

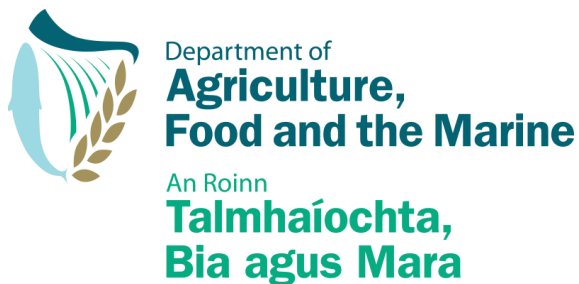
Lamb meat quality – is there a ram effect?

Frank Monahan



“RamLamb” - Gender, Age and Diet Effects on Lamb Meat Flavour and Sensory Quality

1. To determine if the eating quality (particularly, **flavour quality**) of lamb is affected by **castration** of lambs and **age at slaughter**.
2. To determine if the eating quality of lamb from rams is affected by **pre-slaughter diet**.



Sampling

- LTL excised from each carcass
- cut into 2.5 cm thick steaks
- vacuum packed,
- aged for 8 d at 4 °C
- frozen at -20 °C until analysis.



Sensory Analysis - Trained Panel

| | | | | |
|-----------|---------------------------|-----------------------------|-------------------|-----------------------|
| 5 | Cooked minced beef | Lamb | Caramelised | Sweet |
| | | Wet dog | | Herbal(fresh) |
| | Roast beef/lamb | Warm blood | Earthy | |
| | Gravy-like | Fresh meat/meaty | | Farm smell (pleasant) |
| | | Burning fat/caramelised fat | | |
| | Aromatic herby, soapy | | | Grassy |
| comments: | | | | |
| 6 | Soil like, forest floor | Urine | | Bitter |
| | More roast beef than lamb | Putrid | | Rancid |
| | | | | Lamb meat (old) |
| | Garlic | Cookies (bakery) | Greasy/fatty | |
| | | "Cheap" meat | | |
| | Farmer odour, like farm | Grassy | Rancid fat | |
| | Old meat smell | | | |
| | | Herbal smell (when cooler) | Roasted meat | |
| | Cooked dough | | | |
| | Sheep smell | Manure | Dirty straw smell | |

| Aroma Spiking Session PM | |
|--------------------------|---|
| Samples | Descriptors |
| 5 | Gone off milk (sour milk), meat, greasy, red wine, bloody, Sweet & fresh, nutty, grassy & herby, wool, |
| 6 | Caramel & sweet (salty, rancid, burnt rubber tobacco (smoky), non food, manure (after smell), hand sanitizer (alcohol), animal smell, meat & lamb |
| 7 | Strong lamb, Sweet, Caramelised, greasy, (fresh herbs, minty) bettery flavour, Sweet, |
| 8 | Spicy (chillies), Oily, lamb, rancid, mint, refreshing, slightly soap/fairy liquid) weakest lamb smell |

Attributes Assessed by a Trained Panel

Aroma

- Intensity of Roast Meat Aroma
- Intensity of Lamb Aroma
- Grassy aroma
- Aromatic/Herbal
- Metallic/Bloody
- Animal Smell/ Farm Smell
- Woolly
- Buttery
- Fatty
- Rancid
- Manure/Faecal
- Sour
- Sweaty
- Soapy
- Earthy-smell

Flavour

- Intensity of Roast Meat Flavour
- Intensity of Lamb Flavour
- Grassy
- Metallic/Bloody
- Aromatic/Herbal
- Soapy
- Rancid
- Farmyard
- Sour
- Sweet
- Off-flavours

Aftertaste

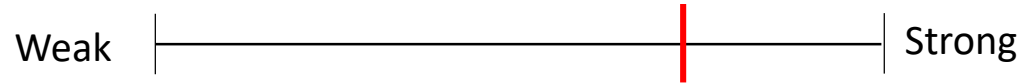
- Intensity of Lamb Aftertaste
- Soapy
- Metallic/Bloody
- Fatty/Greasy
- Dry
- Astringent

Texture

- Tenderness
- Juiciness
- Chewiness
- Fattiness/Greasiness
- Stringiness/Fibrousness
- Stickiness



