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## AMINOACID COMPOSITION OF LONGISSIMUS THORACIS FROM PIGS OF TWO GENETIC LINES

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### Introduction

Amounts of free amino-acids were described in several meat species (Gardner et al., 1969, Koga et al. 1988) but little is know about variation of these compounds within the same specie with different genetic types and variations of the diet. The importance of to identify and to quantifier the aminoacids is also because these are precursory of meat quality. Moreover the sensory evaluation (flavor, aroma, taste etc.) is influenced by their ratio. The aim of the work described in this paper was to evaluate the effect of genetic type and the addend of methionine in the diet on chemical composition as well as the presence of amino acids in longissimus thoracis muscles of pigs.

### Materials and Methods

An analysis of amino acids and chemical composition was performed on longissimus thoracis (LT) muscle from pigs. Ten (**L**) Landrace x (Landrace x Large White) and ten (**LW**)Large White x (Landrace x Large White) entire males were allotted to dietary treatments to determine the effects of dietary methionine. The trial was conducted from winter through spring and the dietary treatments consisted, during 41 days (grower stage), of a basal diet; after this time, for 49 days (finisher stage), the pigs of each genetic type were divided in two groups, the first one fed on the basal diet, and the second on the basal diet fortified with (**M**) methionine (0.1%) .

The animals were slaughtered when they reached an average weight of 108 kg and the samples from the above muscle were removed from the carcasses 24 h postmortem and stored at -35 °C until required for analyses.

Chemical Analyses: Duplicate analyses were made to determine dry matter and ether extract by standard methods; Protein was determined by Kjeldahl nitrogen analysis (AOAC, 1990).

Amino Acid Profiles: Samples from LT muscle were minced and homogeneized. Centrifugation, and removal of proteins by precipitation with trifluoroacetic acid to a final concentration of 4.8% yelded clear supernatants which were directly derivatized with the phenylisothiocyanate according to the method described by Bidlingmeyer et al. (1987). The resulting phenylthio-carbamyl-amino-acids, and dipeptides (PTC-AA) were separated in 100 min by reverse phase, high-performance liquid cromatography at 54 °C on octadecyl (C18) column, 25 cm in length. Components were eluted by a series of linear gradients. Solvents A and B contained 0.07 sodium acetate, both at pH 6.5, solvent B having 40% acetonitrite and 10% methanol. The PTC-AA were detected at 254 nm.

Collagen: Collagen was determined on pig muscle after mincing through a 0.4 cm plate in a table top meat grinder. Collagen content was measured in duplicate for each muscle sample following the procedure of Woessner (1961) as described by Sebranek et al. (1989).

Statistical Analysis: An analysis of variance was performed to separate means, and differences among means were determined by the least-square means procedure in the General Linear Models procedure of SAS (1985).

### Results and discussion

The amino acid data expressed as mg/100 g of protein (referred to 67% on the average of protein recuperated) for the samples of longissimus thoracis muscle are shown in table 1. Amounts of glutamic acid ($P < 0.01$), alanine, arginine, valine, isoleucine and leucine ($P < 0.05$), were greater in the genetic lines LW vs L; except for lysine (4.23 vs 3.87; $P < 0.01$). In general the data for the diet presented similar profiles with only few significant differences for lysine and histidine ($P < 0.01$); glycine and proline ($P < 0.05$). The general profiles of the amino acids from many reports are similar to the data from this report, but some differences between our values and those reported in literature are in function of the large variety of chromatographic technique (Cohen and Strydom, 1988; Sarwar and Botting, 1990). Chemical composition (protein, fat, moisture, collagen,ash and connective tissue) is showed in the figure 1a and 2a. Few differences in the two different groups (genetic line and diet) are remarkable. The data showed more presence of the fat in samples of the muscle derived from animals of both genetic lines, but feed with more methionine (16.34 vs 14.66 LM; 15.26 vs 14.60 LWM). The trend about collagen and the connective tissue is opposite to the results observed for the fat.

