

3A-101: Body composition and physiological changes associated with immunisation of pigs against gonadotrophin releasing factor (GnRF) at two different liveweights

Addendum

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The skatole and androstenone results were pending when the final report was submitted and these are presented below.

Methods

A total of 64 Large White × Landrace × Duroc entire male and immunised male pigs were used in this experiment. The experiment was a 2×2×2 factorial with the main treatments being:

- i) sex (S, entire males (E) and immunised males (I));
- ii) starting weight (W, 50 kg (light) and 80 kg (heavy) LW) and;
- iii) feeding regime (F, 2.5 times maintenance (restricted) and *ad libitum*).

Skatole in belly fat was measured using high performance liquid chromatography - fluorescence detection. The lower limit of quantification was 0.0034 µg/g.

Androstenone in belly fat was measured using high performance liquid chromatography with mass spectrometric detection. The lower limit of quantification was 0.2 µg/g.

General analysis of variance was performed with the GENSTAT 17 program (VSN International Ltd, Hemel Hempstead, UK) to analyse the main effects of sex, initial weight and feeding regime on skatole and androstenone content of belly fat. Several of the androstenone samples were lower than the analysis detection level and these were classed as 0 for the purpose of the statistical analysis. A level of probability of less than 0.05 was used to determine statistical difference between the means. Fisher's-protected least significant differences were used to determine differences between treatments.

Results

Entire male pigs had significantly higher levels of skatole and androstenone than immunised male pigs ($P=0.001$ and $P<0.001$, respectively). Androstenone was also higher in the heavy pigs compared to the light pigs ($P=0.013$). Feeding regime and initial weight had no effect on skatole ($P>0.05$) while feeding regime had no effect on androsteone ($P>0.05$). There were no interactions between sex, feeding regime and initial weight for skatole ($P>0.05$). There was a sex by weight interaction for androstenone where heavy entire males had more androstenone than light entire males ($P=0.001$; Table 1, Figure 1).

The data was also examined to determine the proportion of pigs which exceeded the sensory detection levels of 0.2 µg/g for skatole and 1.0 µg/g for androstenone (Figure 1). 18.7% of the light entire males and 31% of the heavy entire males exceeded the threshold for skatole. One heavy immunised male also exceeded the detection threshold for skatole. Two heavy entire male pigs exceeded the threshold for androstenone.

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Table 1: Skatole and androstenone concentrations in porcine belly fat (n=8).

Parameter	Initial weight	Feeding Regime				SEM ^a	S	F	W	S×F	S×W	F×W	S×F×W
		Ad libitum		Restricted									
		Light	Heavy	Light	Heavy								
Sex													
Final LW (kg)	Entire	72.3	109.2	64.6	105.6	1.71	0.176	<0.001	<0.001	0.018	0.199	0.382	0.428
	Immunised	74.3	109.9	62.5	98.4								
Skatole	Entire	0.181	0.163	0.093	0.212	0.054	0.001	0.885	0.651	0.393	0.169	0.199	0.236
	Immunised	0.070	0.042	0.095	0.072								
Skatole >0.2 µg/g	Entire	37.5%	42.9%	0	25%								
	Immunised	0	0	0	12%								
Androstenone	Entire	0.369	0.722	0.358	0.706	0.082	<0.001	0.741	0.013	0.574	0.001	0.233	0.253
	Immunised	0	0.085	0.190	0								
Androstenone >1 µg/g	Entire	0	14.3%	0	12.5%								
	Immunised	0	0	0	0								

^a SEM for Sex × Feed × Weight; S - Sex, F - Feeding regime, W - Initial weight

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Application of research

The percentage of entire male pigs with skatole levels above the sensory threshold detection levels may in part help to explain the increased fail rates for repurchase intention and quality grade in pork from entire males compared to immunised males.

Several light entire male pigs (final LW 74.3 kg) also had skatole levels exceeding the sensory threshold of 0.2 µg/g. This provides further evidence that as shown by D'Souza *et al.* (2011) boar taint can still be an issue at lower carcass weights.

References

D'Souza, D.N., Dunshea, F.R., Hewitt, R.J.E., Luxford, B.G., Meaney, D., Schwenke, F., Smits, R.J., & van Barneveld, R.J. (2011). High boar taint risk in entire male carcasses. In 'Manipulating Pig Production XIII', ed. R.J. van Barneveld, Australasian Pig Science Association, Werribee, p. 259.