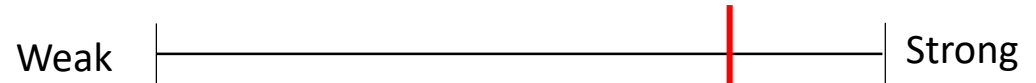
Intensity of Lamb Aroma



Roast Meat Aroma



Grassy Flavour

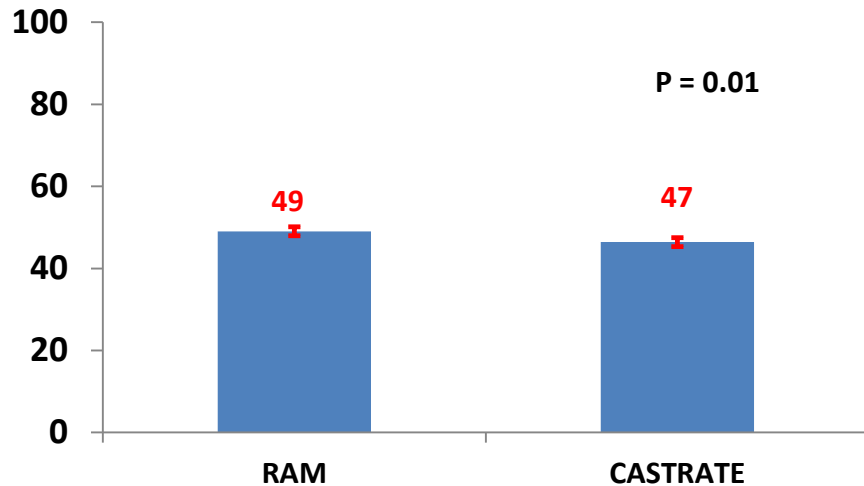


Tenderness

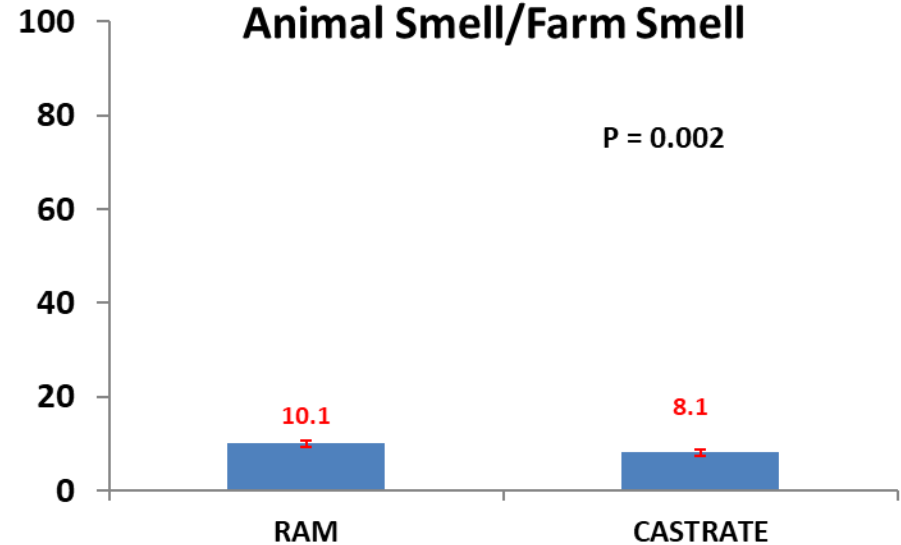


Gender differences detectable by a trained panel?