### Conclusion

The diet fortified with methionine in the supplemented tested did not show differences in the amounts of amino acid and in chemical composition, whereas the genetic line appeared to influence the concentrations of about half the amino acid.

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Table 1. Aminoacid* composition of longissimus thoracis muscle of pigs

| | L | LW | *Mean values* | LM | LWM | *Mean values* |
|---|---|---|---|---|---|---|
| Aspartic acid | 0.85 | 1.01 | *0.93* | 0.91 | 0.95 | *0.93* |
| Glutamic acid | 2.86a | 3.28b | *3.07* | 3.02 | 3.07 | *3.05* |
| Serine | 0.58 | 0.69 | *0.64* | 0.61 | 0.65 | *0.63* |
| Glycine | 1.28 | 1.12 | *1.20* | 1.51 | 1.25 | *1.38* |
| Histidine | 0.34 | Tr | *0.21* | 0.46 | 0.11 | *0.28* |
| Threonine | 0.75 | 0.90 | *0.83* | 0.73 | 0.84 | *0.78* |
| Alanine | 1.37 | 1.54 | *1.46* | 1.47 | 1.37 | *1.42* |
| Arginine | 1.86a | 2.05b | *1.96* | 1.93 | 1.86 | *1.89* |
| Proline | 0.99 | 0.94 | *0.96* | 1.16 | 1.00 | *1.05* |
| Tyrosine | 0.69 | 0.77 | *0.73* | 0.68 | 0.70 | *0.54* |
| Valine | 1.06 | 1.25 | *1.15* | 1.11 | 1.07 | *1.08* |
| Methionine | 0.42 | 0.41 | *0.41* | 0.38 | 0.41 | *0.39* |
| Isoleucine | 1.08 | 1.26 | *1.17* | 1.09 | 1.14 | *1.12* |
| Leucine | 1.82a | 2.01b | *1.92* | 1.90 | 1.84 | *1.87* |
| Phenylalanie | 0.89 | 0.93 | *0.91* | 0.90 | 0.90 | *0.90* |
| Ornithine-2 | Tr | Tr | *Tr* | Tr | Tr | *Tr* |
| Lysine | 4.23A | 3.87B | *4.05* | 4.39 | 4.02 | *4.20* |

* (g/100g of protein).
a, b $P < 0.05$; A, B $P < 0.01$.

Figure 1a - Chemical composition of LT in pigs

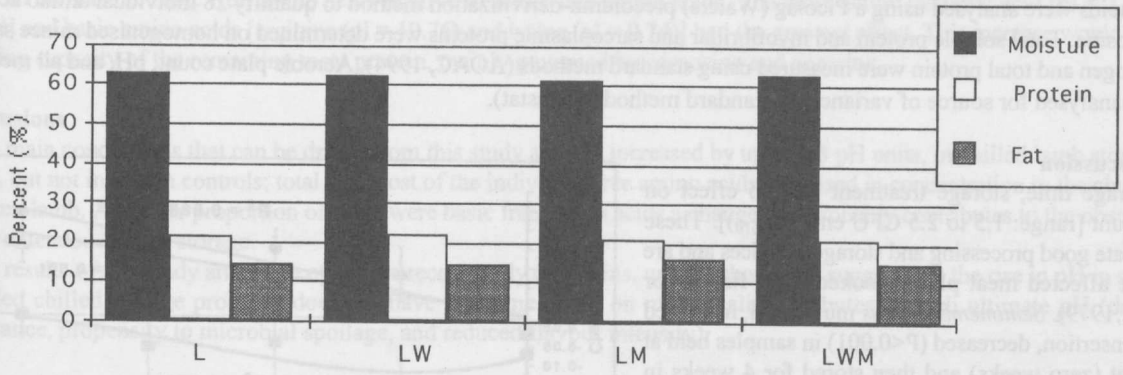


Figure 1b - Chemical composition of LT in pigs