Ultrasound Method For Intramuscular Fat Prediction In Live Pigs Using Two Different Procedures

Bahelka I., Tomka J., Demo P., Oravcová M.

Animal Production Research Centre, Institute for Animal Breeding and Product Quality, 95141 Nitra, Slovakia

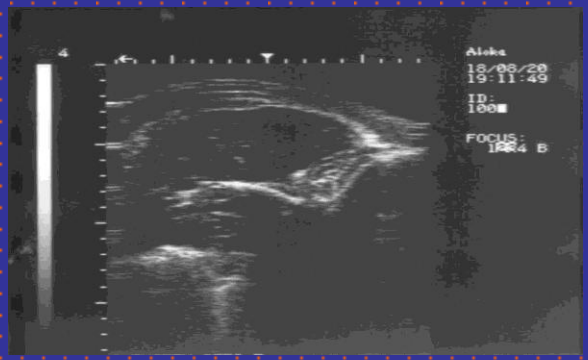
AIM

- to assess the possibility of prediction of intramuscular fat (IMF) in live pigs using two different procedures of ultrasound method: cross-sectional and/or longitudinal images of longissimus dorsi (LD) muscle

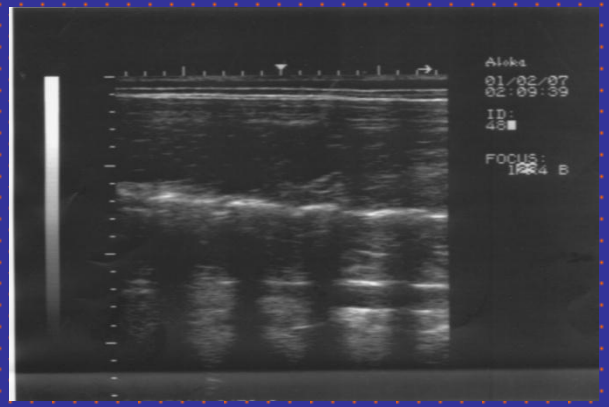
MATERIAL and METHODS

- in the 1st period, 52 hybrid pigs were scanned using ultrasonograph ALOKA SSD 500 with probe UST-5044-3.5 MHz at five different ultrasound intensities (70, 75, 80, 85 and 90 % of total amplifying of sonograph) for 1-3 days before slaughter

- cross-sectional images of LD muscle at right last rib area were taken



- in the 2nd period, longitudinal images of LD muscle at the same place (as 1st period) using ALOKA (at 80 % of intensity only, n = 66) and SONOVET 2000 fitted with 3.5 MHz probe (n = 33) devices were done



- all images were digitalized and analysed using video image analysis (software LUCIA, Laboratory Imaging, Prague, Czech Republic)

- dissection of right half carcass 24 h post mortem was done and the samples (150-200 g) of LD muscle (at the same place as ultrasonic images) for laboratory analysis of IMF were taken (LAIMF)
- results were calculated in the statistical package SAS/STAT, version 9.1.3. (2002-2003)

RESULTS

Table 1. Correlations between laboratory and ultrasound analysed IMF

Ultrasound (cross-sectional images)	LAIMT
Intensity of 70%	0.196
Intensity of 75%	0.403**
Intensity of 80%	0.530***
Intensity of 85%	0.340*
Intensity of 90%	0.206

*P<0.05; **P<0.01; ***P<0.001

Table 2. Regression analysis of dependence of laboratory analysed IMF

Independent variable	Regression equation	Standard error of prediction for		R^2
	$y = b_0 + b_1x$	b_0	b_1	
IMF at intensity of 70 %	*y = 2.30 + 0.13x*	0.149	0.090	0.04
IMF at intensity of 75 %	*y = 2.08 + 0.24x*	0.156	0.076	0.16
IMF at intensity of 80 %	*y = 1.57 + 0.37x*	0.202	0.084	0.28
IMF at intensity of 85 %	*y = 2.12 + 0.23x*	0.202	0.092	0.12
IMF at intensity of 90 %	*y = 2.31 + 0.11x*	0.167	0.074	0.04

Table 3. Correlations between laboratory and ultrasound analysed IMF

Ultrasound (longitudinal images)	LAIMT
ALOKA	0.494***
SONOVET	0.441*

*P<0.05; ***P<0.001

Table 4. Regression analysis of dependence of laboratory analysed IMF

Independent variable	Regression equation	Standard error of prediction for		R^2
	$y = b_0 + b_1x$	b_0	b_1	
ALOKA	$y = 1.50 + 0.38x$	0.203	0.085	0.24
SONOVET	$y = 1.79 + 0.28x$	0.271	0.103	0.20

CONCLUSION

- the intensity of 80 % of total ultrasound amplifying appears as the most suitable to predict IMF in live pigs
- both procedures, cross-sectional and longitudinal images resp., showed nearly equal precision using ALOKA device which has been higher than using SONOVET