

Effect of replacing soybean meal with alternative proteins in growing-finisher diets on performance, carcass characteristics, and life cycle assessment

L.V. Lagos, X. Guan, F. Molist

Background



In the EU, the interest in SBM-free diets has increased for sustainability and circularity purposes



Nearly 90% of SB production is concentrated outside Europe
→ the EU largely relies on imported SBM



Several alternative protein sources are available in the EU
→ peas, sunflower meal (SFM), rapeseed meal (RSM)



Attractive CP content and AA profile, but with nutritional limitations → antinutritional factors (ANF)



Can SBM be totally replaced by alternative proteins in the entire growing-finishing period of pigs?

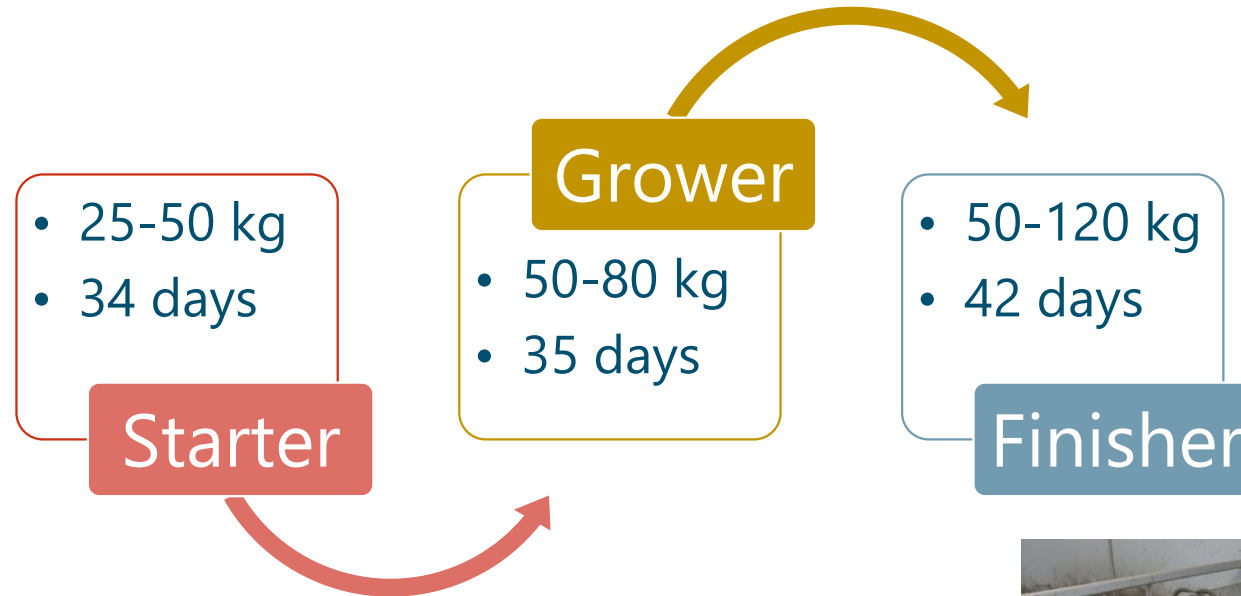
Objective



Hypothesis

Replacing SBM with alternative EU protein sources (peas, SFM, RSM) in growing-finisher diets does not affect growth performance or carcass characteristics and reduces the environmental impact

Materials and Methods



120 pigs (23.4 ± 1.87 kg)

RCBD¹ (2 diets & 3 rounds)

6 replicate pens per diet

10 pigs per pen (5♂ - 5♀)



