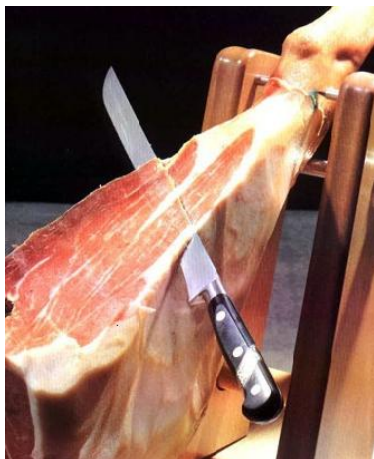


Technologies development to reduce salt content in dry-cured ham **(IRTA, INRA, KIS, GENUS, ABIOC, Matforsk)**

Dry-cured ham is one of the main traditional meat products in Spain. One of the characteristics of dry-cured ham is its high salt content, which plays an essential role both on the stability of the product and



on the sensory characteristics, especially on taste and texture. High salt intake has been associated with hypertension problems. The Ministry of Health and Consumption of the Spanish Government, through the NAOS strategy (Strategy for Nutrition, Physical Activity and Obesity Prevention) has urged food industries to develop healthier products and diets that contribute to a healthy and balanced diet. This strategy recommends reducing salt content in various products to reduce dietary sodium intake in the population. However, reducing salt content in ham is not simple, since it also plays an important technological role. One problem to be solved is the excessive proteolysis during processing, resulting in defective textures. Therefore, the objective proposed in this study is to develop technologies to reduce salt content in dry-cured hams without

negatively alter the stability and sensory quality of the product.

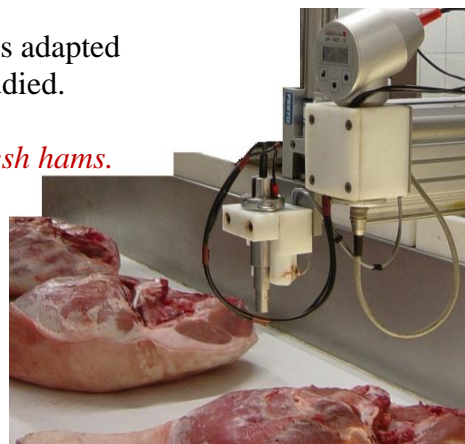
The actions considered include innovations throughout the production chain: from the selection of animals to the preparation of the final product for marketing.

1. Identification and development of genetic markers.

The suitability of three types of markers to select a line of animals adapted to produce dry-cured hams with reduced salt content has been studied.

2. Identification and development of classification systems for fresh hams.

An automatic system for the measurement of pH and electrical impedance has been developed to select hams more suitable for the production of dry-cured hams with reduced salt content. This system can also be used to reduce problems of softness in hams with a standard salt content.



3. Technologies to accelerate the distribution of salt in the ham and to improve product stabilization.

A boning-salting-binding technology has been developed to safely produce restructured dry-cured hams with reduced salt, cohesive and acceptable from a sensory point of view.



4. Optimization of the stages of post-salting, drying and cellar in ham with reduced salt content.

Two equipments have been calibrated and adjusted to measure the composition of the ham in a non-destructive way along the process. NIR equipment is used to evaluate the surface composition and Computed Tomography (CT) equipment for the composition inside the ham.

The NIR equipment has been calibrated to determine the content of salt and water on the lean of the ham surface. Besides, it is being adapted for integration into the control system of the drying room in order to determine the environmental conditions (HR and T) to optimize the drying process while reducing the problem of crusting.



A CT equipment calibrated for dry-cured ham is available in the facilities of IRTA-Center (Monells, Girona). This technology enables to visualize into a single piece both salt-distribution and dehydration along the process. It also allows monitoring geometrical changes of the pieces. CT is a very useful tool to define at pilot scale the most suitable process for hams with reduced salt content. When dry-cured ham elaboration process is modified, CT can be also used to evaluate the impact of the modification on the evolution of the internal composition in hams.



4. Treatments in the final products: mild heat treatment and high pressure.

A heat treatment under controlled conditions has been proved to be effective in improving soft texture, without adversely affecting the other characteristics of dry-cured hams.

A high-pressure treatment on either entire pieces or sliced product can be used to improve the stability of dry-cured hams with reduced salt content. However, the high pressure has an effect on texture and colour.

