PIG CARCASS GRADING IN EUROPEAN UNION

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BACKGROUND

Pig grading is regulated according to an EC scheme. This scheme for grading by using objective measurements to estimate lean proportion was introduced in 1984. Leanness would be calculated by full dissection. This expensive procedure has encouraged some Member States to use a national dissection method, which has introduced biases. To remove these distorsions the EC decided to simplify the dissection. A new definition of the lean meat proportion, based on the dissection of the 4 main joints, was adopted in 1994 (EC regulation n° 3127/94 ; Walstra and Merkus, 1995). As a consequence all Member States have to realize a new dissection trial and assess new grading methods. In 1998, only half of the countries have developed new methods, which leads to a confuse situation.

OBJECTIVES

The objective is to help to compare the grading results between the EU countries.

GRADING APPROVED METHODS

On May 1998, among the 15 EU Member states, 8 have gained approval for grading methods predicting the new lean meat proportion. The 7 other countries have also authorized methods, but for predicting the old lean meat percentage, resulting from a full dissection or a national dissection. Accuracy of all new and old presently approved methods is given in the table 2.

Most of the methods use 2 or 3 predictors : 1 or 2 fat depths and one muscle depth. One fat depth and the muscle depth are measured laterally to the midline, generally 6 cm off, at rib area, in most cases at ¾ last ribs (LR). When a second fat depth is used it is either at ¾ last lumbar vertebra (LV) 8 cm off the midline or at LR 6 or 8 cm off the midline. For measuring laterally to the splitline are used probes based on reflectance or optical or ultrasounds.

A significant sex effect between females and castrates in the prediction of lean meat percentage was reported in The Netherlands by Engel and Walstra (1993), in France by Daumas et al. (1994 and 1998), in Germany by Branscheid et al. (1997) and in Belgium by Casteels et al. (1996). But a separate equation for each sex is only in use in France.

Different devices are generally authorized in each country. Most of them use reflectance principle. Two automats are also authorized, one, Classification Center, using 7 reflectance probes, and the other, Autofom, using 16 transducers scan A. The 3 devices the most used, 20 to 30 millions pigs classified per year, are the french Capteur Gras Maigre (CGM), the danish Fat-O-Meater (FOM) and the New Zealand Hennessy Grading Probe (HGP). All are reflectance probes, but they differ in resolution, profile analysis and quality of components.

For the small slaughterhouses are used either Optical probe or ZP-method. Optical probe is used in Finland, Sweden and Great Britain. ZP-method is used in Germany, France and the whole Austria.

Until now, the lowest error (root Mean Square Error) was reached by the danish Classification Center (1.70), thanks to its 10 measurements. Results of the recently approved Autofom, using 2000 measurements resulting in 127 variables, differ according to country (1.84 in Denmark and 1.58 in Germany). The error of the semi-automatic probes lay between 2.0 and 2.4, depending on countries, sampling, predictors, predicted lean meat. One exception comes from the last trial in Spain with a surprising low error (1.58) for FOM, in contradiction with the anterior trial (2.23). Optical probe and ZP-method error is close to 2.5, the maximal EU authorized level.

GRADING METHODS IN USE

Most of the main producing countries have now new authorized methods, except Spain and The Netherlands. But on May 1998 only 5 countries have implemented its in their slaughterhouses : Finland, Denmark, France and Germany in 1997 and Austria in 1998. But grading statistics are only published in Denmark and France. Both countries have now exactly the same level, 60.0. As Denmark slaughters 10 kg lighter than France and still uses some entire males, it means France has a slight advance in genetic and management. Both countries, with probably Belgium (estimated at 61), have the highest lean meat proportion in Europe (see table 1).

For the other countries, the average level can be estimated through the dissection sample, which has to be representative of the national production. Results presented at the Pigmeat Management Committee in Brussels have shown than most of the countries have an average level comprised between 56 to 58. This is also the case of the countries producing mainly entire males : Spain, Ireland and United Kingdom. For comparisons it has to be taken into account that entire males have a lean meat proportion around 3 points higher than castrated males and also that increasing slaughterweight 10 kg decreases around 1 point lean meat proportion.

