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Expected effects on carcass and pork quality when surgical castration is omitted: results of a meta-analysis study

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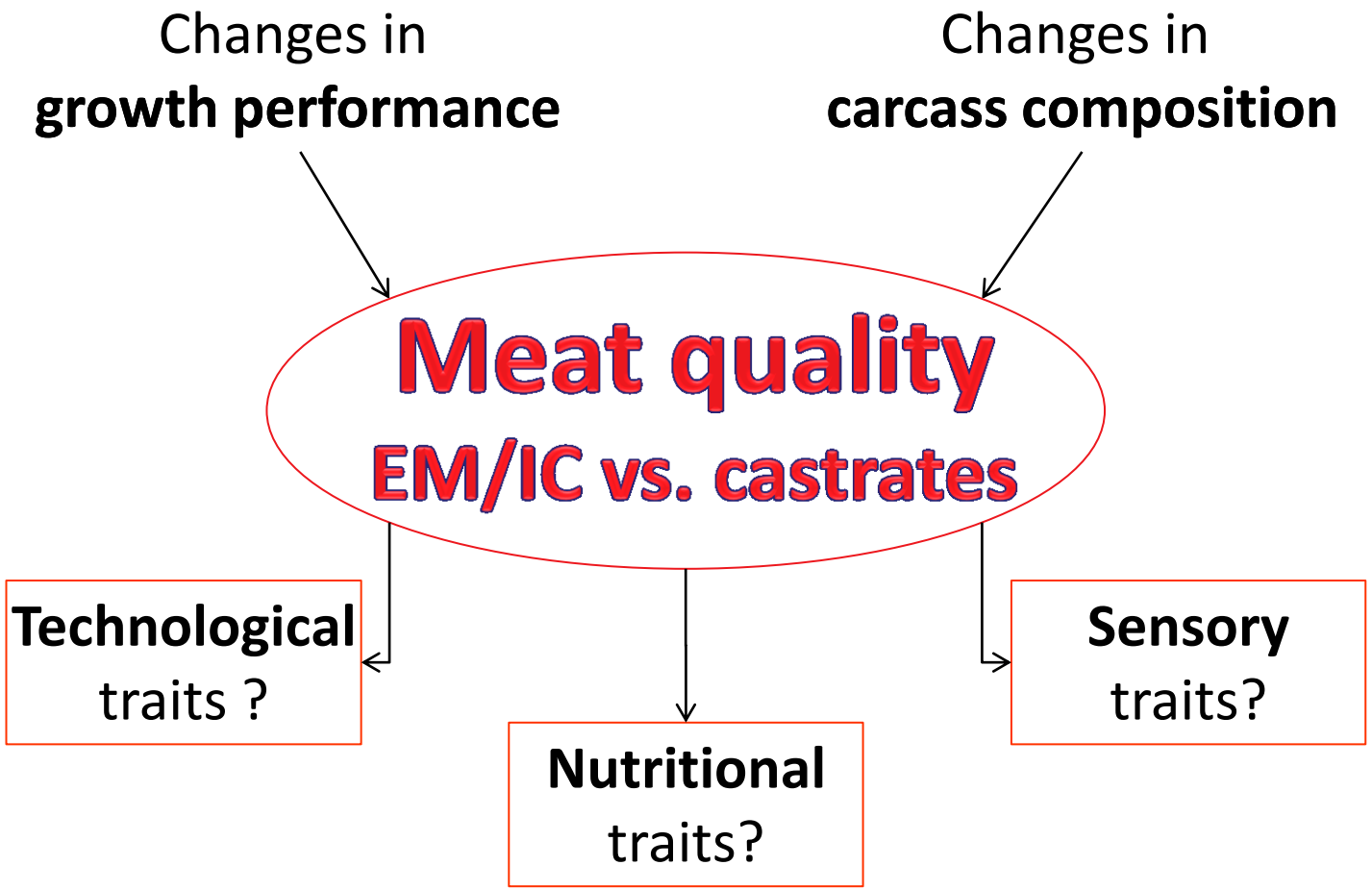
ALP is part of the ALP-Haras Unit

Introduction

- Alternatives to surgical castration
  - Castration under anaesthesia = castrate (**C**)
  - Immunocastration (**IC**)
  - Entire males (**EM**)

