

# Lysine restriction during finishing phase affects growth performance, carcass characteristics and meat quality of heavy pigs

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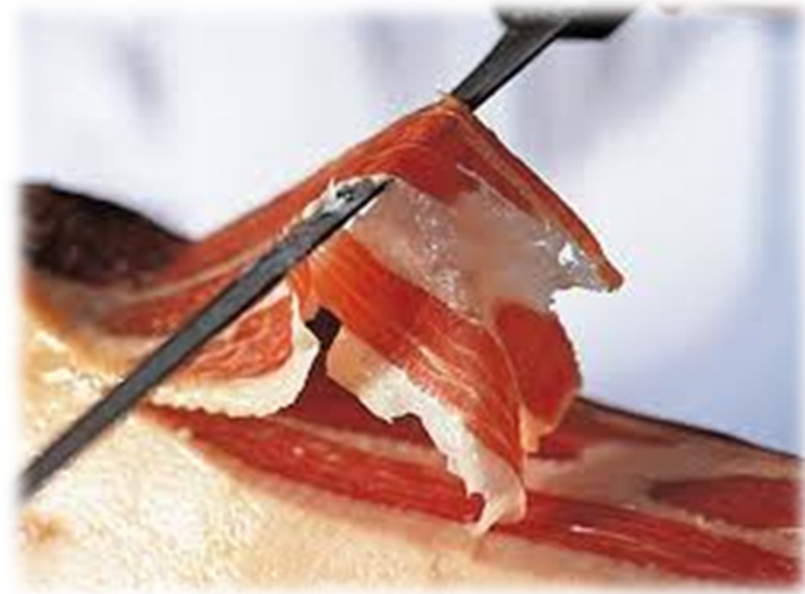
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## Importance of dry-cured products in Spain

A 20% of pigs is intended for dry-cured products and its economical value reach around 15%

Dry-cured ham is the most important one (5 PDO)



## Requirements for Dry-cured ham production

### Genetic breed

Iberian, Duroc and fatty lines



Slaughter weight > 100 kg of body weight

Nutrition (ingredients and nutrients)

↑ Fattiness in carcass and in meat



## Current situation

A high lean deposition → Higher needs of protein

Lower fatness at finisher phase





**The effect of lysine restriction in finisher phase, after slight restriction during grower phase, on performance, carcass characteristics and meat quality of heavy pigs**

## Experimental Conditions



- **Animals: 160 Duroc x (Landrace x Large White) pigs**
  - ½ Barrows y ½ Gilts
  - Beginning:  $28.3 \pm 4.52$  kg BW (blocks by sex and BW)
  - Final:  $129.2 \pm 2.61$  kg BW
- **Diets:**
  - A common diet during grower period (30 to 90 kg BW)  
3.26 Mcal ME/kg and 0.78 % SID Lys
  - Four diets during finisher period (90 to 130 kg BW):  
3.10 Mcal ME/kg, SID Lys: 0.63, 0.56, 0.42 and 0.32 %
- **Five replicates (5 Barrows and 5 Gilts) of 4 animals/treatment**



## Experimental Feeds: ingredients

%	Grower diet	Finisher diets			
		0.63	0.56	0.42	0.32
Barley	16.7	30	30	30	30
Wheat	22	20	20	20	20
Corn	24	21.0	26.8	32.6	38.4
Soybean meal 44%CP	22.6	17.4	11.6	5.8	-
Rapeseed meal	3.0	9.3	9.3	9.3	9.3
Blended fat	3.0	0.5	0.5	0.5	0.5
Macrominerals	2.37	1.46	1.46	1.46	1.46
Vitamin-mineral premix <sup>1</sup>	0.3	0.3	0.3	0.3	0.3

<sup>1</sup>Provided the following (per kilogram of complete diet): 7,000 IU Vitamin A; 1,300 IU Vitamin D<sup>3</sup>; 10 IU Vitamin E; 0.4 mg Vitamin K<sup>3</sup>; 0.8 mg Vitamin B<sup>1</sup>; 3 mg Vitamin B<sup>2</sup>; 1 mg Vitamin B<sup>6</sup>; 15 µg Vitamin B<sup>12</sup>; 12 mg nicotinic acid; 8 mg calcium pantothenate; 10 mg choline chloride; 1 µg Biotine; 15 mg Cu (copper sulfate); 80 mg Fe (ferrous carbonate); 35 mg Mn (manganese sulphate); 80 mg Zn (zinc oxide); 0.1 mg Co (cobalt carbonate); 0.3 mg Se (sodium selenite); and 0.3 mg I (potassium iodate).





## Experimental Feeds: nutrients

	Grower diet	Finisher diets			
		0.63	0.56	0.42	0.32
ME, Kcal/kg	3260	3100	3100	3100	3100
Crude Protein, %	19.3	19.2	16.6	14.3	11.9
NDF, %	11.1	14.0	14.0	13.8	13.7
Ether Extract, %	4.15	4.29	4.49	4.70	4.91
Starch, %	36.8	39.2	47.3	52.2	54.2
SID lysine, %	0.78	0.63	0.56	0.42	0.32

## Productive measures

### ➤ Productive traits

- Average daily gain (ADG, g/kg)
- Average daily feed intake (ADFI, g/kg)
- Feed conversion ratio (FCR, g/g)



## Carcass Characteristics

- **Carcass weight and yield**
- **Carcass size**
  - Carcass length
  - Ham length
  - Ham circumference
- **Yield of main trimmed lean cuts**  
(ham, shoulder and loin)
- **Fat thickness at last 3<sup>rd</sup>-4<sup>th</sup> ribs and GM**



# Meat Quality

- **Color: Cie L\*a\*b\***
- **Chemical composition**
  - Moisture
  - Protein
  - Intramuscular fat
- **Warner Bratzler shear force**



