
Procedure to know the feeding of the Iberian pig during fattening

Brief description

A procedure has been developed based on the quantification of compounds (tocopherols) present in the tissues of Iberian pigs (mainly muscle and fat) in order to determine the food that the animals have received during the fattening phase. The classification criteria for Iberian pig carcasses based on the fatty acid profile has lost validity due in part to the formulation of feeds that incorporate new ingredients that provide a fatty acid profile similar to that of acorns. The quantification of tocopherols in their alpha and gamma forms accumulated in the tissues has proven to be highly reliable in differentiating the three types of pig categories that appear defined in the quality standard for Iberian pigs (acorn-fed, field-fed and feed-fed).



*Figure 1. Iberian pig
in the Mediterranean forest*

This efficiency in classification is achieved thanks to the fact that the food consumed by the pig during the fattening phase is characterised by containing a high content of alpha-tocopherol in the case of grass, and a high concentration of gamma-tocopherol in the case of acorns, therefore these compounds are accumulated in high proportion in the tissues of these animals. However, there is no raw material that can be incorporated into feed in such a proportion that allows the same levels of gamma-tocopherol to be achieved in the tissues, and there is also no possibility of adding the natural form of gamma-tocopherol to feed to achieve the accumulation obtained in pigs fattened exclusively with acorns.

This is a simple, fast and reliable method that is available to any Iberian pig producer as a predictor of the economic value that can be obtained for their pigs, as well as to the meat industry as a measure of quality control, supplier control, etc.

How does it work?

The procedure is based on the quantification of certain fat-soluble compounds by high-performance liquid chromatography (HPLC). Specifically, the quantification of gamma and alpha tocopherol that the animal ingests by eating acorns and grass in different amounts depending on the time it spends in the pasture. Gamma-tocopherol is absorbed and accumulated in quantities directly related to the consumption of acorns. Therefore, a relationship can be established between the content of this substance and the kilograms fattened by the pig during the free-range feeding. This compound appears in minimal quantities in pigs fed with feed, so the determination of the gamma tocopherol content allows to differentiate those pigs fattened with feed from those that have been fattened exclusively with acorns and even from those that have ingested a quantity of acorns and have been finished with feed. The analytical procedure consists of saponifying a minimum quantity of fat and extracting and concentrating the non-saponified compounds using organic solvents and finally separating them by liquid chromatography in a reverse phase apolar column using polar solvents, with both compounds appearing in less than 10 min.

Reference values have been obtained for the minimum gamma-tocopherol levels that pigs should have based on their diet. Taking these reference values into account, regression equations have also been obtained that allow estimating the kilograms fattened during the free-range feeding.

What problem does it solve?

It is an analytical procedure that allows the production origin of the Iberian pig to be distinguished by analysing its fat. It therefore helps to avoid fraud problems at the industry level and is a good tool for achieving an adequate classification of carcasses and meat pieces based on the feed that the pig has received.

What future products will it develop?

The procedure is applicable from farm to table. Therefore, its use can be useful both for livestock farmers to know if their animals reach the maximum quality standard or acorn-fed for which they will be paid at the slaughterhouse, as well as for quality control technicians in slaughterhouses and meat industries who control the classification of animals based on their diet (acorn, field or feed). Finally, it is also applicable during the marketing process of meat and meat pieces, guaranteeing that the cost of the product for which the consumer pays corresponds to its quality.

Competitive advantages compared to other research

The procedure is faster and less expensive than other analyses.

It can be carried out on tissues with low commercial value such as fat and from a minimum sample quantity.

It allows to differentiate with a reliability of over 90% if the diet has been based on the consumption of compound feed or if the Iberian pigs have been fattened on acorns, constituting an important quality control tool in the meat and meat products industry.

It allows the evaluation and control of raw materials from suppliers in the processed products industry.

Measure to establish a precision diet in the formulation of feed based on obtaining products with high antioxidant power and greater nutritional value for the consumer.

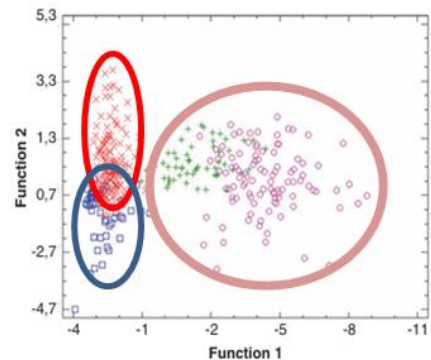


Figure 2. Differentiation between acorn-fed pigs (pink circle), pigs fed with commercial diets (blue circle) and pigs fed with feed in free-range (red circle) according to the gamma and alpha tocopherol content of the tissues

Where has it been developed?

The procedure was developed in the Animal Production Department of the Faculty of Veterinary Medicine of the Complutense University of Madrid, and derives from a long process of study that began in 1993 from the development of the doctoral thesis of Dr. Ana I. Rey and culminated with the publication of an invention patent in 2008. Currently, the procedure constitutes one of the main analytical potentials offered to the industry.

And moreover...

Analytical and technical support is provided to companies in the food and product quality sector, as well as public or private collaborations in the field of the meat industry and in the livestock sector that are interested in implementing feeding in order to achieve improvements in welfare, production and quality that allow for revaluation at the point of sale.

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