE: Low energy diet

Immunocastrates

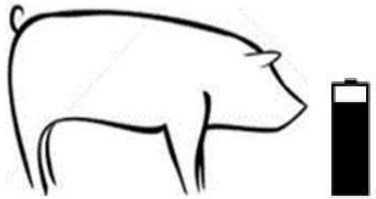


- ✚ Daily gain ↑, FCR ↓
- ✚ Nitrogen efficiency ↑

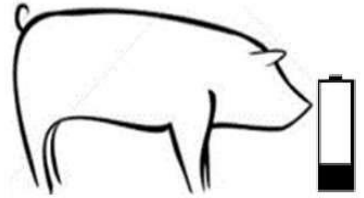


- ✚ CFP per kg carcass gain ↓
- ✚ LMP ↑, Ham and fat thickness ↓

Barrows



- ✚ FCR ↓
- ✚ Nitrogen efficiency ↑



- ✚ Fat thickness ↓
- ✚ CFP per kg carcass gain ↓

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Thank you

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	HE	LE
Barley (%)	20	20
Wheat (%)	33	34
Corn (%)	15	5
Soybean meal (%)	15	8
Wheat middlings (%)	0	5
Sunflower meal (%)	3	5
Sugarbeet molasses (%)	4	4
Mixed fat (%)	3	0
Palm kernel expeller (%)	1	2
Sugarbeet pulp (%)	1	6
Rapeseed meal (%)	1	6
Celite (%)	1	1
Premix (%)	1	1
Limestone (%)	1	1
Salt (%)	0,4	0,4
Phytase (%)	0,01	0,01
Methionin (%)	0,03	0,02
Valin (%)	0,02	0,01
Lysine (%)	0,26	0,34
Threonin (%)	0,06	0,08