TESTIS WEIGHT IS A BETTER PREDICTOR OF BOAR TAINT THAN CARCASS WEIGHT OR AGE

Joline van Zyl[1], Phillip Strydom[1*], and Jeannine Marais[2]

[1] Department of Animal Science, Faculty of Agrisciences, Stellenbosch University, Stellenbosch, South Africa.

[2] Department of Food Science, Faculty of Agrisciences, Stellenbosch University, Stellenbosch, South Africa.

*Corresponding author email: pestrydom@sun.ac.za

I. INTRODUCTION

Boar taint is an unpleasant urine- and faeces-like off-odour and off-flavour found mostly, but not exclusively, in the cooked meat of intact boars when they reach puberty but may also be found in gilts and castrates. Boar taint is mainly caused by androstenone (5α-androst-16-en-3-one), indole and skatole (3-methylindole) [1]. The exact onset of the taint varies depending on factors such as diet and genetics, but it usually occurs around the age of 6-8 months (24-32 weeks) for most boars. The option of slaughtering boars earlier than gilts is often considered and the maximum age mentioned is 25 weeks. Many countries will however use a maximum weight, rather than age, as the parameter of eliminating boar taint. Spain uses 105 kg, UK and the Netherlands 110 kg and Belgium and Denmark 115kg [2]. Weight and age as control mechanisms are not 100% successful to avoid boar taint in meat from intact animals and therefore online methods such human nose and more sophisticated methods such as mass spectrometry, Raman and biosensors are used to detect tainted carcasses [3]. This study investigated the effect of age, weight and testis size on the intensity of various pork fat odours to find an on-farm method to mitigate the risk of boar taint detected at abattoir level.

II. MATERIALS AND METHODS

A total of one hundred weaner male pigs (aged 28 days) were blocked according to weight and allocated to five treatment groups of 20 animals each which represented five different ages: 140 days, 147 days, 154 days 161 days and 168 days. The pigs were housed per group at a density of 1 m^2 per pig and grown on a commercial feed (Nova Feeds in Malmesbury, Western Cape, South Africa). Final live weights were recorded before slaughter. Both testes were weighted at slaughter to compare with sensory and analytical findings (androstenone; not reported in this study). Neck fat (500 g) samples were collected from warm carcasses, processed into sub-samples for skatole and androstenone analyses, as well as for sensory evaluation of aroma/odour of cooked fat. The samples were vacuum packed and stored at -70°C.

For sensory evaluation of pork fat odour, fat samples (1 cm^2), placed in 100 ml transparent glass ramekins and covered with thick aluminium foil, were cooked in an industrial oven (Hobart, Paris, France) at 180°C for 10 min [4]. The samples were cooled for 8 minutes and placed in ceramic mugs, covered with aluminium foil in a 70°C water bath for temperature control. A trained 12-member panel consisting of women evaluated the samples for 12 aroma/odour attributes previously deliberated and established during a training session (Table 1).

For this report multivariate statistical techniques were applied to elucidate patterns in data. Principal component analysis (PCA), employing the correlation matrix, was performed to determine the association between animal and carcass traits and sensory attributes using XLStat.

III. RESULTS AND DISCUSSION

Testis weight was positively (linear) correlated with slaughter age (R^2 = 0.523) and slaughter weight (R^2 = 0.681). All favourable odours were negatively correlated with testis weight, animal age and carcass weight. Unfavourable odours were positively related to testis weight, animal age and

weight (Table 1). Stronger relationships were recorded between testis weight and odour scores than between animal weight and age and odour scores (Table 1). Further testing of androstenone and skatole levels in relation to testis weight and odour scores will determine at what testis weight threshold would be needed to avoid the risk of boar taint. Bekaert et al. [5] showed that measurement of testis width and length and calculation of testis volume (volume=length^2×width×(π/6) can be used to determine testis size on live pigs on the farm. These measurements can be used as on-farm tools to determine and manage the risk of boar taint at abattoir detection level.

Table 1 – Linear relationship between sensory odour scores of pork fat and animal and carcass traits

	Mean sensory score*	R^2 value for linear regression		
		Testis weight	Animal age	Animal weight
Favourable odours				
Cooked pork meat	66.2	0.690	0.158	0.100
Fatty	69.6	0.114	0.035	0.020
Sweet-associated	38.3	0.492	0.115	0.066
Savoury	37.6	0.426	0.132	0.122
Grainy	35.1	0.204	0.023	0.010
Unfavourable odours				
Urine	18.8	0.848	0.024	0.048
Manure	5.3	0.769	0.072	0.074
Earthy	23.4	0.756	0.101	0.010
Moth balls	2.0	0.814	0.041	0.023
Sour	21.4	0.804	0.130	0.022
Sweat	12.6	0.807	0.237	0.035

*Sensory scale 0 = least intense; 100 = most intense

IV. CONCLUSION

Testis weight seems to be a better on-farm tool than animal age or weight to mitigate the risk of boar taint in carcasses from intact animals.

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