INVESTIGATIONS ON THE TOPOGRAPHIC DISTRIBUTION OF THE INTRAMUSCULAR FAT (IMF) CONTENT AND ITS RELATIONSHIP TO SENSORY TRAITS OF THE *M. LONGISSIMUS* IN SWINE

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Background
Numerous authors report on differences in IMF content as well as in the fatty acid composition of the IMF, in palatability scores and in m quality traits between different muscles of the carcass (TOPEL et al., 1966; BEECHER et al., 1965; ALLEN et al., 1967; FISCHER, 19 SCHEEDER et al., 1996). Moreover, within single muscles (e.g. M. longissimus) IMF and meat quality differed depending on the localisa of the measuring point (BLUMER et al., 1962; COOK et al., 1964; DAVIS et al., 1975; FISCHER, 1992; TAYLOR et al., 1993; WICKE et al., 19 MUßMANN, 1995; ZEMBAYASHI et al., 1995; HEYLEN et al., 1996). The rough distribution pattern of IMF in M. longissimus is relatively w known in domestic animals (cattle, sheep, pig). However, detailed investigations on the distribution pattern and on a representive measu point for reliable estimation of the average IMF content are still necessary for a potential integration of this trait in selection and marke programs.

Materials and Methods
Carcasses of 75 gilts and castrates of a commercial crossing (Pietrain x [German Large White x German Landrace]) were investigated. average carcass weight and the lean meat percentage was 96.7 ± 11.6 kg and 55.8 ± 4.9 kg respectively. The IMF of the homogenized mus samples was measured with a NIT analyzer (Infratec 1255). The data of the calibration curve based on values determined by Soxhl extraction (n-hexane) without acid hydrolysis. The IMF values are given as % of wet weight. For determination of sensory traits the mus samples were heated to 75°C core temperature and evaluated by a test panel. The traits juiciness, tenderness, flavor and overall accepta were scored from 1 to 6 (higher values - better eating quality).
The cross-sectional distribution of IMF were measured at each 5 regions (fig. 2) in 8 measuring points (fig. 1) of 25 longissimus muscles. The analysis of variance was done with the software package STATISTICA. LSQ-means were compared with the Newman-Keuls-test.

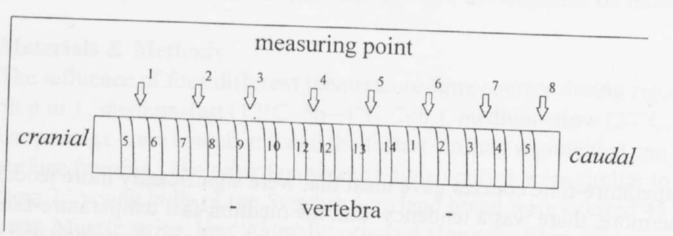

Fig 1: Measuring points for the investigation of the longitudinal distribution pattern of IMF

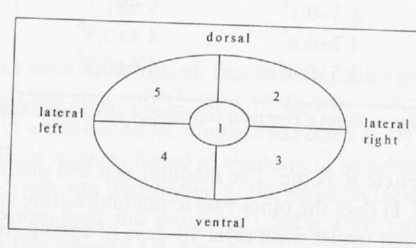

Fig. 2: Measuring points for the investigation of crossectional distribution IMF

Results
The IMF values range from 1.98 % (11th/12th thoracic vertebrae) to 4.18 % (5th/6th lumbar vertebrae; fig. 3). There is a significant increased variability in IMF in the cranial as well as in the caudal regions, respectively. Obviously, this is due to the higher absolute IM content in these regions compared to the medial region. These results are in accordance with investigations of BLUMER et al. (1962) an FISCHER (1992). The reference measuring point (13th/14th rib; No. 5 in fig. 1) is characterized by the second lowest IMF content of a investigated regions. The values obtained for the region 8th/9th rib (No. 2/3 in fig. 1) represent best the average IMF content of the who muscle (2.73 %).
There are significant differences in meat quality between the different measuring points (figs. 4 and 5). So, meat color brightness is differe between region 1 and all other regions as well as between region 2 and regions 4, 7 and 8. The Minolta a*-values differ significantly betwe regions 7, 8 and the other ones whereas the b*-values in regions 2, 3, 4 are different from those in the other regions.
The increased meat color brightness in the cranial region is obviously caused by the visibly increased number and size of intramuscular fa particles. Higher IMF values in the caudal region do not affect color brightness in the same manner, probably due to a more intense color (re as indicated by higher a*-values). On the other hand, the IMF in this region is located more ventrally within the muscle, thus increasing th risk of measuring errors.
The average values of the muscle for color brightness (L*=49.2), color intensity and saturation (a*=7.1; b*=2.5) are reflected best in th regions 9th/10th thoracic vertebrae and 13th thoracic/1st lumbar vertebrae, respectively.
In the cranial region of the M. longissimus we found no cross-sectional differences in the IMF content. In contrast, there are significan differences between the ventral regions (No. 3, 4; fig 2) and the dorsal and central parts (fig. 6). We observed a „tree-like“ fat intercalation i this region which is responsible for these results.
In figure 7 the sensory trait overall acceptance is plotted versus the investigated measuring points.
There is a significant influence of the region on all scored sensory traits. The almost parallel trend of the IMF values and sensory traits (r= .5 to .6) is in contrast to reports on low correlations between IMF and eating quality of meat.

