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DISSECTED SAMPLE JOINTS AS INDICATORS OF BODY FAT CONTENT IN THE PIG

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OPSOMMING: GEDISSEKTEERDE KARKASSNITTE AS VOORSPELLERS VAN LIGGAAMSVETINHOUD BY VARKE

Hierdie studie is onderneem om die voeglikheid van verskeie gedissekteerde snitte van die varkkarkas as voorspellers van totale liggaamsvet te ondersoek, om sodoende die tyd, arbeid en koste wat in beslag geneem word by karkasevaluasie-tegnieke, te verminder.

'n Totaal van 22 Landras X Grootwit kruisings (kastrate) is gebruik as eksperimentele diere. Die diere is op een van 2 voedingsbehandelings vanaf agt weke ouderdom tot slagouderdom grootgemaak, waarna hulle een uit elke behandeling tweeweekliks vanaf 11 weke tot 31 weke ouderdom geslag is. Die kastrate is geslag en die liggaamssamestelling deur middel van chemiese analises en fisiese disseksies bepaal. Die data is gebruik om die verwantskap tussen gedissekteerde onderhuidse vet vanaf die verskeie karkassnitte en totale liggaamsvet te bepaal. Die onderhuidse vet van die boud en lendesnit was die mees gepaste snitte om te dissekteer, ten einde totale liggaamsvet te voorspel.

SUMMARY:

This study was undertaken to investigate the suitability of various dissected carcass joints as predictors of total body fat in the carcass in order to minimize the time, labour and costs involved in carcass evaluation techniques.

A total of 22 Landrace X Large White crossbred castrates were used as experimental animals. These castrates were allotted to one of two nutritional treatments when eight weeks old and reared till they were slaughtered, one from each treatment at 2 week intervals from an age of 11 weeks up to 31 weeks of age. The animals were slaughtered and their body composition determined by chemical analyses and physical joint dissection. The data were used to calculate the relationship between the subcutaneous fat from the various sample joints and total body fat. The subcutaneous fat from the ham and loin joints proved to be the most suitable joints to dissect for predicting total body fat.

Procedure

The pigs fed diets 1 and 3 in the study by Rossouw (1982) were used as experimental animals in this experiment. In addition to the analitical procedures described by Rossouw (1982) the shoulder, midback, loin and ham joints were each physically dissected into subcutaneous fat plus rind, muscle and bone components. The time taken to dissect each joint was also recorded. Regression relationships were then calculated between ln live mass (kg) of the animal and the ln of subcutaneous fat (kg) dissected from each joint.

Results and Discussion

The data of the regression relationships between ln total body fat (TBF) and ln dissected joint subcutaneous fat (SCF) revealed TBF to be highly correlated with SCF (Table 1). Although other research workers have not investigated SCF as an indicator of TBF the figures in this study indicate this parameter to be an accurate estimator of TBF in the pig. The data show SCF dissected from any of the four major carcass joints to be suitable predictors of TBF. Dissected joint SCF from the ham (0,9907) and from the mid-back (0,9930) had the highest correlation (Table 1).

The figures in Table 2 (calculated by Rossouw, 1982) indicate that the Ham and Loin joints were generally superior to the Shoulder and Midback joints in predicting TBF. These findings agree with the results of Hankins & Ellis (1934), Zobrisky, Brady, Lasley & Weaver (1959), Bowman, Whatley & Walters (1962), Cross, Carpenter & Palmer (1970) and Smith & Carpenter (1973). The data from this study does, however, indicate that the SCF from any carcass joint could be used in a logarithmic regression to calculate TBF. When selecting a parameter for the prediction of carcass composition in the pig, Mc Meekan (1941) indicated several points that must be taken into consideration. In the first place it is advisable to consider only joints

Table 1

Regression relationships between ln TBF and ln dissected SCF from the various carcass joints for treatments 1 and 3 in combination

x	y	Treatment	Regression equation	r	Syx
TBF	Total SCF	1 and 3	y = 0,1610 + 0,9700 x	0,9754	0,0840
TBF	Ham SCF	1 and 3	y = -1,6910 + 0,9000 x	0,9907	0,1095
TBF	Shoulder SCF	1 and 3	y = -0,5990 + 0,8100 x	0,9793	0,1449
TBF	Midback SCF	1 and 3	y = -1,5590 + 0,9400 x	0,9930	0,0949
TBF	Loin SCF	1 and 3	y = -2,0365 + 0,9869 x	0,9718	0,2338

x = x 1000

which could be separated from the body with a high degree of accuracy. For this reason he ruled out the Shoulder joint owing to an absence of well defined cutting margins.

