INTERCALIBRATION OF ANALYTICAL METHODS - A PART OF THE EU PROJECT "SUSTAINABILITY IN THE PRODUCTION OF PORK WITH IMPROVED NUTRITIONAL AND EATING QUALITY USING STRATEGIC FEEDING IN OUT-DOOR PRODUCTION"

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Background

This ongoing EU-project "SUSPORKQUAL" covers seven research areas (WP):

WP1 Sustainable pig production. Economy and sustainability in different outdoor pig production systems compared with conventional systems.
WP2 Compensatory growth in pigs. Strategic feeding systems in order to improve sustainability, growth and meat quality in outdoor pig production.
WP3 Animal welfare and health in pigs. Studies of animal welfare in outdoor and conventional pig production systems in the period up to slaughter.
WP4 Residues in pigs. Identification and possible accumulation of residues in pigs from outdoor production systems compared with conventional systems.
WP5 Pork quality. Identification of pork quality (meat composition, eating quality, shelf-life and technological quality) of fresh and processed pork in relation to the production systems used.
WP6 Nutritional value of pork. Studies of the bioavailability of iron and zink from pork by humans.
WP7 Consumer demands and marketing possibilities of new pork products. Survey of the consumers' image of pork production systems and expectations, attitudes and willingness to by pork products

13 partners from 7 European countries (Denmark, United Kingdom, Estonia, France, Ireland, Poland and Sweden) are involved in the project.

The studies of WP5 aims to characterise the overall meat quality of pork produced in out-door production systems compared with conventional produced pork. Quality parameters describing carcass value, meat appearance, technological properties of the meat, eating quality measured both by sensory analysis and traditional subjective methods, shelf-life of fresh and processed pork and nutritional value will be performed. The data obtained will be used to compare the pork quality from pigs produced in the different production systems to determine which of the production systems produce better pork quality.

Objective

An intercalibration of some of the methods to be used in the project was performed in order to answer the question "Is it possible to compare the analytical results from different partners?" The results from the analysis of the water, fat, protein, pigment (hemin), iron and zink contents are presented in this paper.

Methods

Nine samples of minced pork were prepared by one partner and distributed frozen to the other partners involved. Three muscles, *M. Longissimus dorsi*, *M. Biceps femoris* and *M. Semimembranosus*, from three pigs were used. The meat was minced twice through a 3 mm plate and thoroughly mixed in a food mixer equipped with mixing bowl and dough hooks (Bosch Food Mixer Concept 7000, Robert Bosch Hausgeräte GmbH, Germany). Portions of 100-150 g minced pork were vacuum-packed, frozen and stored at –20°C until distribution. The partners were instructed to thoroughly mix the drip from the thawed pork into the pork sample again before analysis. The analysis of each sample was performed in triplicate at each partner.

The partners were named A-H. Water was analysed as water loss by drying and protein by the Kjeldahl method. Fat was analysed by the SBR-method (Partners A, F, G), the Soxlet-method (partner B) and by a rapid microwave solvent extraction method (partner H). Pigment was analysed by the method of Oksbjerg *et al* (2000) (partners A, E), the method of Hornsey (1956) (partner D) and the method of Hornsey (1956) modified by Boccard *et al* (1981) (partner C). Iron and zink were analysed by atomic absorption spectroscopy (AAS) (partners B, H) and by inductively coupled plasma (ICP) discharge (partner A) after dry ashing.

Results and Discussion

There was a variation in the content of water, fat, protein, pigment (hemin), iron and zink (Figure 1) within the analysed nine samples relevant to cover the expected variation in the pork to be analysed in the project. The same pattern of variation was found for all the analysis, but the levels differed between the partners. The mean water content varied between 73.5% and 74.1%, a small difference. The results for the fat content were significantly lower for partner H (mean 2.6%) compared with the other partners (means 3.2-3.5%), which may be explained by the different methods used. Partner H used a rapid microwave solvent method, which may not extract the phospholipids completely like the SBR-method used by the partners A, F and G. The mean protein content differed between 21.2% and 22.4%. The Kjeldahl method was used by all the partners, and evidently, small variations in the performance of the method influence the results. The pigment content was almost the same for partner C and E (mean 41.3 and 42.8 mg/kg, respectively) although different analytical methods were used. On the other hand, significantly lower pigment content (mean 35.8 mg/kg) was found by partner D, although both partner C and D used the Hornsey (1956) method. Various modifications of this method may be the reason for the different results. There was a fairly good conformity in the iron content between the partners, and the mean iron content varied between 7.1 and 8.1 mg/kg. A high conformity in the zink content was found between partner A and partner B (mean 15.5 mg/kg for both), while the zink content was significantly lower (mean 14.3 mg/kg) in some of the samples analysed by partner H.