CONCLUSIONS

In 1998 is the harmonization of grading methods in EU still incomplete. Half of the countries have gained approval of new methods predicting the new lean meat proportion (from dissection of the 4 main joints) and only 5 have implemented its in their slaughterhouses. This partial harmonization has changed the hierarchy, putting France at the top with Belgium and Denmark. All the other countries are still using methods predicting the old lean meat proportion (from full dissection or national dissection), which do not permit a fair comparison. At less 2 years more will be necessary to achieve a complete harmonization.

New technologies, especially using ultra-sounds, have been developed. The most promising at the moment seems to be the danish automatic system Autofom. But price is still high compared to the accuracy improvement (0.2 to 0.4 of RMSE). Advantage concerns

more the classification of joints. The semi-automatic probes (reflectance or ultra-sounds) would therefore stay for a long time the most common used instruments.

Two methodological improvements have recently been introduced in grading, both by France : use of sex as predictor and development of a calibration procedure of predictors in regression (Causeur and Dhorne, 1998). A specific sex-equation must contribute to a closer matching between offer and demand, to the benefit of producers and meat manufacturers. The new calibration procedure now allows to gain approval of new methods quickly and cheaply, without dissection. Furthermore the measurements will not necessary be the same as those of the reference method.

LITERATURE

- Branscheid W., Dobrowolski A., Höreth R, 1997. Neue Schätzformel und ein neues Gerät. Top Agrar 3/97, 8-11.
- Casteels M., Van de Voorde G., De Smet S. (1996). Protocol for the approval of CGM and PG 200 as grading methods for Belgium. EC Working Document VI/3013/96.
- Causeur D. and Dhorne T. (1998). Calibrating predicting variables in linear regression models. Submitted to Biometrika.
- Daumas G., Causeur D., Dhorne T., Schollhammer E. (1998). The new pig carcass grading methods in France. Proceedings of 44th ICoMST, Barcelone (Spain).
- Daumas G., Dhorne T., Gispert M. (1994). Accounting of the sex effect on prediction of pig carcass lean meat percentage in the Community. Proceedings of 40th ICoMST, The Hague (The Netherlands), S-III.11.
- Engel B. and Walstra P. (1993). Accounting for subpopulations in prediction of the proportion of lean meat of pig carcasses. Anim. Prod. 57, 147-152.
- Walstra P. and Merkus G.S.M. (1995). Procedure for assessment of the lean meat percentage as a consequence of the new EU reference dissection method in pig carcass classification. ID-DLO document.

Table 1 : Average of lean meat proportion by country

Country	Belgium	France	Denmark	Great Britain	Germany	Austria	Spain	Sweden	Finland	Ireland	Nether-lands
% Lean	61	60	60	58	57	57	57	57	56	56	56
Method (1)	New	New	New	Old	New	New	Old	New	New	New	Old
Year	1996	1997	1997	1996	1995/96	1996	1996/97	1996	1995	1996	1997
Source (2)	Sample	National	National	National	Sample	Sample	Sample	Sample	Sample	National	National

(1) New or old lean meat proportion. (2) From national statistics or from sample used for dissection trial.

Table 2 : Accuracy (root Mean Square Error) of the new and old approved methods by country

Approval year	COUNTRY	Auto -fom	CC (1)	CGM	FOM	Uni -fom	HGP	PG 100	PG 200	OP (2)	Ultra Meat -er	Ultra FOM	US Porki -tron	ZP (3)
NEW METHODS														
1998	IRELAND				2.22		**2.30**							
1997-98	FRANCE Female			**1.98**							2.24			2.45
1997-98	FRANCE Castrate			**2.17**							2.21			2.49
1997	SWEDEN						**2.10**			2.47				**2.38**
1997	AUSTRIA													
1997	GERMANY	1.58			**2.14**	2.25	2.05		2.22		2.12		2.20	2.52
1997	BELGIUM			2.08					2.45					
1996	DENMARK	1.84	**1.70**		2.02	2.22								
1996	FINLAND						**2.17**							
OLD METHODS														
1994	SPAIN				1.58									
1992	NETHERLANDS						**2.1**							
1992	PORTUGAL				2.40		2.39			2.38				
1988-93	GREAT BRITAIN				2.23		2.37			**2.31**	1.96	2.38		
1989	GREECE				2.12		2.18	2.30						
1988	ITALY light				2.37			2.44		2.38				
1988	ITALY heavy				2.30			2.36		2.45				
1988	LUXEMBOURG						**2.42**							

In bold the most common method in use by country.

(1) Classification Center

(2) Optical Probe

(3) Two points method : one fat depth and one muscle depth at splitline