## Statistical Analyze

**Statistical package: SAS v 9.2 (2002)**

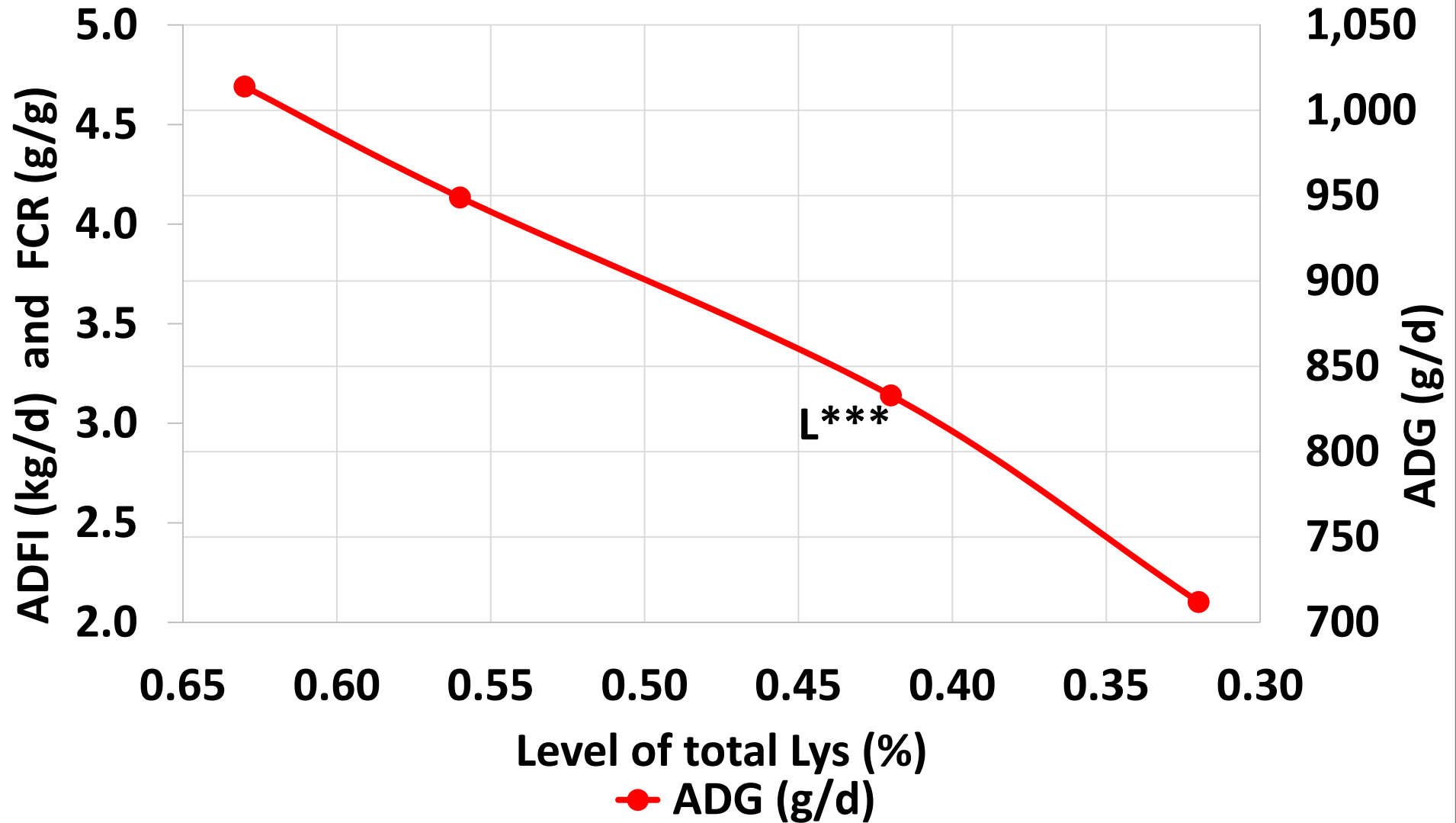


➤ **Factorial model 2 (sexes) x 4 (diets in base on Lys content)**