Conclusions

It is possible to compare the effects of different feeding systems on these quality parameters between the partners, as the results showed the same pattern of variation in the analysed samples. On the other hand, the fact that the results showed differences in the levels of the single samples means that it is not possible to directly compare the absolute values.

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Pertinent literature

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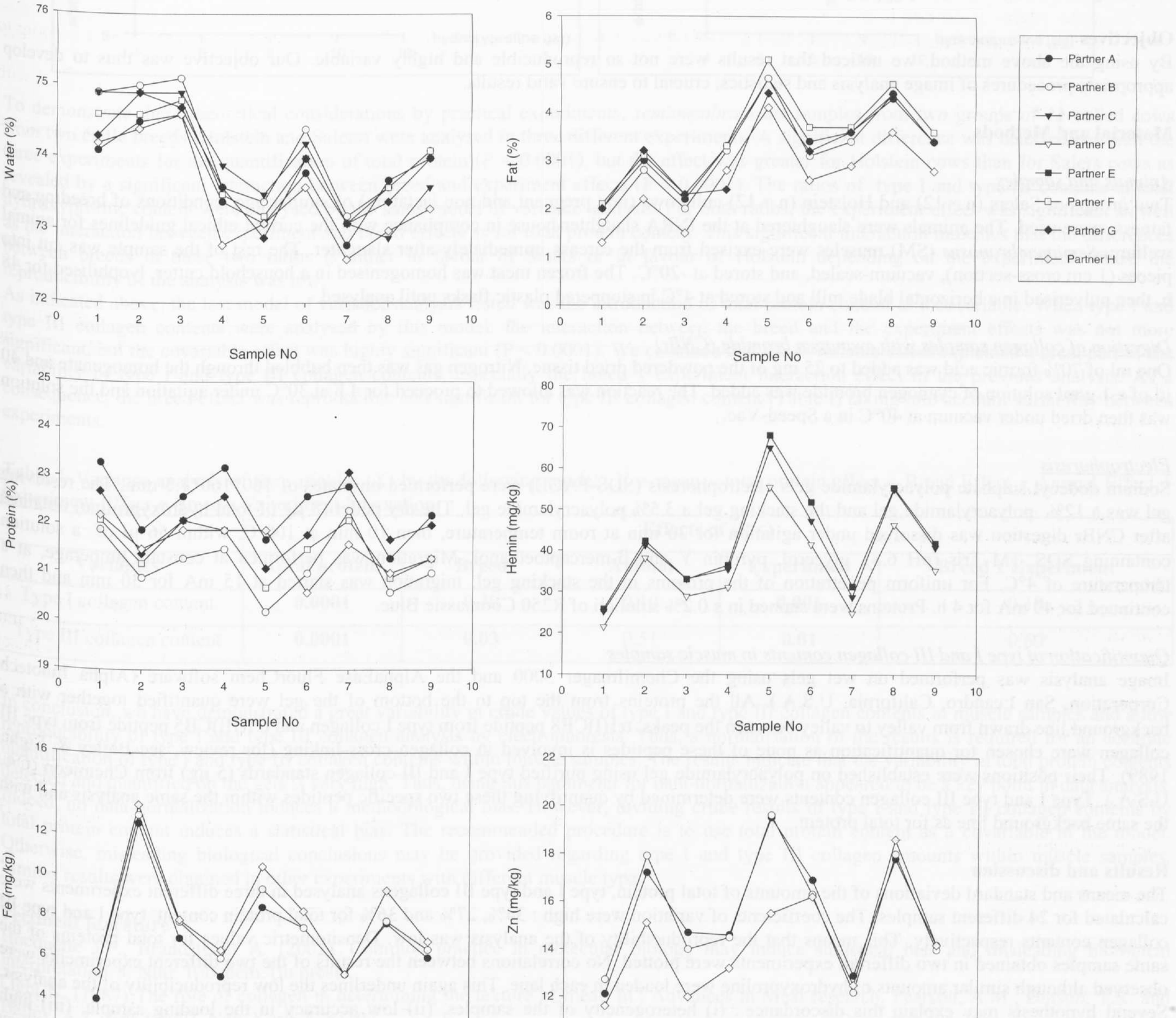

Figure 1. Content of water, fat, protein, pigment (hemin), iron and zink in nine samples of minced pork analysed by the different partners.