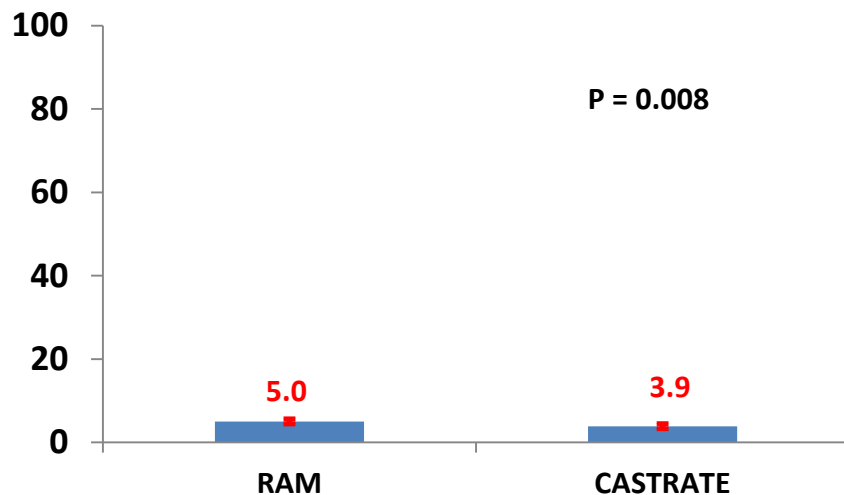
Intensity of Lamb Aroma



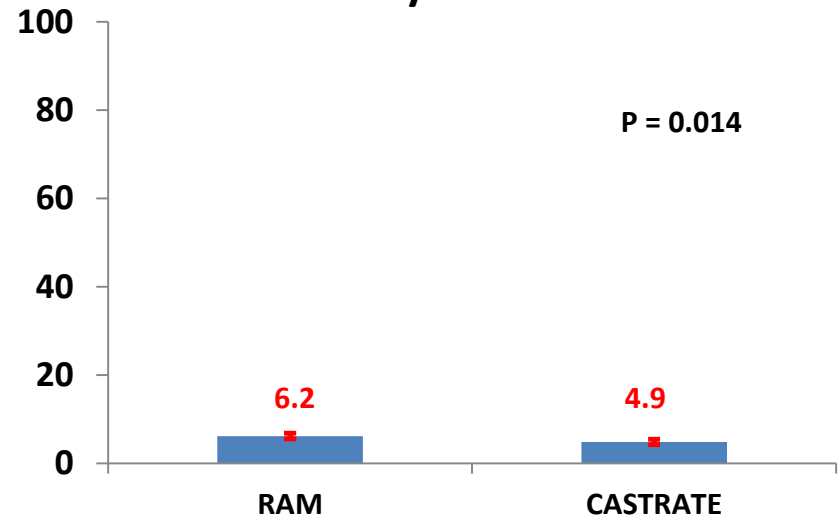
Animal Smell/Farm Smell