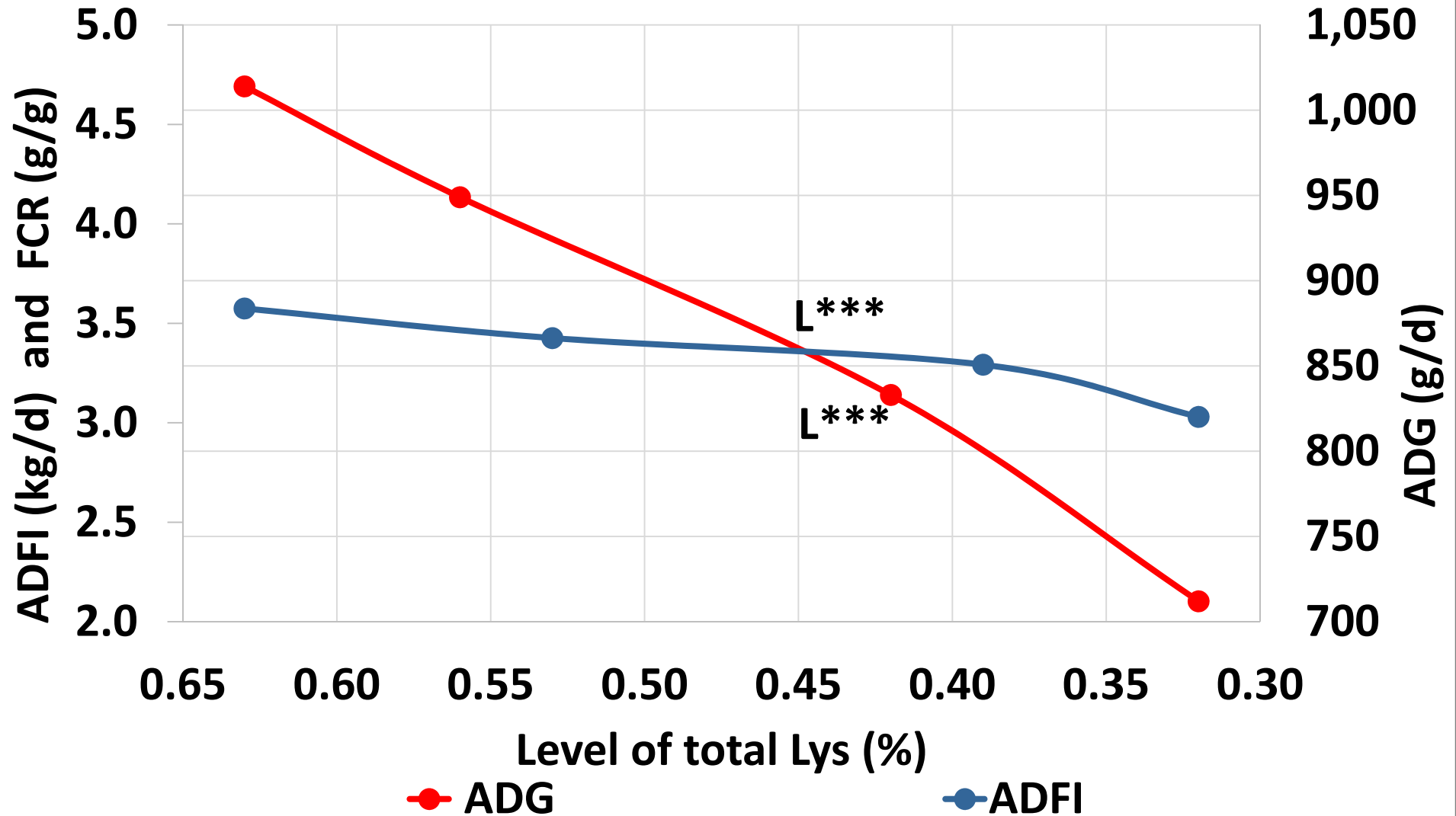
➤ **Procedure GLM**



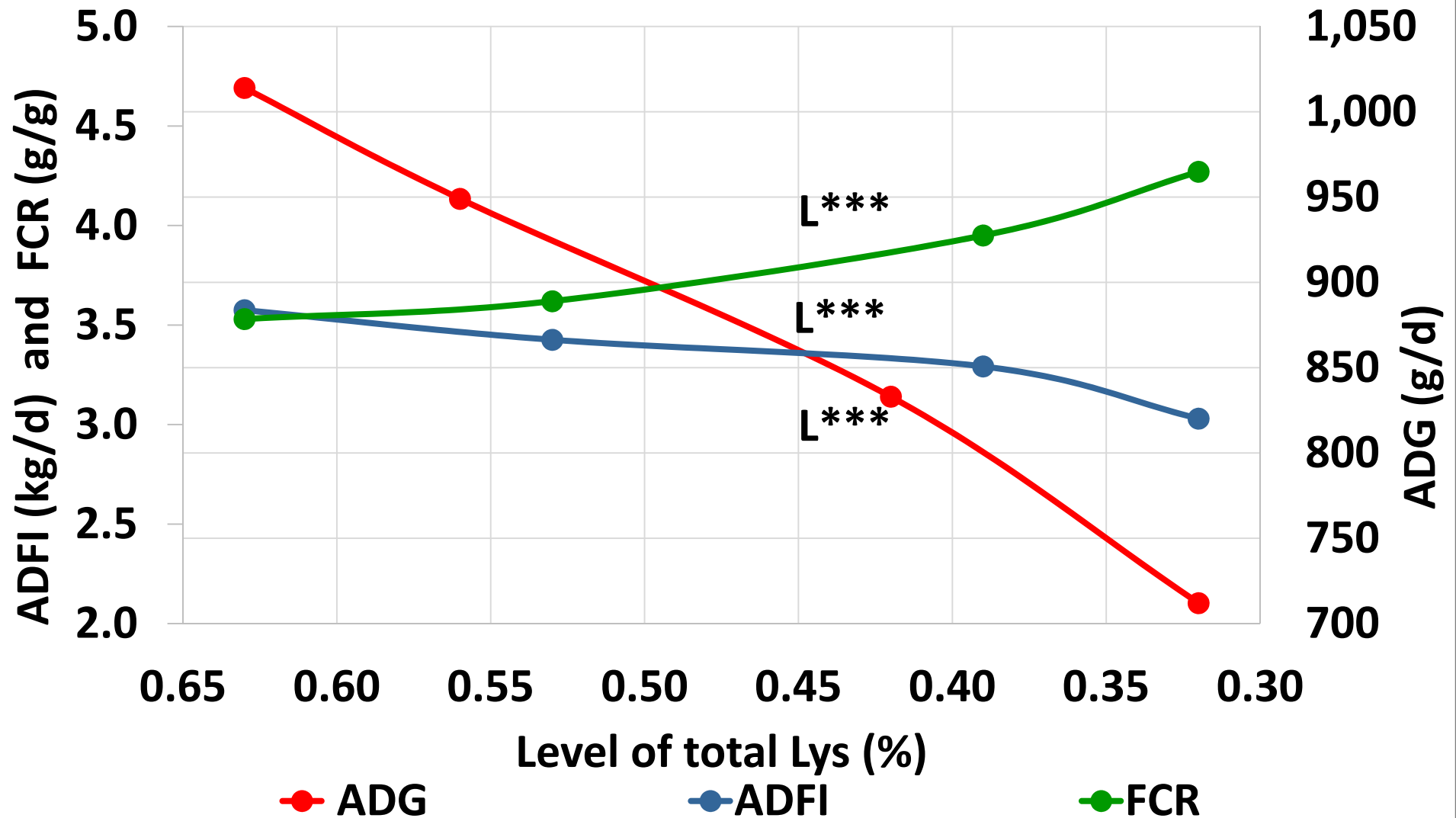
## Productive parameters of finisher phase



