



Session 21

Beef production, supply and quality from farm to fork

Effect of commercial line and housing condition on carcass, meat and sensory quality of beef young bulls



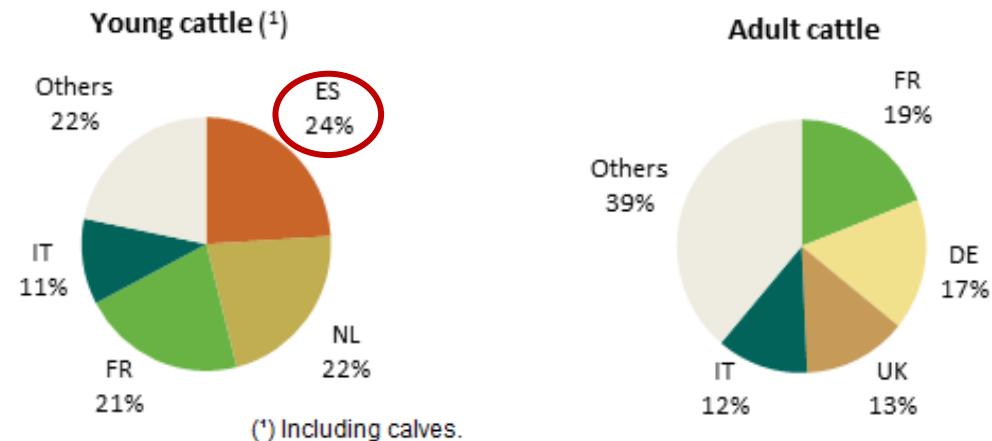
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Introduction

- ✓ Beef production in Spain is based on the production of young bulls (≤ 12 m) and bulls in intensive or semi intensive systems.
- ✓ Young bulls production is mostly based on **Holstein or Holstein crossbreed** with Limousine, Charolaise or Simmental.
- ✓ This wide variety of young crossbreed leads to a meat production systems that **relies on the finishing phase to improve product quality.**



Why the housing condition?



- ✓ **Intrinsic** (age, muscle, carcass weight and fatness) or **extrinsic** (environmental conditions and pm tech factors) factors can affect meat quality (Dunne et al., 2008).
- ✓ One of the least understood is the “environment”.
- ✓ Previous works focused on comparison between confined or restrained animal in similar conditions. **Little info on flooring conditions effect on carcass and meat quality.**



So...what do we know?



✓ Benefits of providing straw are mainly **related to floor confort** (SCAHAW, 2001).

✓ Preference of cows depends on the **type of lying mat** (Sonck et al., 2009) and on the **quantity of straw** (Jensen et al., 1988)....but can be



✓ When given a choice, cattle displayed a **strong preference for straw bedding** over slatted floor when other floor types were available (Lowe et al., 2003).



✓ Studies suggest little effect of type of indoor housing on meat quality (Dunne et al., 2008; Gottardo et al., 2003).

Objective



✓ To evaluate the effect of the **commercial line** and the **housing conditions** on carcass characteristics, meat and sensory quality of beef young bulls.



1. The results presented are a part of a larger study.
2. Trial carried out under commercial conditions.
3. Only carcass, meat and sensory results discussed.

Commercial lines (CL) and treatments (TRT)

PASTURE YOUNG BULLS (PYB):

fed on pasture until 8m finished in intensive conditions

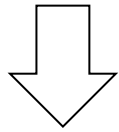


INDOOR YOUNG BULLS (IYB):

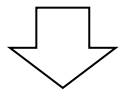
fed with hay and concentrate after weaning



1st PHASE
according
to PS



90d
FINISHING
In the
same farm



SLAUGHTER

Age
11.71 ± 0.26 m

n=10



n=10



n=17



n=19



FINISHED WITH A CONCENTRATE-BASED DIET

- ✓ Space available: about 6m²/animal
- ✓ No outside access during finishing period.

Material and methods



1. Slaughter weight according to the **company criteria**.
2. At slaughterhouse: carcass weight (kg), conformation and fat cover scores (SEUROP).
3. At 48h pm: final pH and instrumental colour.







On previously stored samples:

4. **Instrumental texture (WBSF)**: 0d and 7d vacuum aged.
5. **%IMF**: FoodScan™ on 48h pm.
6. **Sensory analysis**: trained panel, 7d vacuum aged samples, Tcore 60°C.



Results: Carcass Quality







	PYB (n=20)		IYB (n=36)			CL	TRT	CL*TRT
						P	P	P
Carcass wgt (Kg)	369.3a	390.4a	286.4b	295.1b		<0.01	NS	<0.01
Conformation	U-b	Ua	R+c	R+c		<0.01	NS	NS
Fatness score	2-d	2+c	3-b	3a		<0.01	NS	NS

a, b, c: values in the same row with unlike letters means different for P<0.05

- ✓ Different carcass weight, conformation and fatness score due to production system.
- ✓ Slat housed animals presented higher fatness.
- ✓ No differences for final pH.