	Advantages of
Feed efficiency	BOAR TAINT
N-losses	
Carcass leaness	

Open Question



Materials and methods

In the database results of **26** published (>1990 up to 2009) and **2** unpublished studies included:

- Carcass characteristics
- Meat quality

EM = control
C
Female pigs (**F**)
IC

In the study results (means) from:

- EM; n = 2683
- C; n = 3427
- F; n = 3736
- IC; n = 96

Materials and Methods

Results of 9 traits were collected

- **Lean meat**, %
- **Intramuscular fat**, % - longissimus muscle
- **Initial pH** - 30, 45 and 60 min post mortem in the LM
- **Ultimate pH** - 18, 24 or 48 h post mortem in the LM
- **L*** - lightness of the LD
- **Drip loss**, % - purge formed during storage at 4°C for 24, 48 or 72 h
- **Shear force**, kg - maximum shear force
- **SFA**, % - saturated fatty acid level in the adipose tissue
- **MUFA**, % - monounsaturated fatty acid level in the adipose tissue
- **PUFA**, % - polyunsaturated fatty acid level in the adipose tissue
- **Tenderness score** - evaluated on a scale from 0 (though) to 10 (tender)
- **Sensory juiciness** - evaluated on a scale from 0 (though) to 10 (tender)

Statistical Meta-analysis

Original data

Means

SEM, SED, LSD

Database for meta analysis

Means

pooled SE

Empirical effect size

= IC_{Mean} – EM_{Mean}/pooled SE

= C_{mean} – EM_{Mean}/pooled SE

= F_{mean} – EM_{Mean}/pooled SE

Empirical effect sizes & estimated parameters of the model are dimensionless quantities

Statistical Meta-analysis

- Data analysis carried out as multiple treatment studies (Gleser and Olkin, 1994)
  - Linear model accounts for *correlation of effect sizes* as introduced by a the common control group (EM)

- Generalized least squares procedure were used to calculate

Model parameters β_C, β_{IC} and β_F = estimates of the of population effect sizes for C, IC, and F, respectively.

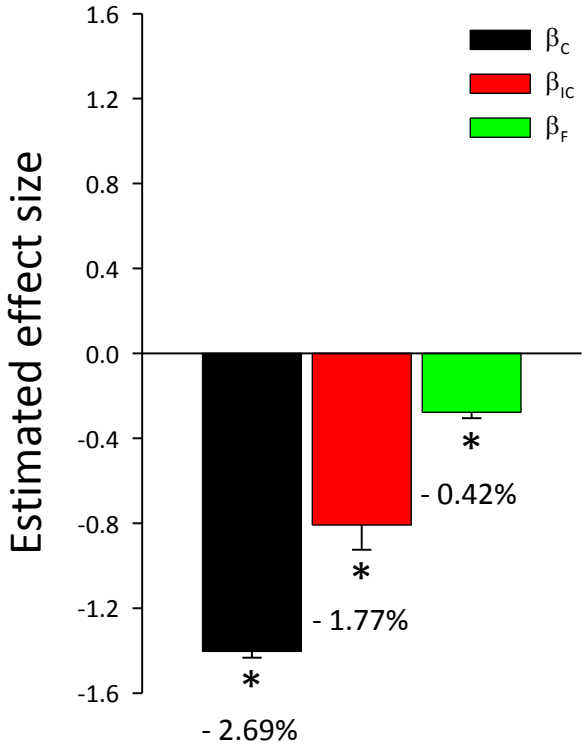
Estimates of mean differences

$$D_{C\text{-}EM} = C_{mean} - EM_{Mean}$$
$$D_{IC\text{-}EM} = IC_{Mean} - EM_{Mean}$$
$$D_{F\text{-}EM} = F_{mean} - EM_{Mean}$$