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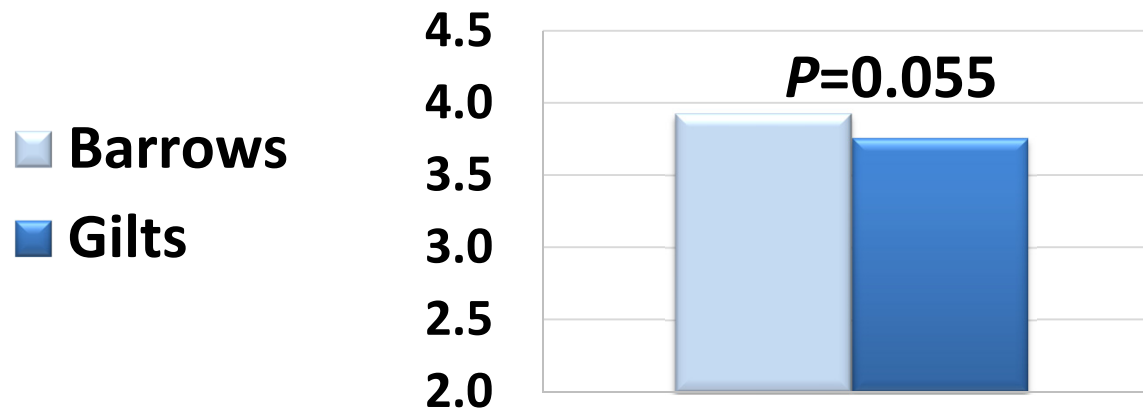
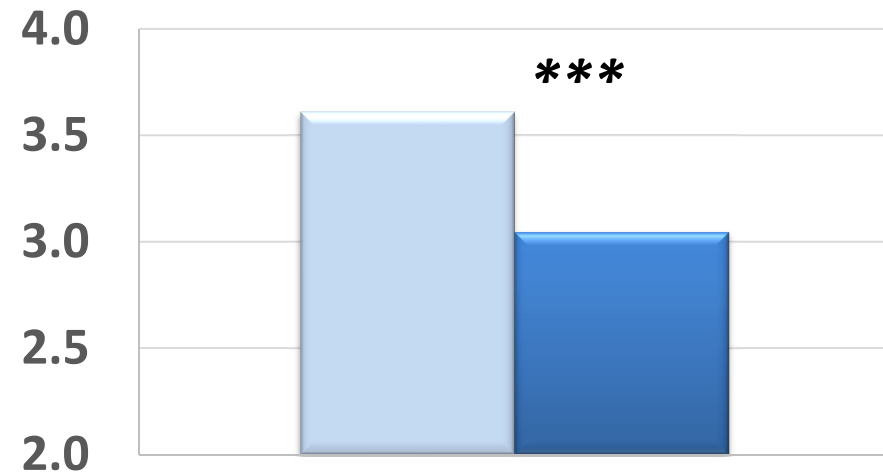
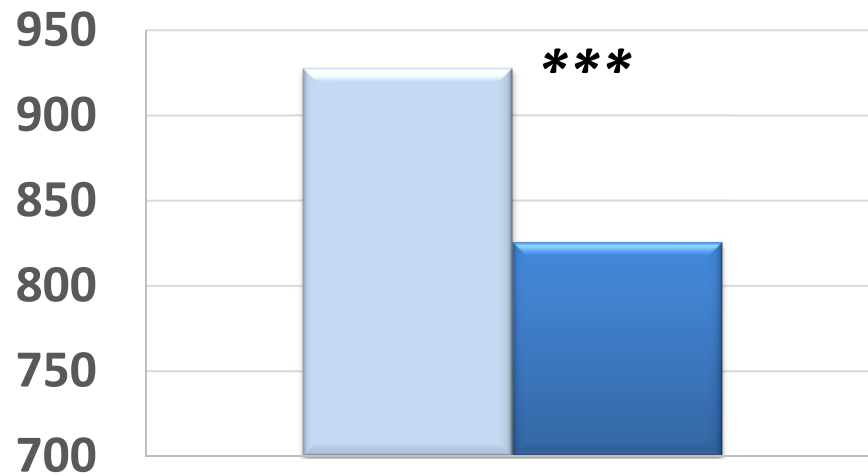