¹ Randomised complete block design

Dietary treatments

Ingredient composition

Ingredient content, %	Starter		Grower		Finisher	
	Control	SBM-free	Control	SBM-free	Control	SBM-free
Wheat	30.17	27.92	30.00	37.00	20.00	20.00
Barley	20.00	10.00	16.00	15.00	20.00	15.00
Maize	12.00	16.29	17.39	5.00	25.96	28.51
Wheat middling's	11.97	-	17.00	6.65	20.00	4.49
Soybean meal (48% CP)	16.00	-	12.08	-	8.17	-
Sunflower meal (38% CP)	-	16.00	-	9.52	-	10.53
Rapeseed meal 00	-	9.12	-	12.50	-	11.00
Peas (<22%)	-	10.00	-	6.18	-	5.00
Soybean oil	2.90	3.31	0.37	0.60	0.30	0.52
Palm oil	-	-	1.65	2.48	0.39	0.22
Limestone	0.59	0.40	0.35	0.12	0.34	0.06
Monocalcium phosphate	0.43	0.42	0.34	0.34	-	-
Lys HCl (79%)	0.37	0.32	0.34	0.38	0.32	0.30
Met L/DL (99%)	0.13	0.07	0.07	0.02	0.05	-
Thr L (98%)	0.16	0.16	0.14	0.11	0.13	0.06
Lys HCl (79%) + Trp L (98%) ¹	0.28	1.01	-	-	-	-
Val L (96.5%)	0.11	0.20	-	-	-	-