Results: %IMF and Instrumental Colour

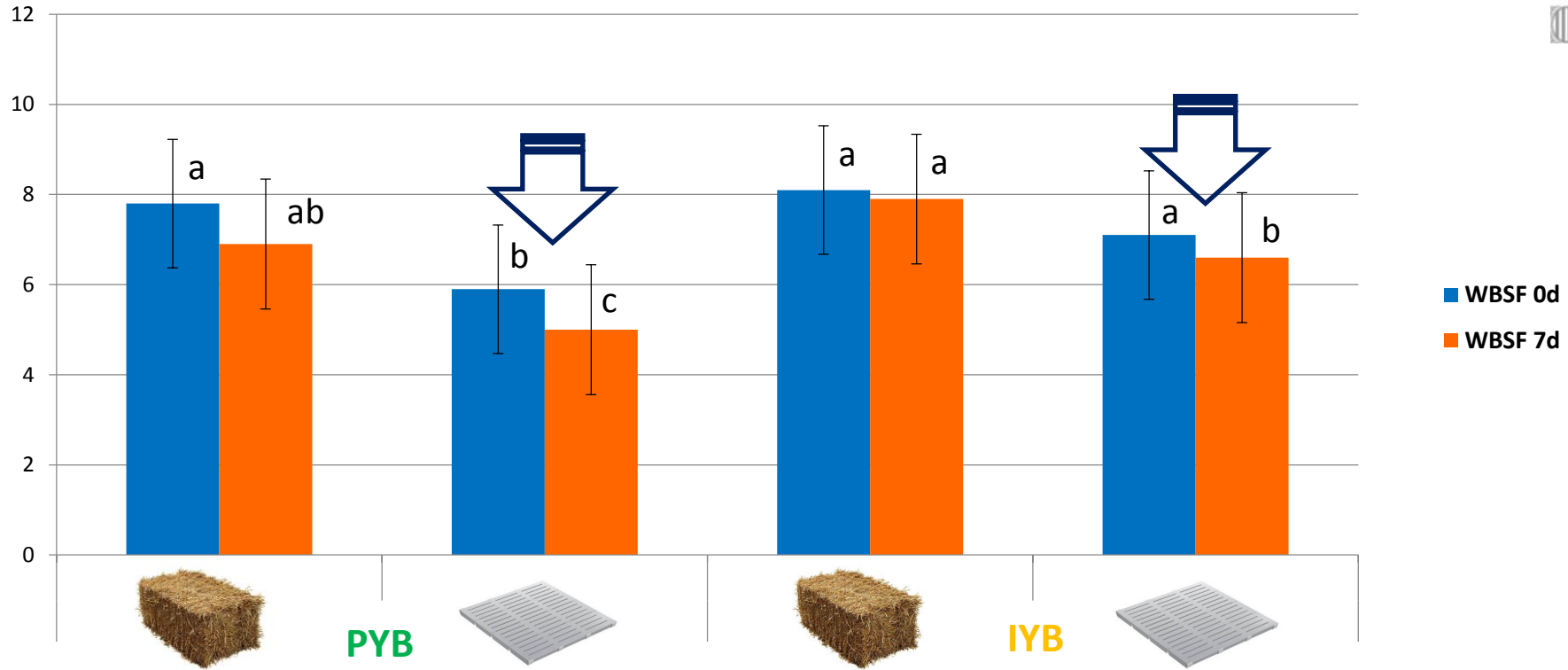


	PYB (n=20)		IYB (n=36)		SE	CL	TRT	CL* TRT
						P	P	P
% IMF (LL)	1.66b	1.69b	2.08b	2.54a	0.607	<0.01	NS	<0.01
L* (CIE Lab)	33.4b	36.3a	34.0b	36.1a	1.798	NS	<0.01	<0.01
a* (CIE Lab)	16.9	16.8	17.4	17.2	1.366	NS	NS	NS
b* (CIE Lab)	1.5c	2.3ab	2.1b	2.7a	0.986	0.071	<0.05	<0.05

a, b, c: values in the same row with unlike letters means different for P<0.05

- ✓ CL clearly affected % of IMF content.
- ✓ Young bulls on slat presented higher L* and b*.
- ✓ No CL effect on instrumental colour.