## Productive parameters of finisher phase





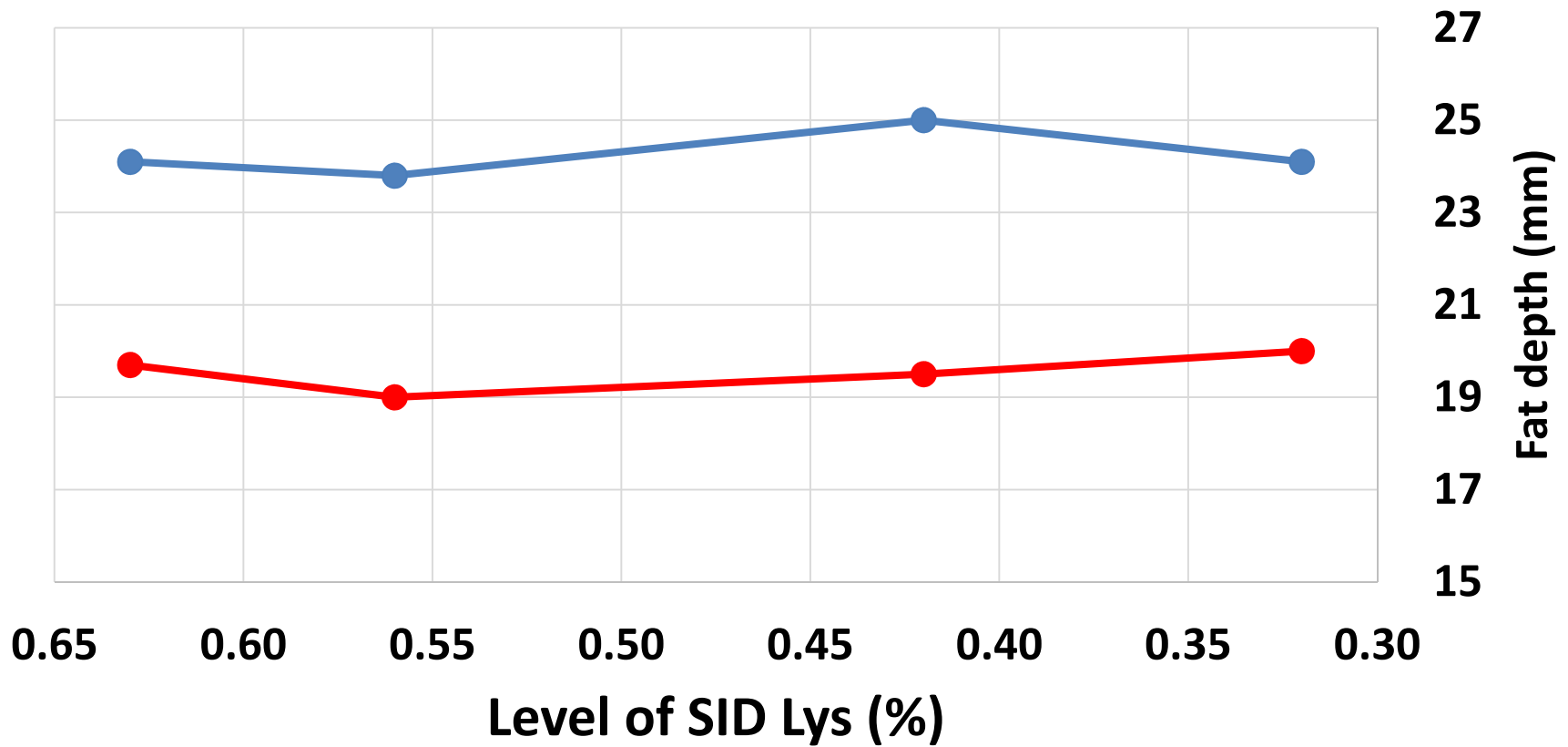
## Productive parameters



■ Barrows

■ Gilts

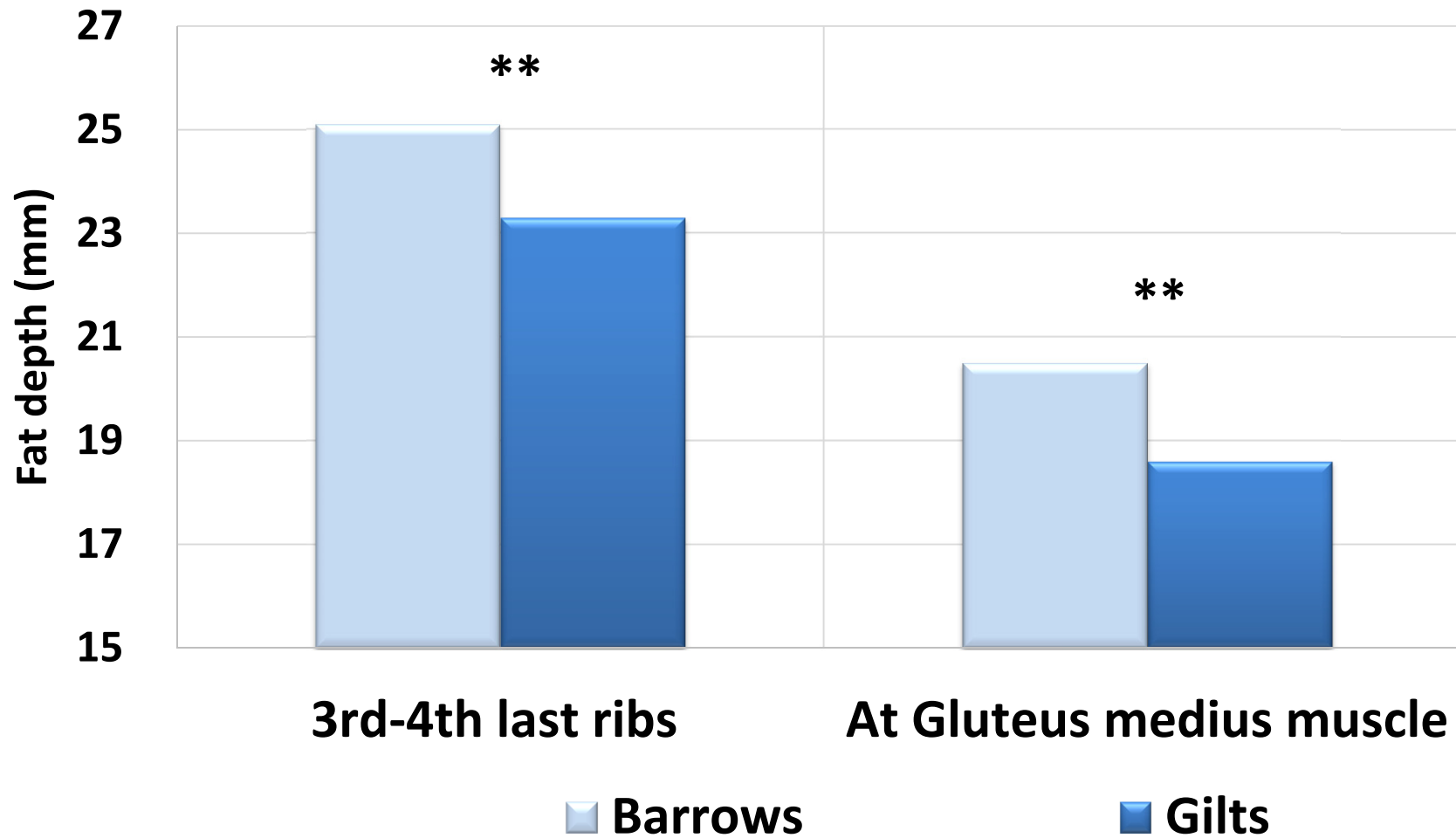
# Backfat thickness (mm)