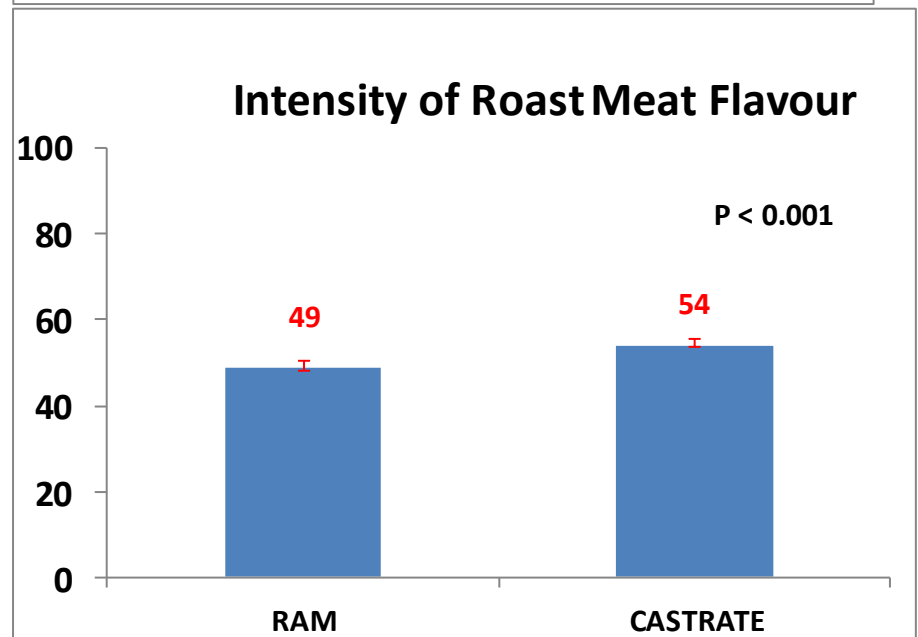
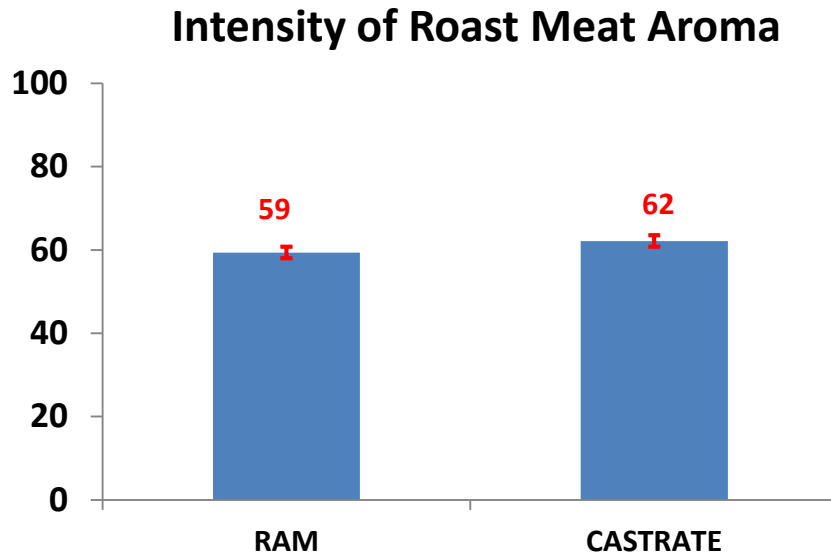
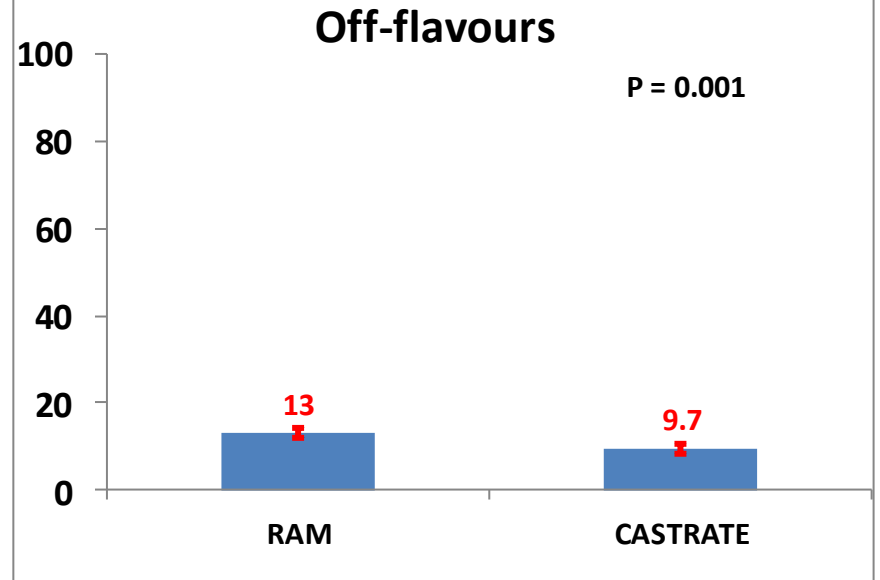
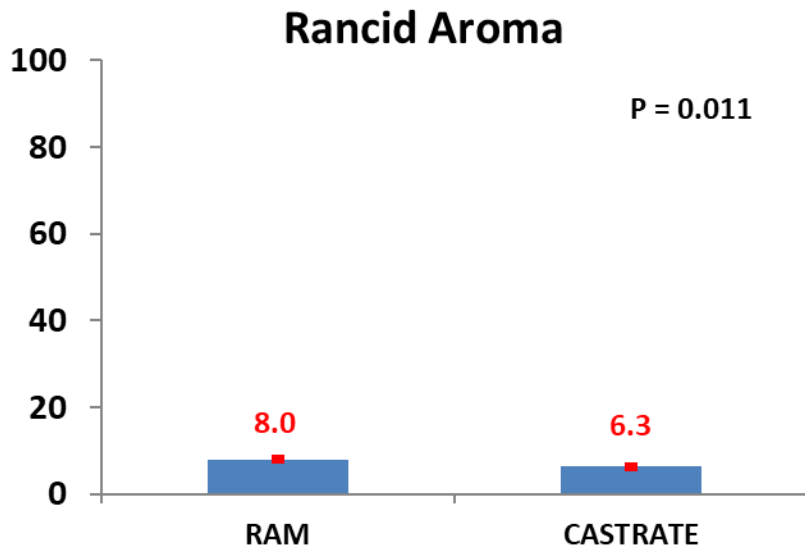