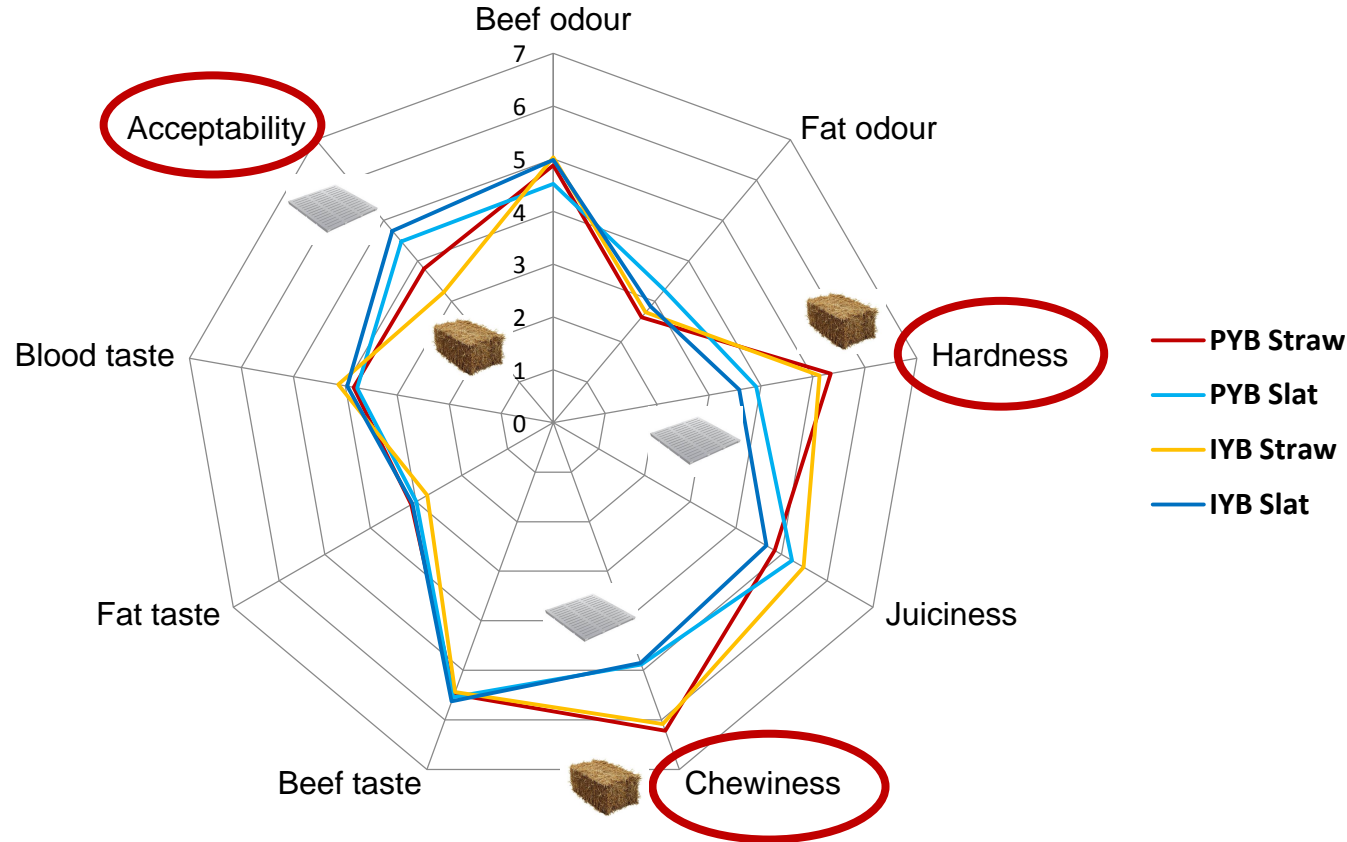
Results: Instrumental Texture (WBSF, kgf/cm²)



- ✓ No effect of CL on SF at 0d ($P=0.075$).
- ✓ Slatted floor = more tender meat? ($P<0.01$).
- ✓ Interaction CL x TRT ($P<0.01$).

a, b, c: column of the same colour with unlike letters means different for $P<0.05$

Results: Sensory Analysis by trained panel



- ✓ CL did not affected sensory characteristics.
- ✓ Housing system affected meat hardness and chewiness.
- ✓ Meat acceptability was higher for slat housed young bulls.

**For sensory analysis a 10cm semi-structured scale was used. All samples were evaluated by a 6-members trained panel. Samples were cooked until reach 60°C of core temperature.

Conclusions



- ✓ Commercial line has a predominant effect on **carcass quality and %IMF** (so...industry decisions are crucial!!!).
- ✓ The **interactions between CL and indoor housing system** during finishing period **can affect both instrumental and sensory quality of meat.**
- ✓ On a sensory quality level, **slatted-floor housing can help to produce more tender and less chewy meat** than straw-bedded housing.



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Thank you for your attention!

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