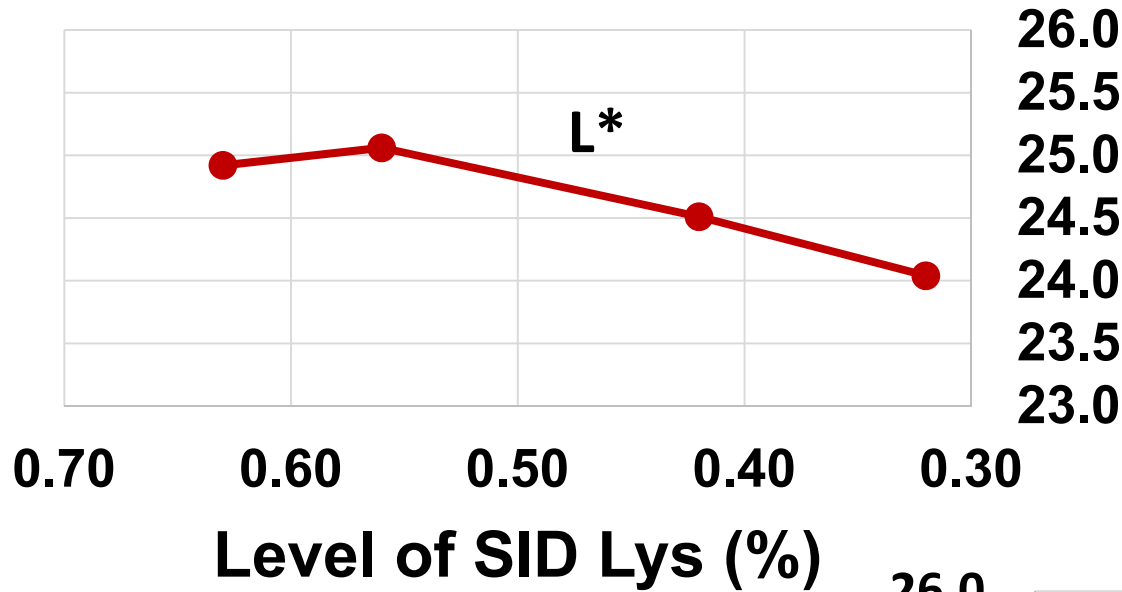
● 3rd-4th last ribs

● At Gluteus medius muscle

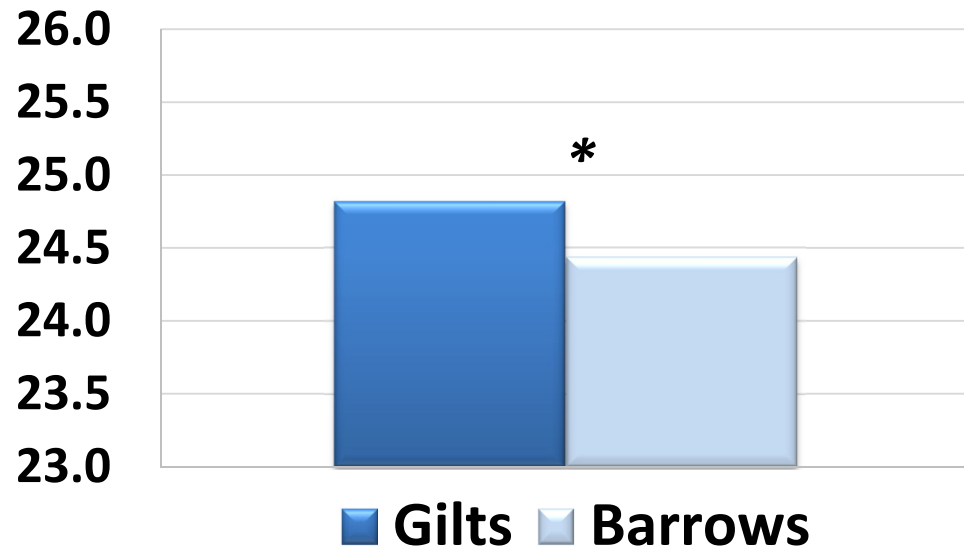
## Backfat thickness (mm)



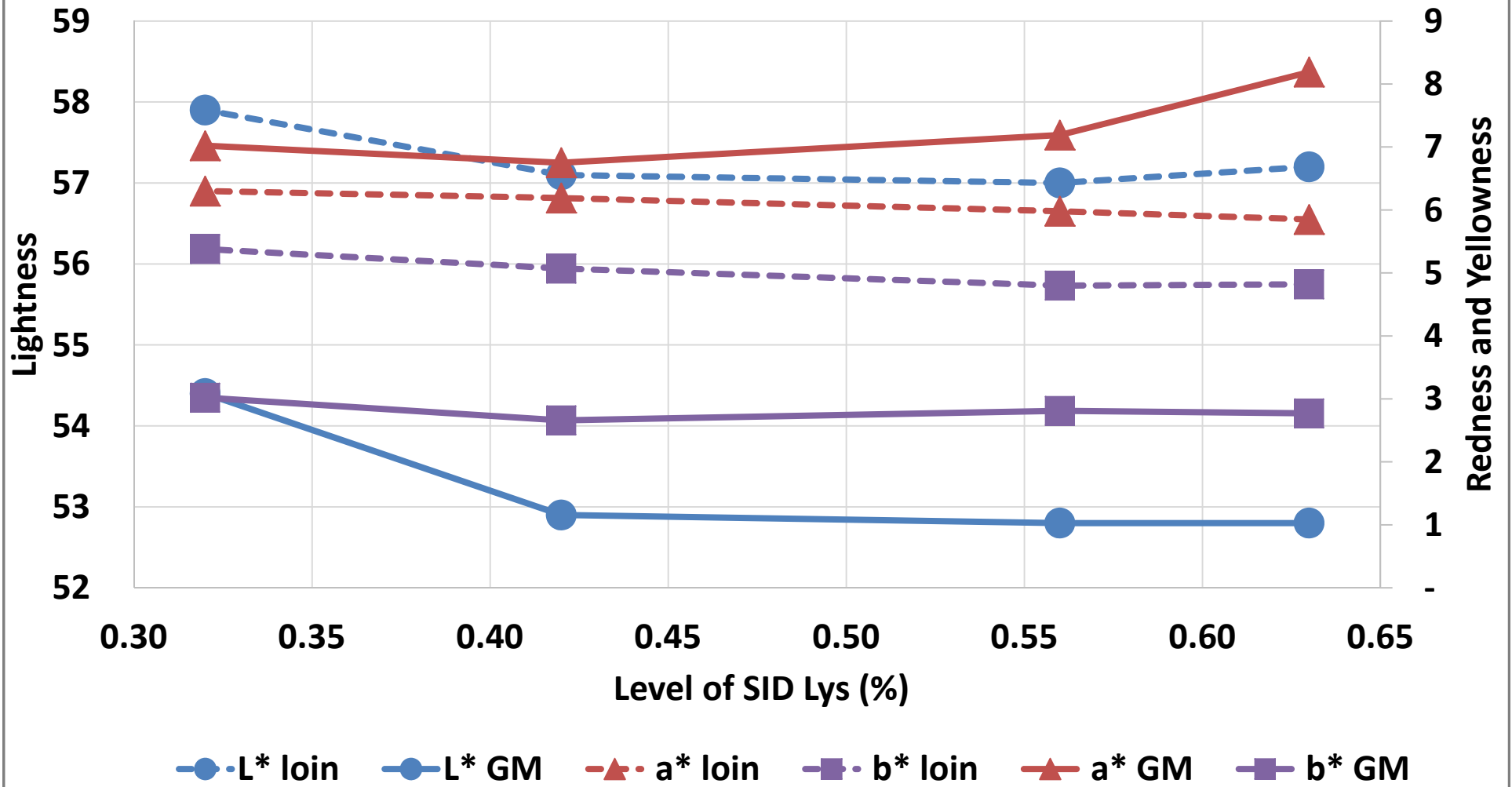
# Main trimmed lean cuts (kg)