Manure/Faecal Aroma

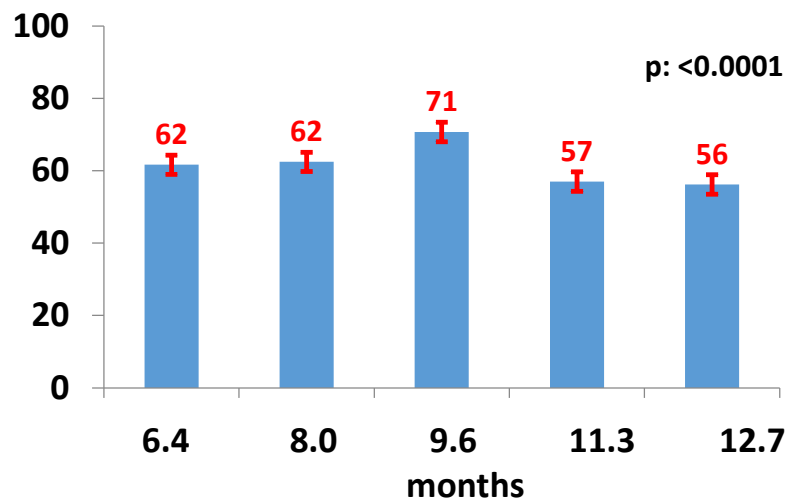


Woolly Aroma

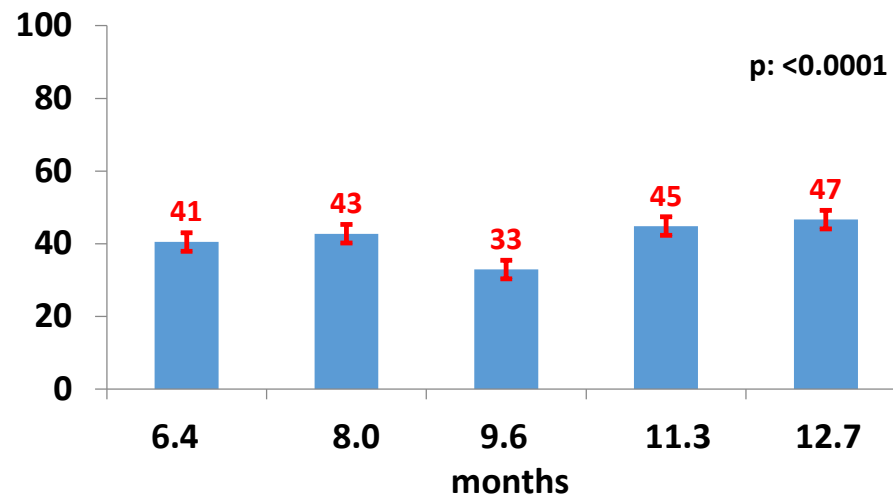




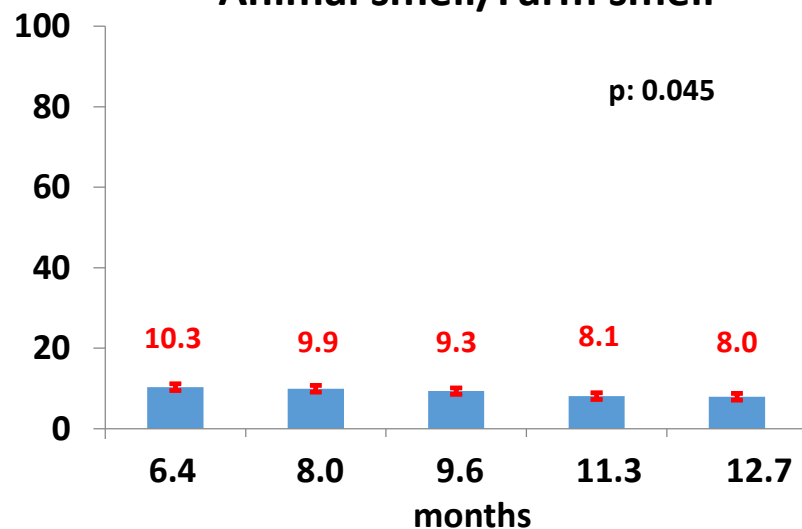
Tenderness



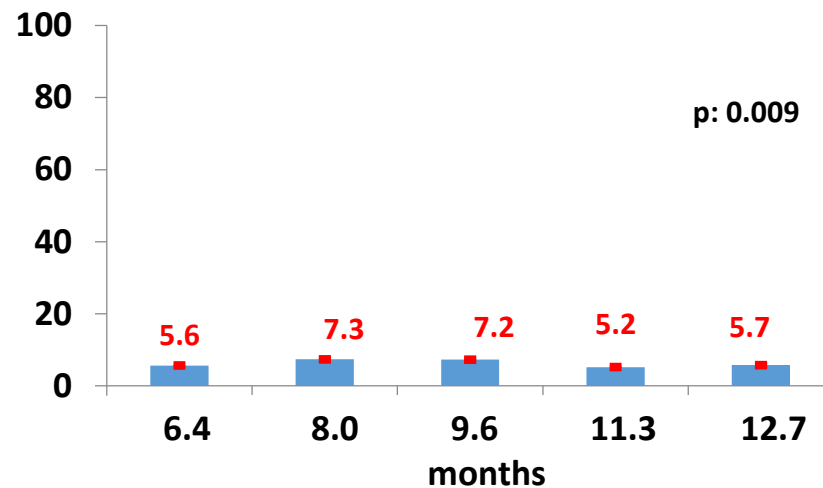
Chewiness



Animal smell/Farm smell



Sour Aroma



Percentage of lamb samples with “undesirable” attributes

| | Texel × Scottish Blackface | | Scottish Blackface | |
|---|----------------------------|-----------|--------------------|-----------|
| | Rams | Castrates | Rams | Castrates |
| Animal smell/Farm smell | 18 | 0 | 9 | 4 |
| Woolly Aroma | 14 | 6 | 4 | 4 |
| Rancid Aroma | 6 | 2 | 4 | 0 |
| Manure/Faecal Aroma | 10 | 2 | 4 | 2 |
| Off-flavours | 8 | 0 | 4 | 0 |
| Rancid Flavour | 18 | 4 | 11 | 4 |