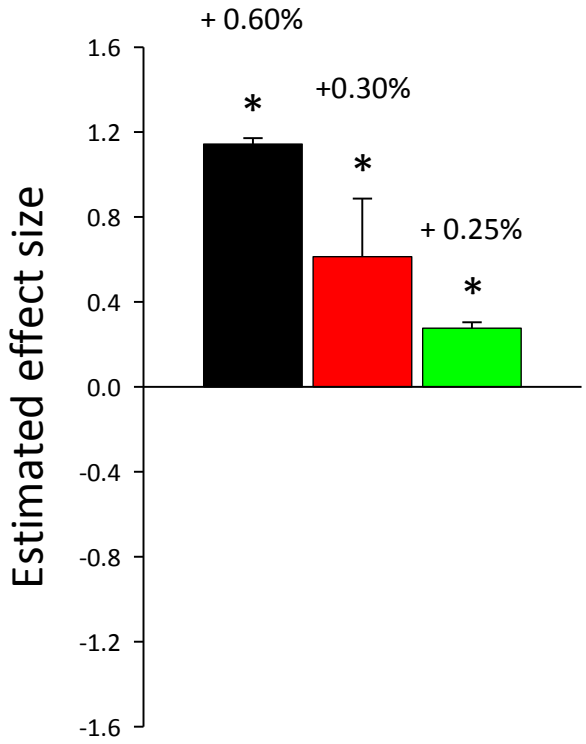
Results

Carcass Characteristics

Lean meat percentage

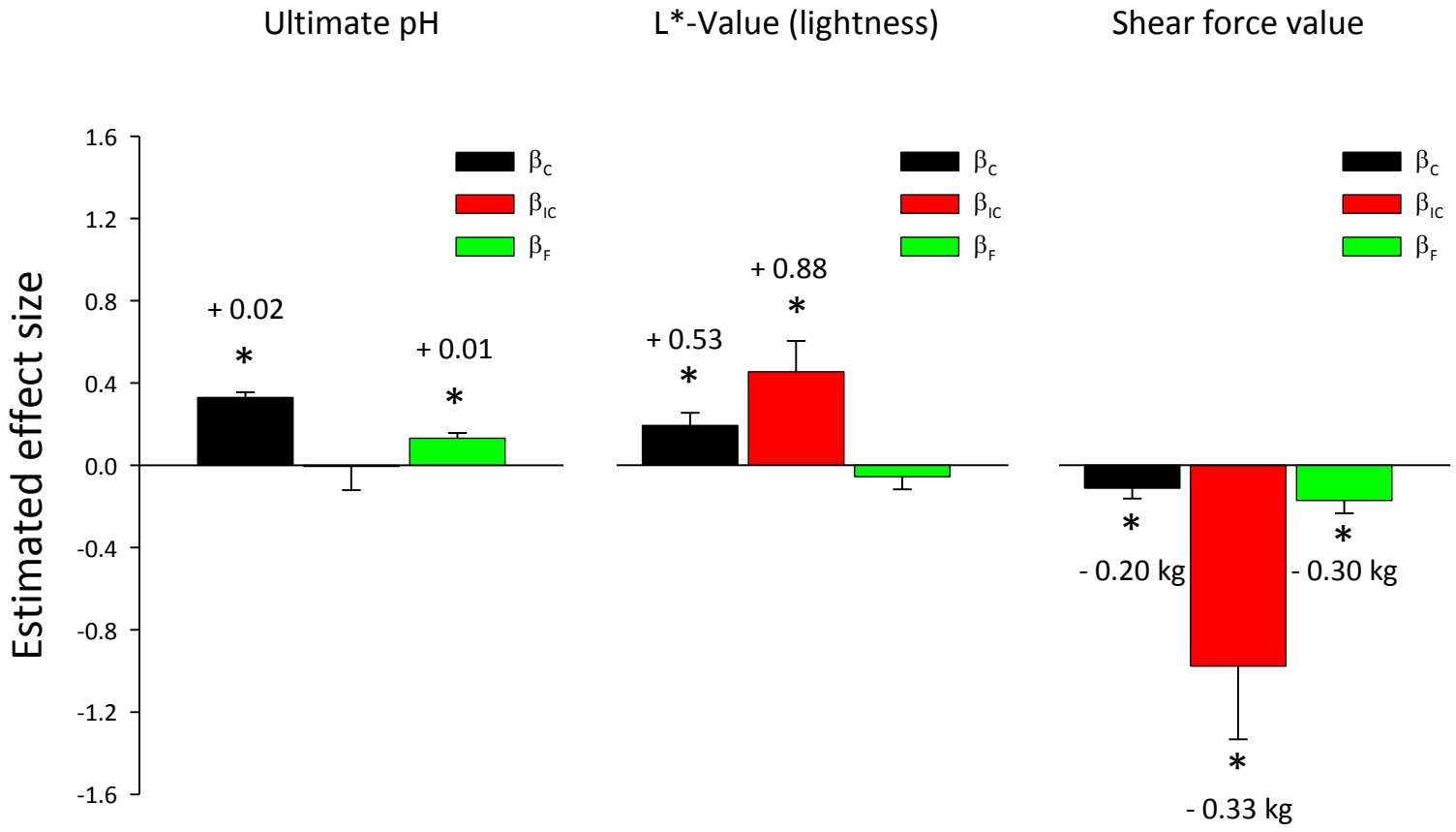


Intramuscular fat content



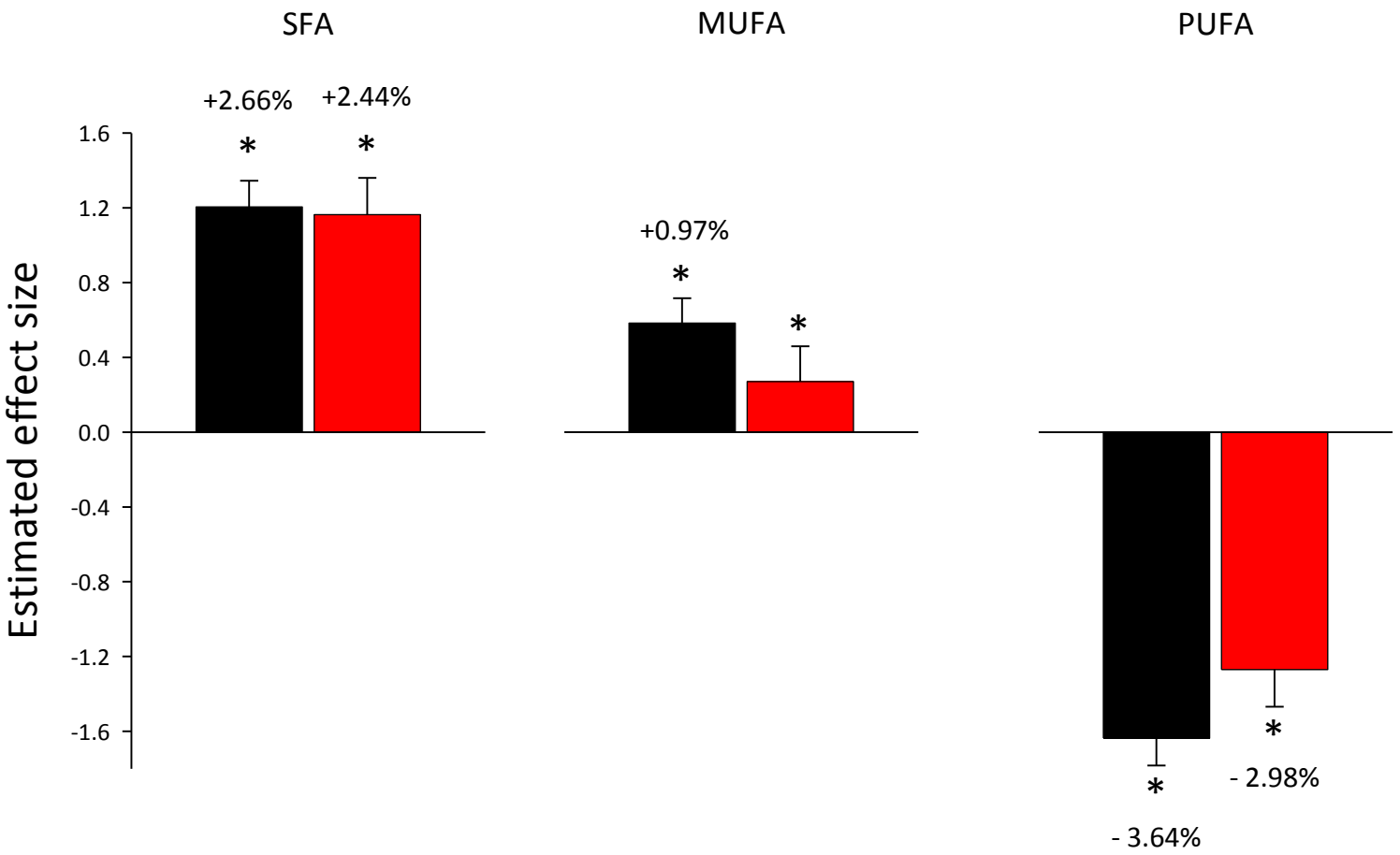
Results

Meat Quality Traits