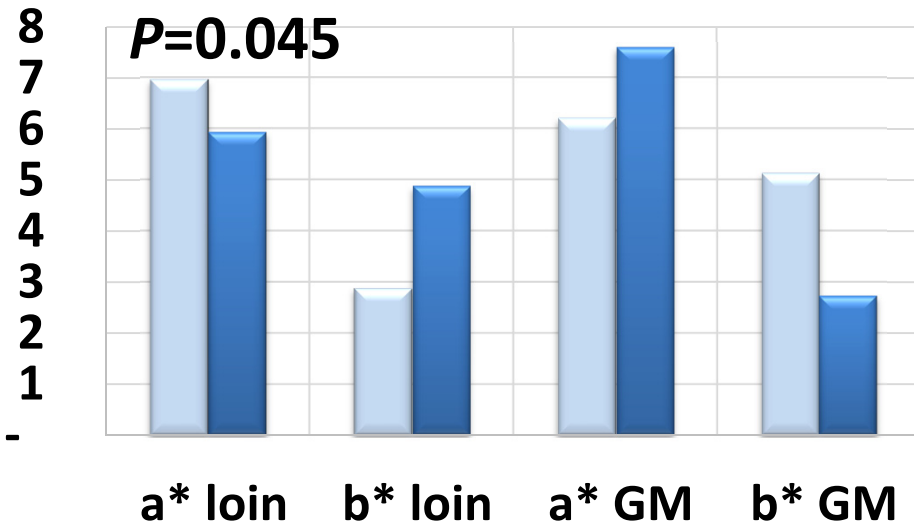
**TOTAL**  
(ham + shoulder + loin)