| Farmyard Flavour | 22 | 13 | 9 | 6 |
| One or more “undesirable attributes” | 42 | 21 | 26 | 12 |
| | Rams: 34% | | Castrates: 17% | |

$$|x - M| > 2 \times (MAD \times 1.4826)$$

Sensory Evaluation by Consumers



Gravador et al, 2018. Small Rumin Res.,169,148.

- ✓ Overall Liking
- ✓ Aroma Liking
- ✓ Flavour Liking
- ✓ Juiciness Liking
- ✓ Tenderness Liking

9-point hedonic scale



9= like extremely



1= dislike extremely



- ✓ Aroma
- ✓ Flavour
- ✓ Juiciness
- ✓ Tenderness

Intensity



☐ 9= extremely strong/tender/juicy

☐
☐
☐
☐
☐
☐
☐

☐ 1= extremely weak/tough/dry

- ✓ Unpleasant aroma/off-odour
- ✓ Unpleasant taste/off-flavour

Intensity



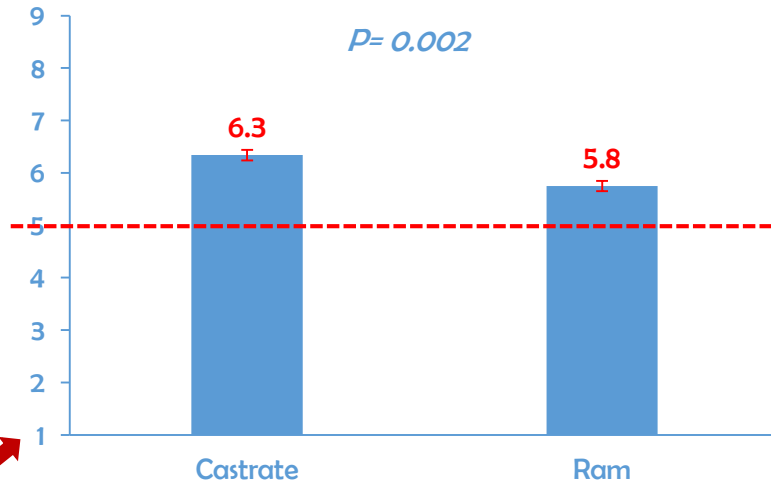
Gender differences detectable by a consumer taste panel?

