

MeatMaster™ II

Grading of Pork Hams with Bone for Cured Ham Production



When producing dry/cured products of pork hams, selecting the right raw materials is of vital importance for the efficiency of the drying/curing process as well as for the quality of the finished product.

Important information for the segregation is to know the intramuscular fat and fat marbling of the hams. This can be obtained from knowing the fat layer thickness (assessed visually or from other system) and the total fat content of the ham (measured by MeatMaster™ II).

This Application Note outlines how the MeastMaster II can be used for grading incoming pork hams (bone-in) and the benefits this will have for the dry ham producer.

Production Process

Dry ham products are products like Serrano Ham (Iberia) or Parma Ham (Italy).

The hams are salted and cured/dried with bone-in for a period of 6 up to 36 month, depending on specification and quality. During the drying and curing process several parameters are controlled like humidity, temperature and airflow. In this process, the hams develop their characteristic flavour from a combination of several chemical and biological reactions.

The major challenge for the dry ham producer is to secure a drying and curing process which minimizes the number of defective products at the end of the process. A defective product is a product which has not been dried and cured properly because wrong chemical and biological reactions have taken place. Depending on the conditions, a defective product can either have too high water loss and consequently shrinks into a shape like a flat balloon or develops a bad flavour caused by a too high water content (too high water activity level).

Defective product can normally first be identified at the end of the curing process. It has no value and is therefore a loss for the dry ham producer.

A way to avoid defective products is to have a good raw meat segregation, where the raw pork hams are segregated according to weight, thickness of fat layer, level of intramuscular fat (fat marbling) etc. Raw pork hams with the same characteristics, like same fat content, same weight etc. will require the same drying & curing process.

Benefits of Using MeatMaster II

The MeatMaster II has proven to be a beneficial solution for dry ham producers. With the MeatMaster II it is possible to sort the raw pork hams into different categories giving the possibility to address the optimal drying process for raw hams. Ultimately, this leads to a minimum of faulty final products.

A visual grading of the raw hams only gives the possibility to grade the hams according to weight and thickness of the fat layer. Using the MeatMaster II gives the ability also to include the intramuscular fat and fat marbling when grading the hams according to fat content.

The ability of a ham to lose water during the drying process is related to its fat content. From the fat marbling and fat results from MeatMaster II, the hams can be sorted into different categories where each category requires a different drying process. The major benefits for the ham producers are:

- Increased yield as the number of faulty hams is reduced significantly
- More uniform products within each dry ham category



Fig. 1 Image of a pork leg/ham as it appear on the touch screen of the MeatMaster II

Test Results

Example of Achieved Accuracy

30 pork hams with bone and skin were measured three times with MeatMaster II.

The hams had an avg. length of 55 cm (22 inches), an avg. height of 20 cm (8 inches), a weight between 12 and 15 kg and a fat content between 18 and 28 % absolute.

The fat calibration was adjusted by FoodScan™ results based on homogenized samples of the hams.

The weight calibration was corrected with results from a scale weighing the entire ham.

The MeatMaster II accuracy for fat and weight was registered as follows:

	Fat (% absolute)	Weight (% relative)
Accuracy	1.32 %	0.21 %
Repeatability	0.57 %	0.07 %

Capacity

The capacity is mainly determined due to the speed version of the MeatMaster II, the length of the ham and the gap between the hams. A certain gap between the hams is needed to keep the scan of the individual hams separate, but also to respect the requirements of the downstream sorting/grading system.

For a MeatMaster II speed version 375 mm/sec. a capacity of 1280 hams per hour can be achieved considering a safety margin of 5 %. The calculation is based on a length for the entire ham of 600 mm and a gap between the hams of 400 mm resulting in a total belt length of 1000 mm per ham.

Note: Fat and weight accuracy as well as capacity need to be evaluated on project to project basis due to local conditions.

Conclusion

The sorting of raw pork hams is traditionally based on the thickness of the fat layer and the weight. With MeatMaster II it is possible to also base the grading on the total fat content of the ham. From knowing the fat layer thickness (assessed visually or from other system) and the total fat content of the ham (measured by MeatMaster II), the intramuscular fat and fat marbling can be assessed by the customer. Such information enables the salting, drying and curing processes to be more accurately applied, leading to more consistent products, more consistent quality and better yields.

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