It therefore seems desirable to use the more valuable parts of the carcass for they provide the required accuracy of estimate of the composition of the whole carcass (as was observed in this study). Cook, Cuthbertson, Smith & Kempster (1974) found that each joint predicted carcass composition with a similar degree of precision, and that selection of a joint for predicting TBF depends on the labour, costs, carcass depreciation and the precision of predicting carcass composition. These points were also stressed by Evans & Kempster (1979).

Time and costs involved in obtaining SCF from the various carcass joints

Table 3 presents the time (min.) and costs involved in dissecting SCF from the Ham, Shoulder, Mid-back and Loin dissections. The Ham is the most expensive joint followed by the Mid-back and Shoulder, the Loin being the cheapest. In order to standardise, time (min.) was multiplied by cost (c). Following this procedure, the Ham joint was found to be the appropriate carcass joint for predicting carcass composition when physically dissected fat is used as a criterion (Table 3).

According to Adam & Smith (1966) a complete physical dissection on a half carcass by a skilled technician took

Table 2

Relative precision of the regression equations calculated for estimating TBF at various live masses (Treatments 1 & 3)

Live Mass		90	86	60	50
x	y	kg	kg	kg	kg
TBF	LM	29,55	27,89	14,33	10,59
TBF	Ham SCF	28,95	26,68	13,95	10,02
% Dev.		2,03	4,33	2,65	5,38
TBF	Shoulder SCF	27,64	25,53	13,46	9,75
% Dev.		6,48	8,46	6,07	7,93
TBF	Mid-back SCF	28,74	26,40	13,50	9,65
% Dev.		2,74	5,34	5,79	8,87
TBF	Loin SCF	30,44	27,82	13,76	9,72
% Dev.		3,01	0,25	3,98	8,21

8 hours, comprising 3,5; 1,8; 1,0 and 1,7 hours for the Shoulder, Mid-back, Loin and Ham respectively. Although only the subcutaneous fat was removed in the present study, the trends in dissection time were not similar to those found by Adam & Smith (1966). The Loin took the longest and the Ham the second longest time to dissect.

Evans & Kempster (1979) found that the Ham and Shoulder joints were the least costly (each 12% of the whole side dissection cost). The Loin was intermediate (17%) whilst the mid-back was the most expensive to dissect (22%), a finding which is in agreement with the data in this study.

On the basis of these costs, and the relative precision of the different joints, the Ham joint proved the best compromise between cost and precision. Mc Meekan (1941) also reported that the Ham and Loin are the most desirable. Both joints can be separated with a high degree of precision and have a further advantage in that their dissection offers less technical difficulties than many other joints. Using various techniques, Hankins & Ellis (1934), Mc Meekan (1941), Hetzer, Hankins, Kind & Zeller (1950), Aunan (1951), Whitemand, Whatley & Hillier (1953) and Bowman *et al.* (1962) suggested that the proportions of the various tissues of the Ham are indicative of the proportions of the respective tissues in the entire carcass.

Table 3

Time and costs involved in dissecting each individual carcass joint

Joint	* Cost cent/kg	Time (min.)	CXT
Ham	68	5,08	345,4
Shoulder	58	6,44	373,5
Mid-back	58	7,09	411,2
Loin	48	7,77	373,0

* Fixed price of pork sold at the Pig Testing Centre, Irene.

Evans & Kempster (1979) stated that when comparing a genetic population where a full dissection of sub-samples was not possible (as in the case of Performance and Progeny testing of Boars), the Ham joint would be recommended for prediction purposes since both slopes and intercepts are stable over genotypes. Similarly the Ham joint is likely to be suitable for the carcass evaluation of the progeny of boars compared in breeding schemes. For experiments involving different levels of feeding without the possibility of full dissections, either the Mid-back or Shoulder joint should be chosen, since these joints have the most stable regression equations over feeding regimes.

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