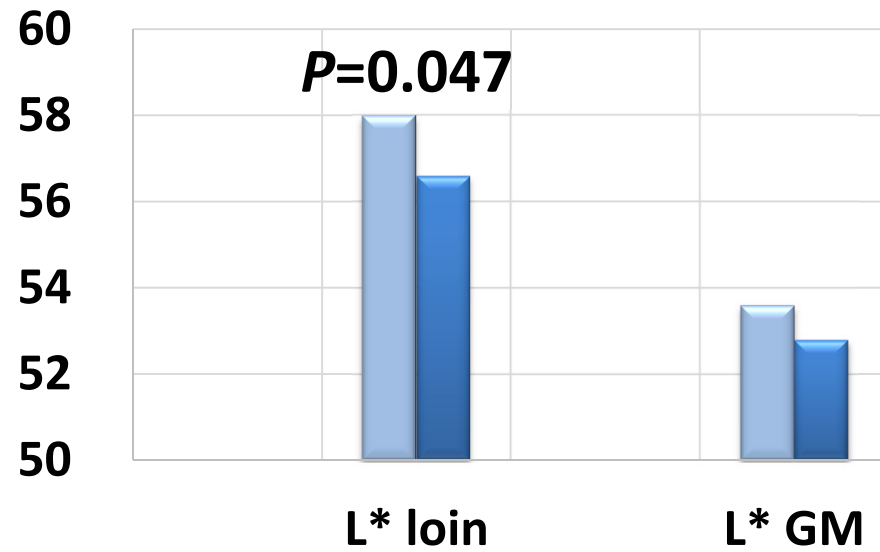
# Meat Quality



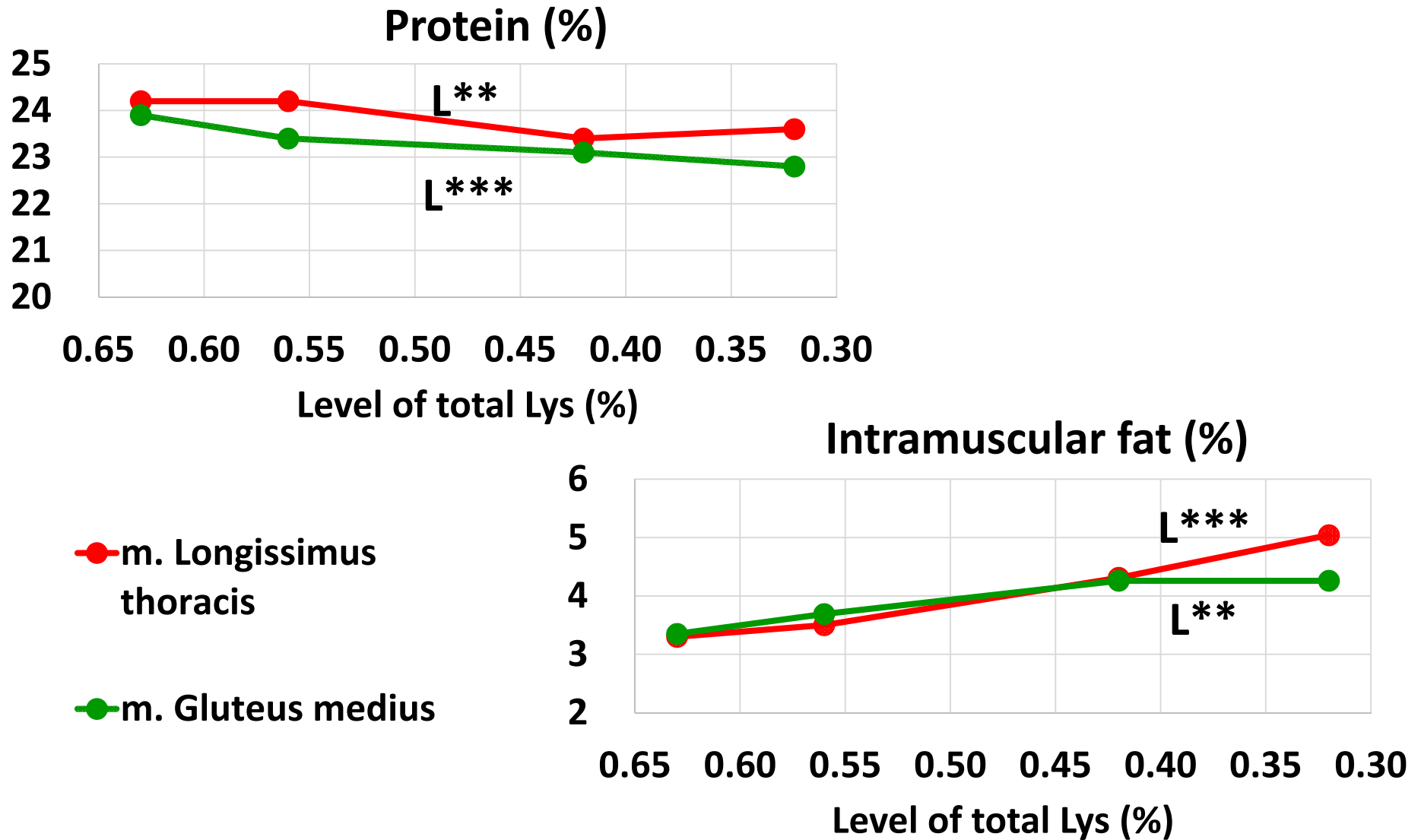
# Meat Quality



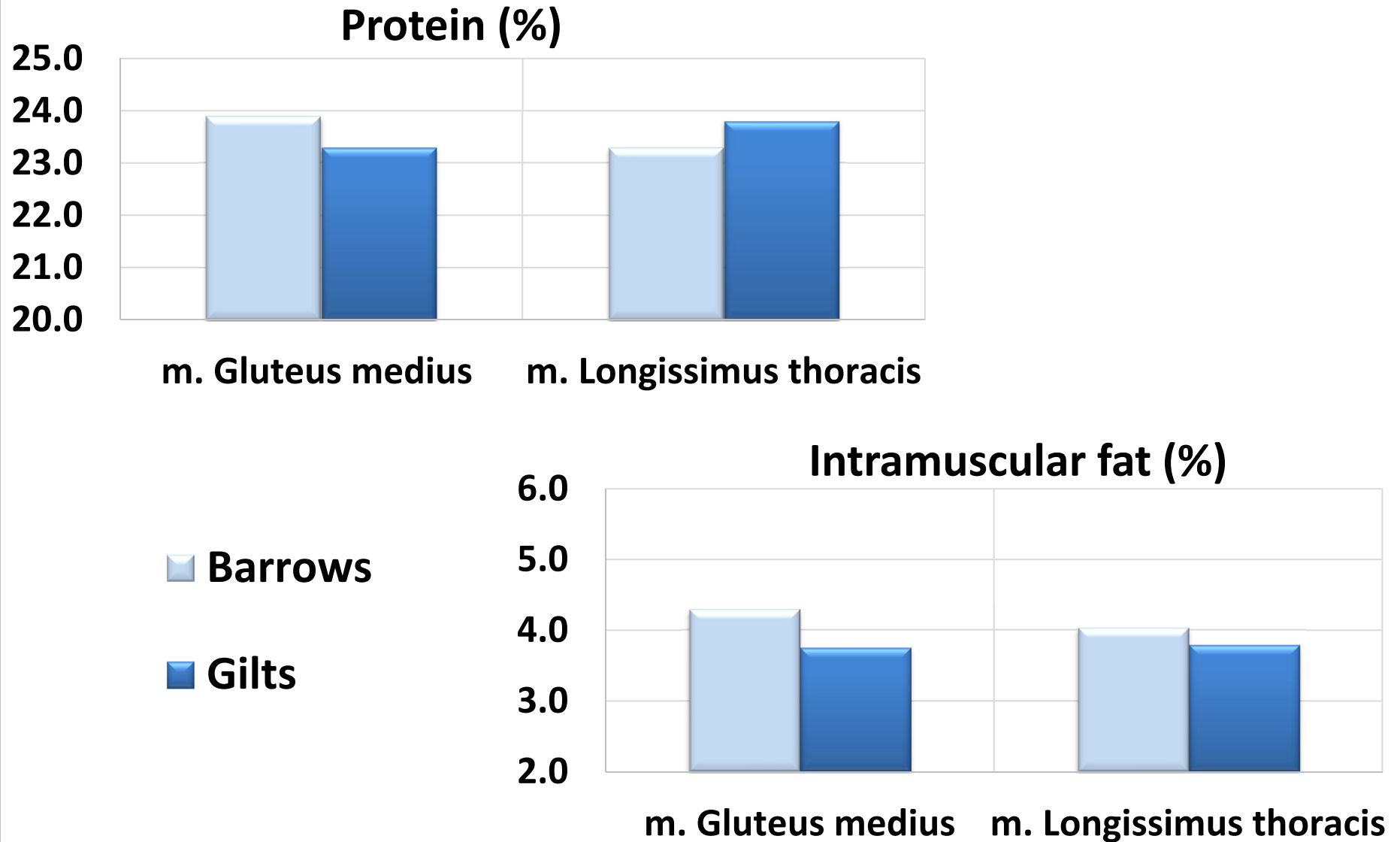
■ Barrows  
■ Gilts



## Chemical Composition of Meat



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**A decrease of dietary Lys content from 0.63 to 0.32% during the finisher period exposed:**

- the low capacity of mature pigs (90 kg BW) for response to a Lys restriction
- linear and negative relations between productive parameters and meat quality.

Thank you for your attention

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