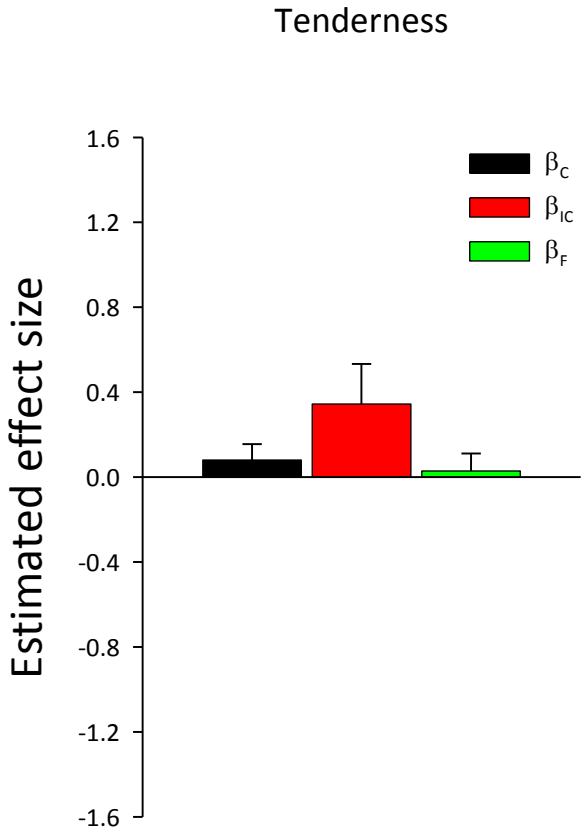
Results

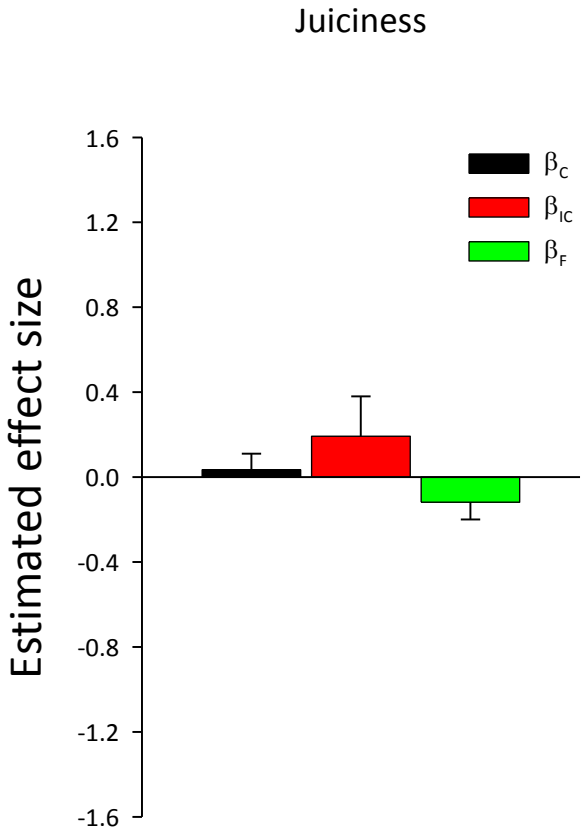
Fatty Acid Composition



Results

SENSORY EVALUATION





Conclusions

Raising EM instead of castrates, immunocastrates or female pigs may result:

- Leaner cracsses
- Lower intramuscular fat content
- Adipose tissue has a higher degree of unsatuation
  - Higher SFA and lower PUFA content
- Greater shear force values
  - no apparent effect on tenderness scores

Thank you for your attention