¹ Ratio 18:5

Dietary treatments

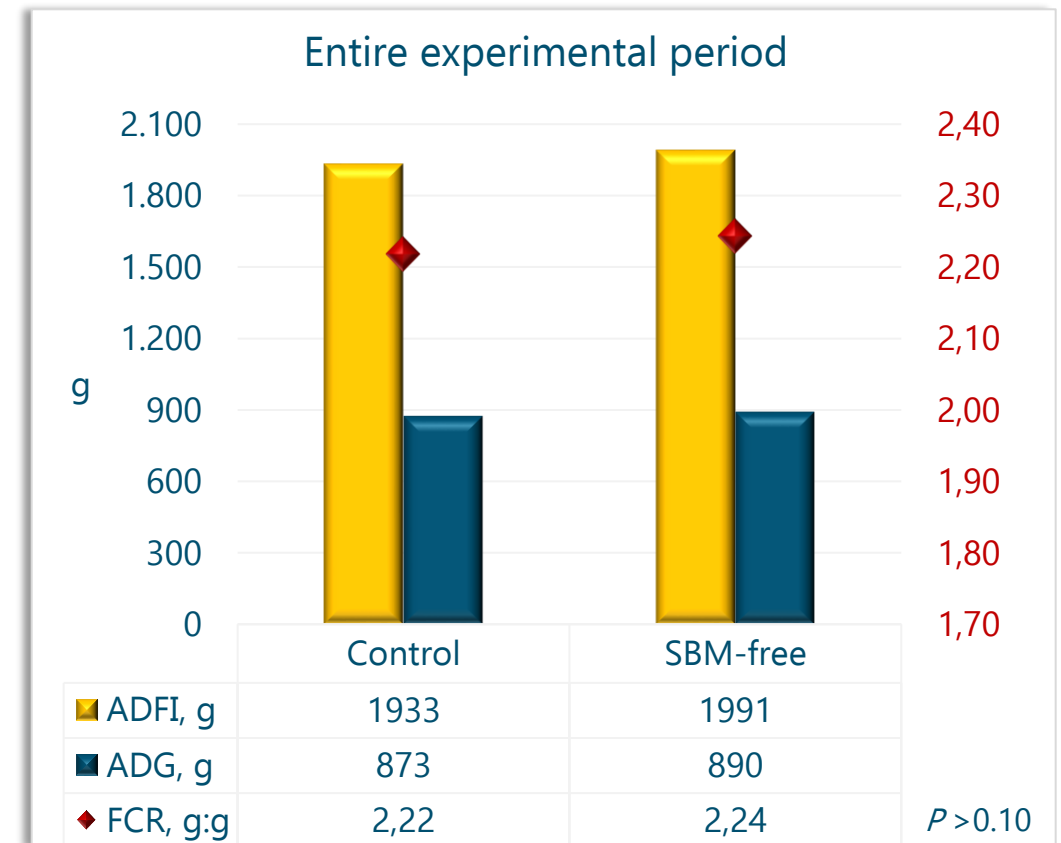
Nutrient composition

Nutrient content, g/kg	Starter		Grower		Finisher	
	Control	SBM-free	Control	SBM-free	Control	SBM-free
Moisture	129	125	132	129	133	130
Ash	44	44	37	38	35	36
CProtein	165	172	151	164	136	155
CFat (AH)	55	59	48	57	37	38
CFibre	33	54	35	54	37	52
Starch (AM)	379	359	401	363	422	403
NE (MJ)	9.98	9.98	9.80	9.80	9.52	9.52
SID Lys	9.87	9.87	8.27	8.27	7.19	7.19
SID Met/SID Lys	0.35	0.34	0.34	0.33	0.33	0.34
SID M+C/SID Lys	0.60	0.60	0.62	0.64	0.62	0.68
SID Thr/SID Lys	0.64	0.64	0.68	0.68	0.69	0.69
SID Trp/SID Lys	0.19	0.21	0.19	0.19	0.19	0.19
SID Val/SID Lys	0.66	0.66	0.71	0.74	0.73	0.81
STTD P	2.90	2.90	1.95	1.95	1.45	1.45
Ca	6.50	6.50	4.84	4.84	4.70	4.70
fCHO	115	116	115	118	115	117
iCHO	72	85	79	94	86	88
fCHO/iCHO	1.60	1.36	1.46	1.26	1.34	1.33

Results

Growth performance

Item	Control	SBM-free	SEM	<i>P</i> -value
BW, kg/pig				
End Starter	51.0	50.9	0.24	0.64
End Grower	81.2 ^a	83.3 ^b	0.48	0.03
End Finisher	120.1	121.6	0.69	0.19
Days to slaughter				
ADFI, g/pig				
ADG, g/pig				
FCR, g/g				



Results

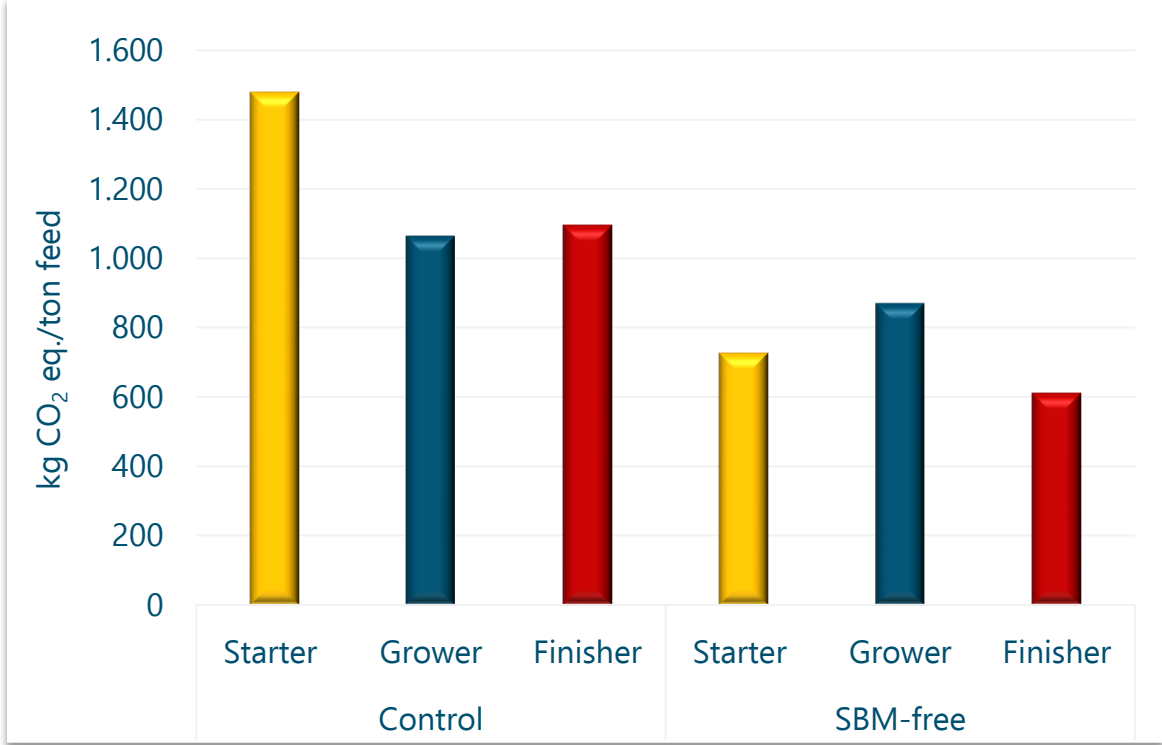
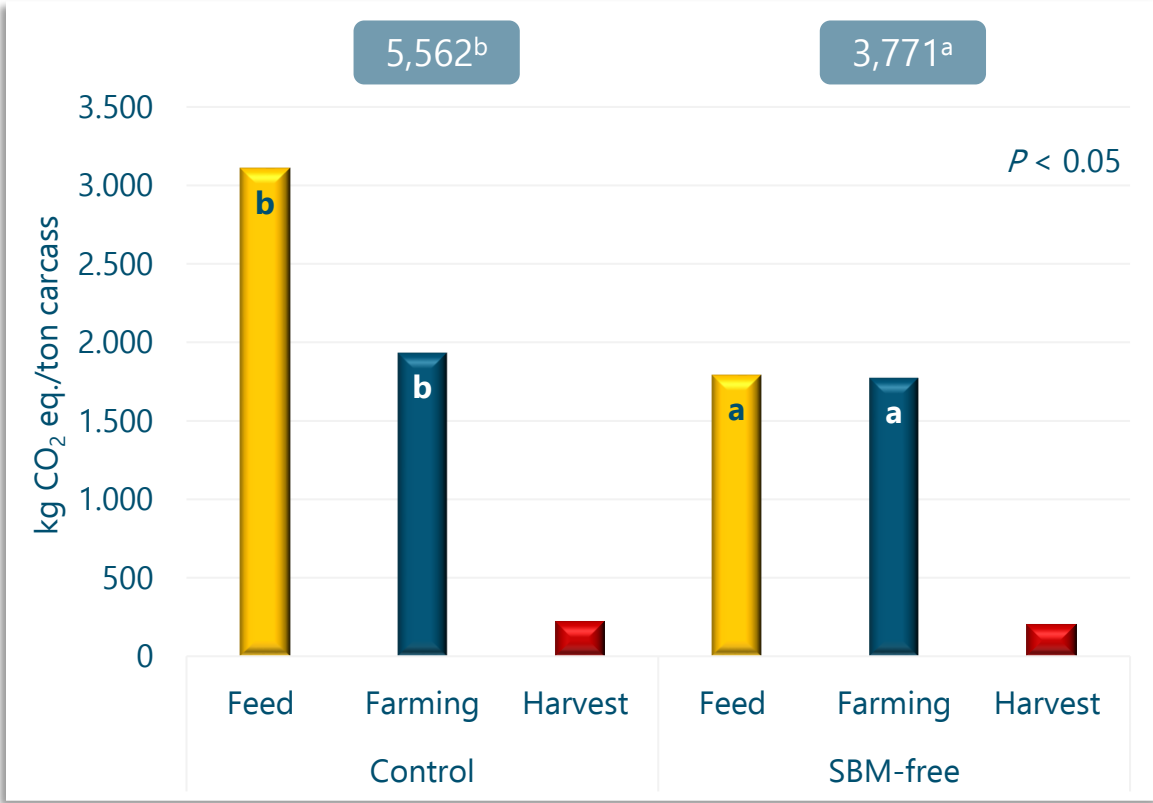
Carcass characteristics