Like
Extremely



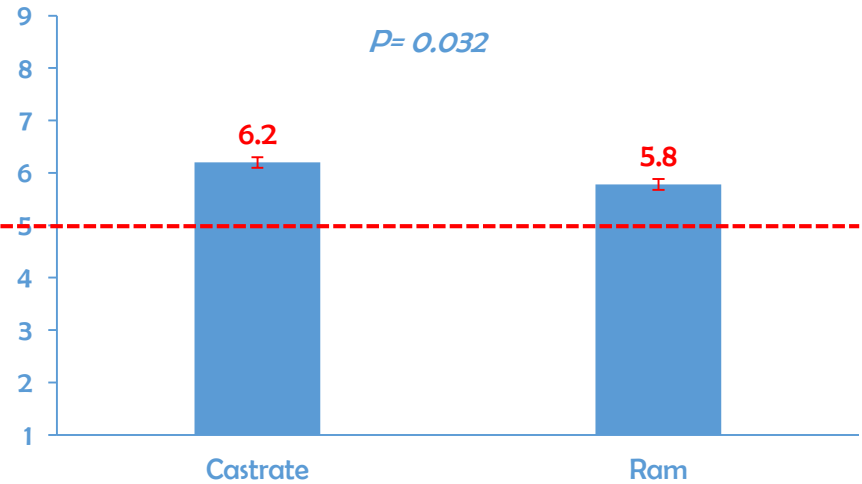
Overall Liking

$P=0.002$



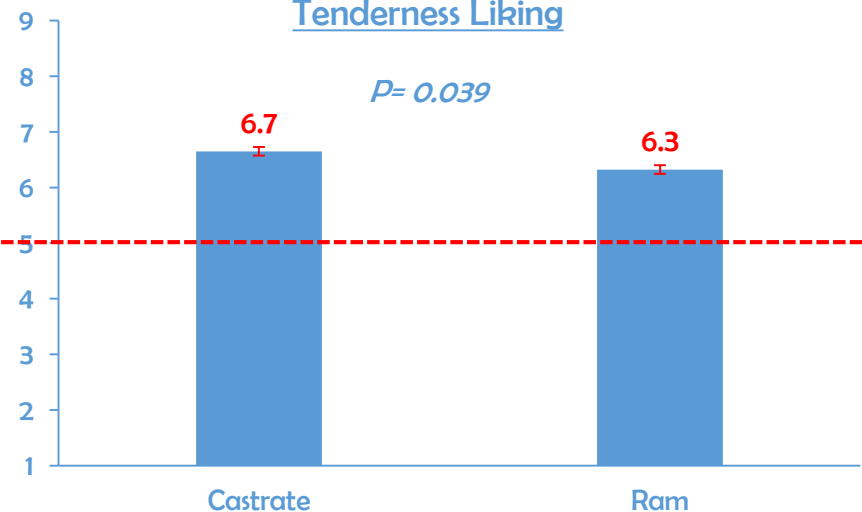
Flavour Liking

$P=0.032$



Tenderness Liking

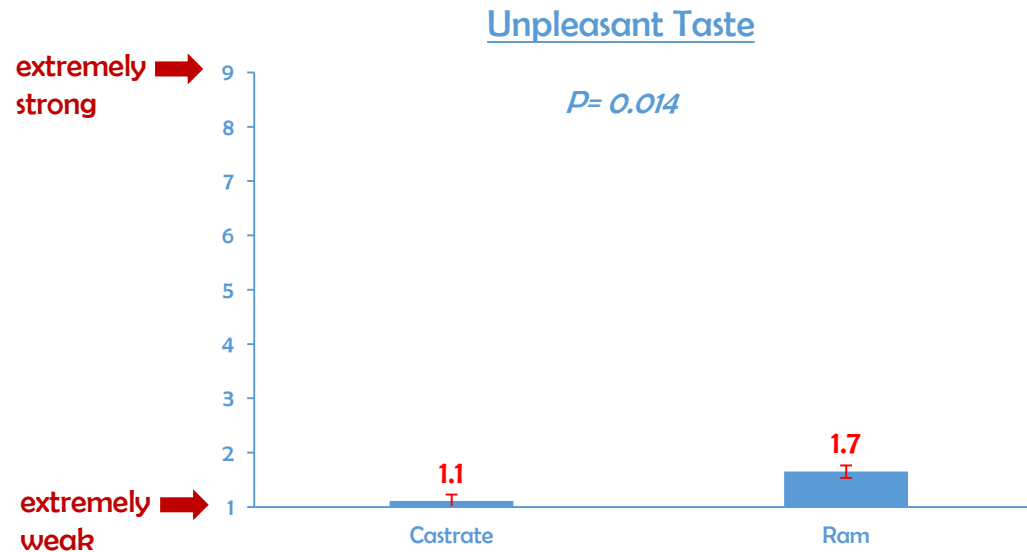
$P=0.039$



**Neither Like
nor Dislike**

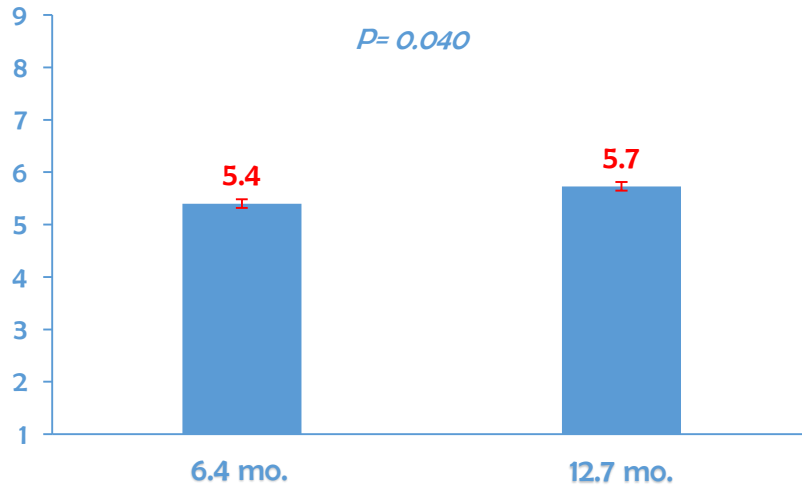


Gender differences detectable by a consumer taste panel?

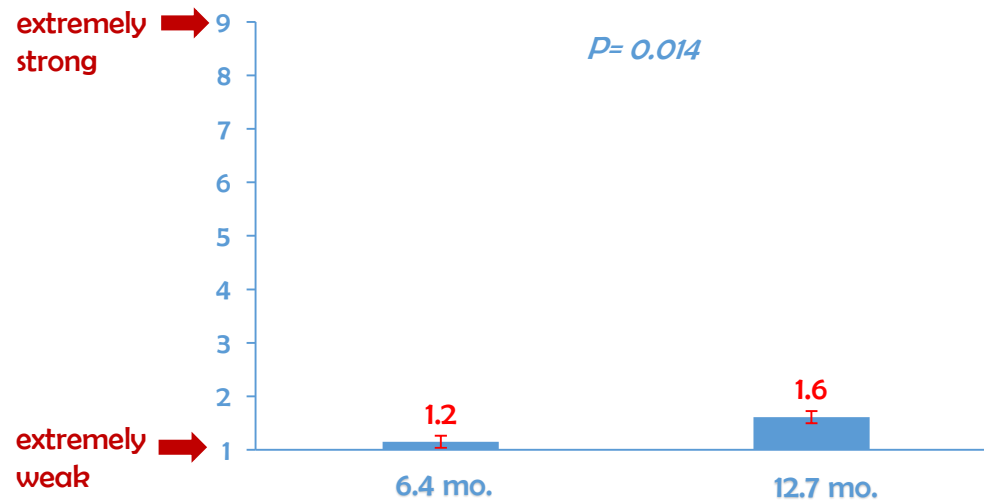


Age differences detectable by a consumer taste panel?

Flavour Intensity



Unpleasant Taste

