

PERCENTAGE OF LEAN MEAT EVALUATION OF PIG CARCASSES ACCORDING TO EU PROCEEDINGS

Gelu Movileanu

Valahia University of Targoviste, Faculty of Environment Engineering and Biotechnology
18-24 Unirii Street, 130082, Romania
E-mail: movileanug@yahoo.com

Abstract

Pig carcass grading is based on instrumental classification of pigs year incentive to produce the desired quality. Council Regulation EC Nr. 3220/84 classification requires that should be linked to the lean meat to be derived from dissection percentage of all striated muscle tissue from the carcass as light as possible by knife. Involved the reference method, however, is laborious. An EC was wide trial conducted in 1990/1991 to look for (him) to more dissection simplified method. The results of this trial we're described by Cook and Yates (1992). General acceptance evolved to dissect only the four main shares, representing about 75% of all striated muscles. Striated muscles to be defined as skeletal having a transverse banding pattern under the light microscope. Also the general agreement reached was fasciae that I would be defined would be muscle tissue and left on the muscles.

Keywords: carcass, lean meat, dissection, optical instruments, striated muscle tissue

1. INTRODUCTION

Grading of pig carcasses by classifying instruments aimed at stimulating farmers to produce high-quality pigs. Council Regulation EC Nr. 3220/84 states the following fact: the classification must be linked to the percentage of muscle tissue obtained by dissection with a knife as far as possible all the striated muscles of the body. [2] . Reference method implies that it is laborious. In 1990/1991, a test was done by the EC in order to find a more simplified method of dissection. The results of this test have been described by Cook and Yates (1992) [1]. General agreement has been reached only perform dissection of four main parts, which account for 75% of total striated muscle. Striated muscles are defined as muscles on the skeleton structure with a cross at the light microscope. It was also a general consensus on the fascia were defined as muscle tissue, and will remain on the muscle. Consequently, with the change depending on the numerator and denominator, this means a radical change in the percentage of lean meat. However, the introduction of a grading factor for establishing an EU-wide average of approximately 55% muscular tissue.

Reference method aims comparability and reproducibility, particularly when dissecting the muscles is only coming from some sections, definitions are important for slicing procedure of the case, they must be very clear. The definition and separation of housing and cuts tissue is well documented to be used as a guide for the new EU reference method.

Evaluation of the percentage of muscle tissue

The numerator for calculating the percentage of muscle tissue is composed of the total weight of muscle tissue in the pulp, chop, shoulder, chest and sirloin. The total weight of the muscles of these parts is defined as the difference between the total weight of these parts before dissection and total weight of fat, rind and bones after dissection. Thus, weight differences between the weight before and after dissection, which are due to cutting and evaporation losses are included in the numerator. The tenderloin is not dissection, its total weight is assigned to muscle tissue. In general, fascia and tendons leave the muscle as will be discussed later.

Denominator to calculate the percentage of muscle tissue is defined as the sum of all parts whether or not it makes dissection on them.

The formula to calculate the percentage of muscle tissue is as follows: (a calculation example is given in Annex I):

$$Y = C \times 100 \times \frac{\sum^4 (J - SSF - IF - B) + T}{\sum^{12} J}$$

where:

- Y = percentage of muscle tissue
- C = 1.3 (constant factor / constant)
- J = weight portion of dissection before
- SSF = weight of skin with subcutaneous fat
- IF = intramuscular fat weight
- B = bone weight
- T = weight sirloin
- = Total weight of parts: leg, shoulder and chops including fat back and chest
- = Total weight of all 12 parts

In Figure 1, different parts are presented according to the new EU reference methods.

