Genetic aspects of the technological and eating qualities of pig meat

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A survey of the genetics of meat quality in pigs is presented. Genetic effects play a primary role in the overall variation of the technological and eating qualities of pig meat and our present knowledge may be summarized as follows.

(1) The halothane sensitivity gene, in the homozygous state, induces a very fast fall of muscle pH and is directly responsible for the PSE (pale, soft, exudative) meat condition. It explains to a large extent the genetic variation in technological qualities (drip loss, processing yields) and also in eating qualities (especially tenderness) of pig meat.

(2) It may be admitted that the halothane sensitivity gene is almost completely recessive as regards its effect on meat quality, though certain results do not support this assumption.

(3) The breed variation in pork technological qualities partly results from the large breed differences in halothane gene frequency, but other factors are implied, particularly those which affect meat ultimate pH. One example is the so-called « Hampshire effect » which leads to the « acid meat » condition and could be due to a single dominant gene (RN−) : the latter point however awaits confirmation.

(4) In addition to the halothane sensitivity gene, an important factor responsible for the breed variation in pork eating quality is the intramuscular fat content.

(5) The heritability of technological quality criteria (pH, reflectance, ...) is of moderate magnitude (0.20 to 0.30), whereas that of intramuscular fat content is higher (0.40 to 0.50).

(6) A genetic antagonism, more or less marked according to the populations and the traits involved, exists between pork technological quality and growth or body composition traits. The halothane sensitivity gene is the major factor responsible for the « meat quantity-meat quality » genetic antagonism, since its effect is unfavourable on meat quality while favourable on carcass lean content.

(7) The within-breed genetic relationship seems to be of rather low magnitude between intramuscular fat content and carcass fatness.

Influence of halothane sensitivity and ultimate pH on meat quality in three pig breeds

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The technological qualities of the meat from 45 Large-White (LW), 42 Pietrain (P) and 58 Belgian Landrace (BL) purebred pigs were assessed by fresh meat measurements and cooked « Paris ham » processing ability. There were 9 halothane-negative (HN) and 33 Halothane positive (HP) animals among P pigs, 16 HN and 42 HP among BL pigs, whereas all the LW pigs were HN. Glycolytic potential and a number of enzyme activities of three muscles of various metabolic types where measured on a subsample of 101 pigs (28 LW, 30 P, 43 BL). As a general rule, the