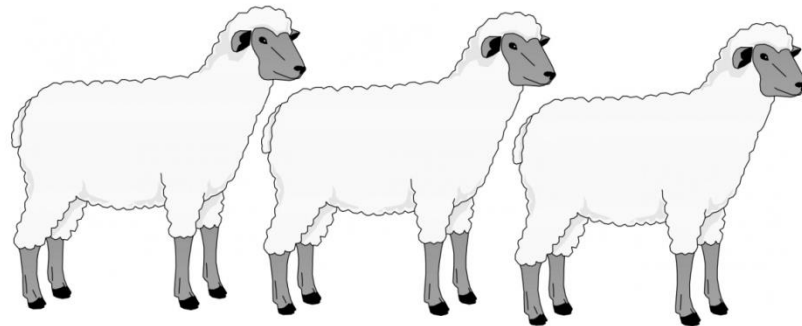


CONCLUSIONS

Sensory quality differences exist between rams and castrates.

Differences are significant but numerically small.

NEITHER MEAT is DISLIKED, but CASTRATE LIKED MORE



Acknowledgements



Linda Farmer, Michael Diskin, Nigel Brunton, Paul Allen, Aidan Moloney, Alan Fahey, Noel Claffey, Vasiliki Gkarane, Rufielyn Gravador, Terence Hagan, Janeen McKinnie-Hill, Aurlie Aubry

Frank Monahan, UCD, AIMSNI, Belfast, 28/2-
1/3, 2019