2. MATERIALS AND METHODS

Selection of carcasses

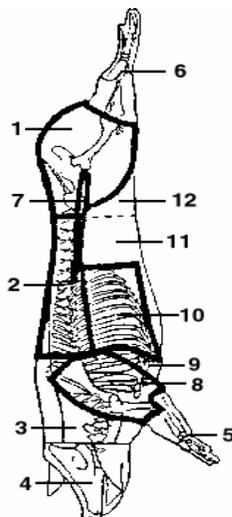
For muscle tissue dissection, use the left side of the case. In addition to selecting carcasses from a statistical viewpoint, it will use only those cases that were well cleaved (including the correct splitting of the head and sternum), along the spine spine, as well as across the

chest. If housing is not split properly, it will select the next frame with desired characteristics (race / hybrid and / or sex, weight, back fat, percentage of muscle tissue). In some slaughterhouses, cutting head is left whole, but still got through the rind and suspended weighing up to a half-carcass post-mortem after 45 minutes. In such cases, the selection of carcasses, the head must be weighed and the weight must be divided by two to obtain the correct weight of the housing. However, the head should be cut off to remove or brain.

Preparing the case

Before dissection, the carcass must be prepared to meet the requirements of Council Regulation (EEC) Nr. 3220/84 and Regulation (EC) Nr. 3513/93 [2], as housing is defined as "animal sacrifice, drained of blood and eviscerated, whole or cut along the median line, without tongue, bristles, hooves or genitals and without fat, kidney and diaphragm."

First be removed from the carcass parts that do not belong, such as tissue or remaining parts of the urogenital diaphragm (*diaphragma pars especially lumbalis*). Unlike the Council Regulation [3], in terms of EU reference method, the tail does not belong to the housing. This must be removed between the sixth and seventh coccygeal vertebrae. [6]. The same applies to the spinal cord and brain before dissection. Cold carcass weight is recorded before dissection in order to verify weighing errors during dissection. [6].



- 1 Round(ham)
- 2 Chop
- 3 Neck
- 4 Cap + goiter
- 5 Boiled leg compared to
- 6 Rear leg rear
- 7 Tenderloin
- 8 Shoulders
- 9 Brisket
- 10 Chest
- 11 Fried 1
- 12 Fried 2

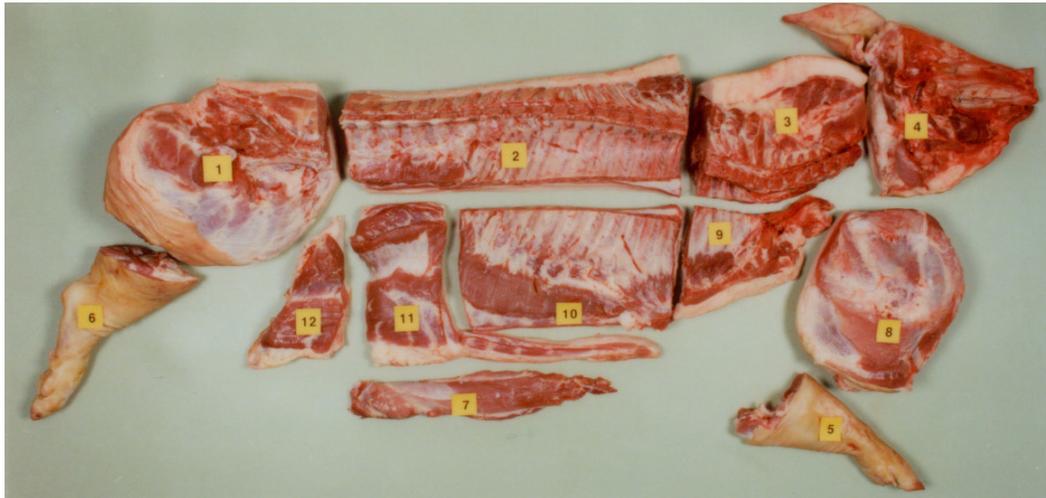


Fig. 1. Portioning housing according to the EU reference method.
Main sections the dissection is carried out are bold areas.

Dissection

Total dissection is performed only on the four main sections, this means it is completely separated from the pulp tissue, chops, shoulder and chest muscles, bones and fat [3]. The fat is divided into subcutaneous fat including rind (skin) and intramuscular fat. The latter remains after separation from the other muscles of each muscle. All weights except the weight of the half, it recorded at least up to the nearest 10 grams, or up to 5 or 1 gram if possible. [5].