Item	Treatment		SEM	<i>P</i> -value
	Control	SBM-free		
Carcass weight, kg	93.8	93.3	0.18	0.17
Dressing percentage	77.6	77.3	0.11	0.13
Lean meat percentage	60.1	59.5	0.29	0.24
Muscle depth, mm	66.5	65.2	0.58	0.19
Back fat thickness, mm	12.4	13.3	0.46	0.26

Final BW as covariate

Results

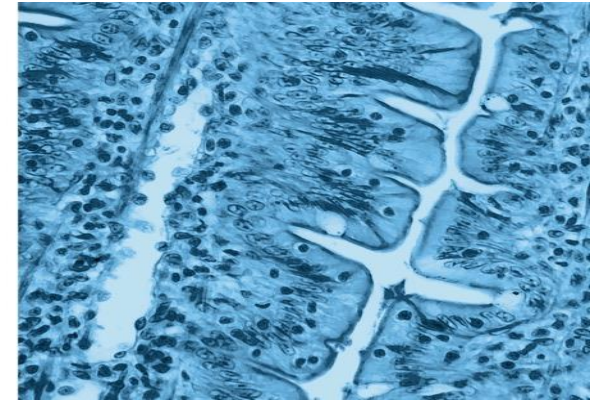
LCA – climate change



Conclusion

Sunflower meal, rapeseed meal, and peas are good alternative sources for SBM in growing-finishing pig diets as growth performance and carcass traits are not compromised, but the environmental impact of the production is considerably reduced





Thank you for your attention

VLagos@schothorst.nl