The black frame in figure 7 indicates the average scores in sensory traits. Thus, a representative evaluation of eating quality can be done at one measuring point (10th/11th thoracic vertebrae) for all 4 single traits.
The region 9th/10th thoracic vertebrae seems to be the best compromise to obtain representative results for both IMF and sensory traits with only one sample of the M. longissimus.

Conclusions

- There are significant differences in the IMF content within the M. longissimus longitudinally as well as cross-sectionally.
- Similar differences were found for meat quality (color; eating quality).
- The highest IMF content is located in the cranial and caudal regions, respectively.
- The data obtained from the measuring region 8th/9th thoracic vertebrae reflects the average values the muscle better than the commonly used reference measuring point (13th/14th rib).
- An exact standardisation of the measuring points is necessary for comparability of IMF values.

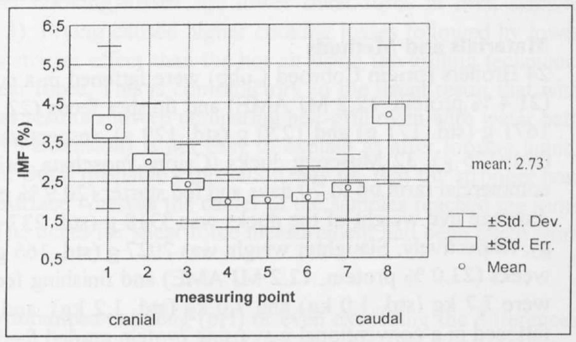

Fig.3: Distribution of IMF-content at the longitidunal axis of M. long.

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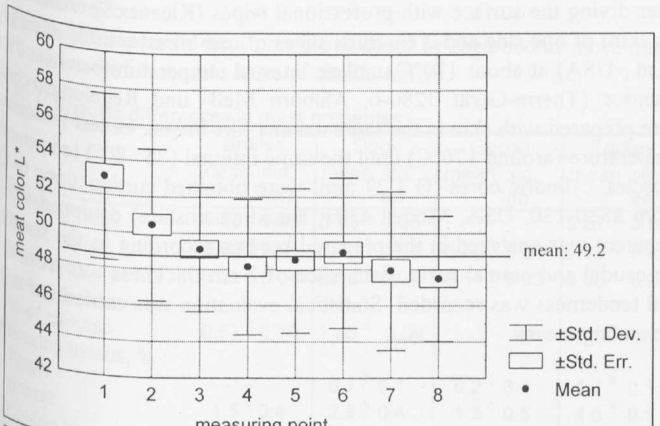

Fig. 4: Meat color (L*) of M. longissimus depending on measuring point

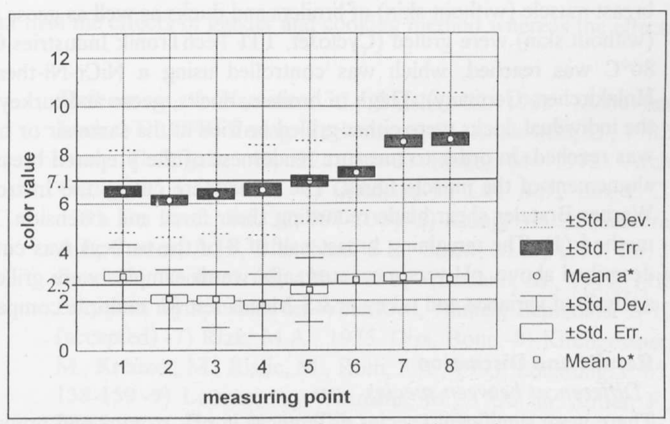

Fig. 5: Color values a*,b* of M. longissimus depending on measuring point

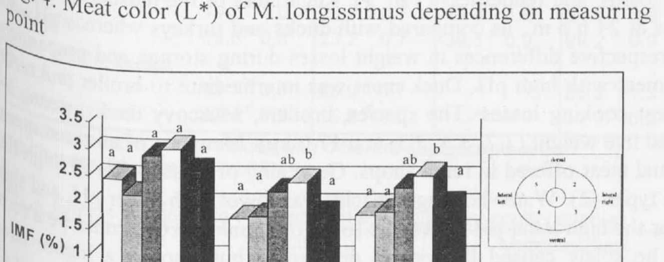

Fig 6: Comparison of IMF contents of M. longissimus in different measuring regions

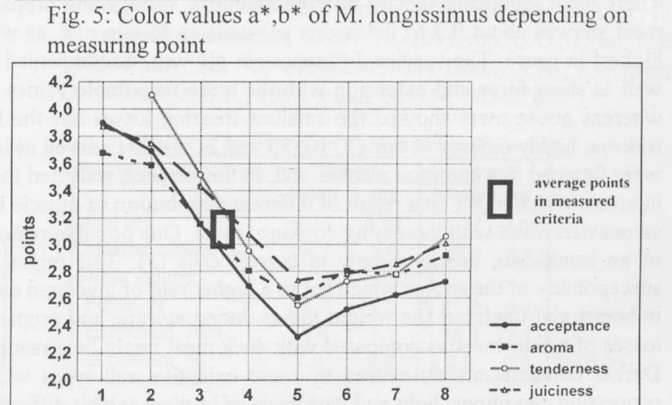

Fig. 7: Sensory traits of the M. longissimus at different measuring points