3. RESULTS AND DISCUSSIONS

To achieve national tests the dissection, 145 carcasses were dissected from 14 pig farms representative of the population in Romania. Dissection was done in a separate room at the slaughterhouse ALDIS at 24-48 hours after slaughter in perfect conditions refrigeration (temperature below 10 °C). Cutting was done by the same experienced butcher, the method of reference for dissection in the EU (Walstra and Merkus, 1996). [4]. Im weight loss during dissection were extremely small, on average, 0.38% for pulp, 0.49% for the chop, 0.44% to 0.84% for the shoulder and belly. Dissection of four main parts of carcasses was done by 10 butchers. Dissection was supervised throughout

the deployment by specialists from Danish Meat Research Institute.

Information provided by the equipment used to test the two National dissection [7]. are as follows:

Fat-O-Meat'er (FOM)

N = 145

R² = 0.78288

RMSE = 2.48840

$$Y = 60.26989 - 0.81506 * 0.20097 * X1 + X2$$

RMSEP = 2.51938

Y = estimated percentage of lean meat
X1 = fat including rind thickness, in millimeters, measured at 7 cm from the midline between the 3rd and 4th last rib
X2 = muscle thickness in millimeters, measured at 7 inches, the midline between the 3rd and 4th last rib.

OptiGrade-Pro

N = 145

R² = 0.79425

RMSE = 2.42238

$$Y = 61.21920 - 0.77665 * 0.15239 * X1 + X2$$

RMSEP = 2.45933

Y = estimated percentage of lean meat

X1 = fat including rind thickness, in millimeters, measured at 7 cm from the midline between the 3rd and 4th last rib

X2 = muscle thickness in millimeters, measured at 7 inches, the midline between the 3rd and 4th last rib. [7].

The results were as follows:

Table 1: Dissecting the sample parameters

| Sex | % Lean dissection | Hot carcass weight (Kg) | Thick bacon FOM (mm) | FOM muscle thickness (mm) | Thick bacon OGP (mm) | OGP muscle thickness (mm) |
|--------------------|-------------------|-------------------------|----------------------|---------------------------|----------------------|---------------------------|
| Females | 57,71 | 79,87 | 17,39 | 53,69 | 15,98 | 53,57 |
| Average | 72 | 72 | 72 | 72 | 72 | 72 |
| N | 5,537 | 7,368 | 4,961 | 8,106 | 5,346 | 10,508 |
| Deviation Standard | | | | | | |
| Medium | 54,91 | 79,92 | 18,62 | 52,89 | 17,09 | 50,53 |
| Males | 73 | 73 | 73 | 73 | 73 | 73 |
| N | 4,696 | 8,195 | 4,393 | 8,103 | 4,493 | 9,032 |
| Deviation Standard | | | | | | |
| Total | 56,30 | 79,90 | 18,01 | 53,29 | 16,54 | 52,04 |
| Average | 145 | 145 | 145 | 145 | 145 | 145 |
| N | 5,303 | 7,768 | 4,707 | 8,086 | 4,949 | 9,877 |
| Deviation Standard | | | | | | |

The differences between old and new can be seen in reference tab.nr.2

Table 2. Lean Meat Dtribution

| Character | Media | Deviation Standard | Minimum | Maximum |
|--|--------------|--------------------|---------|---------|
| Hot carcass weight, kg | 79.9 | 7.77 | 58.6 | 100.7 |
| Cold half-carcass weight, kg | 39.3 | 3.87 | 28.5 | 50.4 |
| Lean meat dissection,% ("old" reference) | 54.36 | 5.53 | 37.23 | 65.51 |
| Lean meat dissection,% (baseline 2006) | 56.30 | 5.30 | 38.61 | 66.89 |
| FOM X1, mm | 18.0 | 4.71 | 10 | 32 |
| X2 FOM, mm | 53.3 | 8.09 | 37 | 74 |
| OGP X1, mm | 16.5 | 4.95 | 9.4 | 30.8 |
| OGP X2, mm | 52.0 | 9.88 | 32.1 | 82.2 |

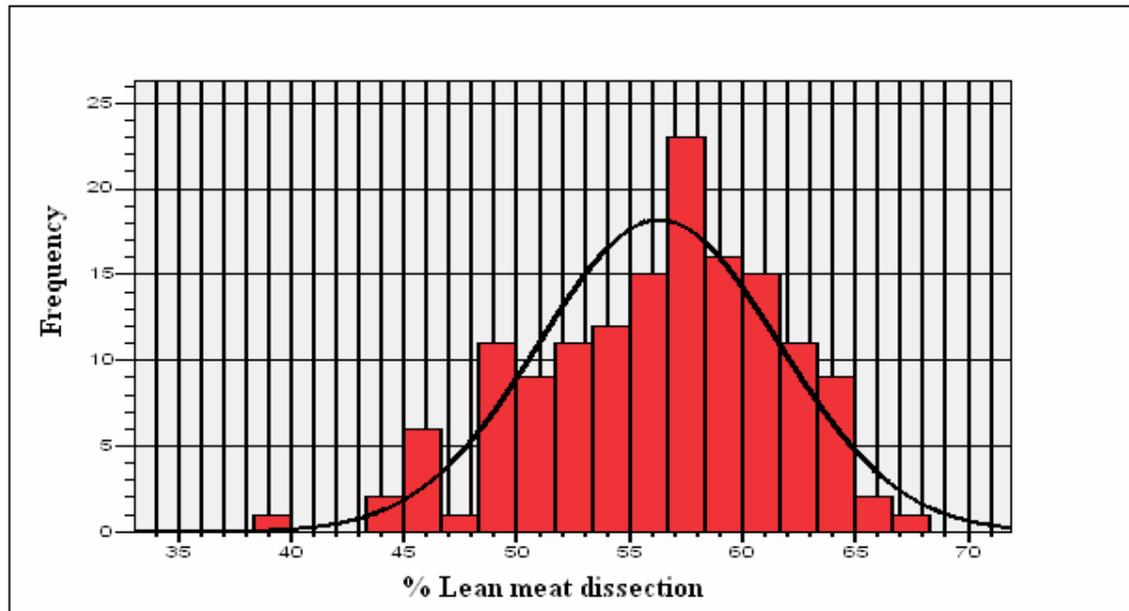


Fig..3. Lean meat percentage distribution obtained from the national test.

4. CONCLUSIONS

- The purpose of standardization is to create a comparable basis, even for the price paid by suppliers of pig slaughterhouses. For example, a supplier delivers contemporary groups of pigs at two abattoirs. In a slaughterhouse is used for classification of pig carcasses Fat-o-Meat'er equipment and the other OptiGrade-Pro. Required for consignment, so estimates of the proportion of lean meat, and distribution of quality classes will be very similar.
- In Romania: 1 unit corresponds to approximately% of lean meat to approx. 6.12 RON / kg. carcasses.

5. REFERENCES

- [1] Cook, GL and CM Yates. Report by the Research Commission on the harmonization of methods for grading pig carcasses in the Community. September. (1992) (in press).
- [2] Council Regulation EC Nr. 3220/84 to assess the Community scale for grading pig carcasses. (1984) November., 3 pp
- [3] Council Regulation EC Nr. EC Regulation No. 3513/93 that change. 3220/84 (1993) 3 pp
- [4] VETERINARY ANATOMY OF NOMINAL. Third Edition it. International Committee for veterinary anatomical nomenclature. Ithaca, New York (1983) 209 pp
- [5] Scheper, J. and W. Scholz. Zerlegung DLG-Schnittführung für die von der Schlachtkörper Rind, Kalb, Schweina and Schaf. Arbeitsunterlagen DLG (1985) 31 pp
- [6] Gelu Movileanu Classification and inspection of carcasses of pigs, cattle and sheep according to EU, Bucharest, Ed.Ceres, 2008.
- [7] Marian Laba Commission classification of carcasses