Hygienic production and distribution of mechanically recovered meat in the European Union

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An EU-working group has discussed in detail scientific hygienic criteria for the use of mechanically recovered meat in meat products in Brussels.
Members of the working group:
Dr. C. Lahellec, France; Prof. Dr. E. Nurmi (rapporteur), Finland; Prof. Dr. Dr. Ch. Ring (chairman), Germany; Prof. Dr. N. Skovgaard, Denmark; Dr. H. Winter, European Union, Brussels

History

According to many published reviews mechanical deboning has undergone clear stages of development. The oldest type of mechanical meat separator is said to be a drum-type separator, used by the Japanese fish industry at the beginning of the 1940's. For the second type of separator, a rotating auger was developed and for the third, a pressure roller. The newest development of equipment in addition to the machines used for poultry is a device into which a spiral conveyor brigs the crushed bone-and-meat and where a knife-pack cuts the meat from the bones.
The quality of mechanically recovered meat, its good technological characteristics and comparatively low cost make the product a profitable and useful raw material.

Legal provision/ Legislative requirements

In recent years legislative norms on meat have been revised in many countries. Mechanically deboned meat is also often controlled by legislation. The norms are generally based on the protein, fat and calcium content, the size and number of solid particles (bone particles) in the deboned meat and also on the storage and use of mechanically deboned meat.
Mechanically deboned meat does not fit conveniently into most existing meat or food categories. Therefore, application of the regulatory controls to the handling, processing, storage, use and nutritional standards and microbiological criteria varies widely between different countries.
Codex Alimentarius Comission has given the recommended international code (CAC/RCP 32-983) of practice for the production, storage and composition of mechanically separated meat and poultry meat intended for further processing. This code indicates e.g. „-to allow for variation in technology and since different time-temperature combinations may be suitable, no single time-temperature requirement is suggested. These intermediate combinations may be used a) maintained at 10°C and mechanically separated within 5 hours of boning b) chilled to 4°C and mechanically separated within 72 hours of boning and c) chilled to -2"C within i 20 hours and d) immediately placed in a freezer and frozen within 48 hours of boning. Frozen mechanically separated meat should be kept in a manner to prevent microbial growth and retard oxidative deterioration. If it is not frozen immediately the material should be kept at a temperature + 4°C or below measured in the meat and should be used for further processing within 48 hours. And we can read in this code still e.g. that the bone content should be reduced to the minimum level consistent with current technology. On this basis the calcium content expressed on dry matter should not exceed 1.5 per cent“

Definitions

MRM (soft separation) means meat obtained from bones and removal of tenders and connective tissue. This meat is mainly used in raw sausages, where tender-free meat is needed.
Meat removed from bones by machines is generally termed mechanically deboned meat (MDM), mechanically deboned tissue (MDT) mechanically separated meat/tissue (MSM)/ (MST) or mechanically recovered meat (MRM).
Mechanically recovered meat, MRM, (hard separation) means meat obtained by mechanical means from fleshbearing bones apart from the bones of the head, the extremities of the limbs below the carpal and tarsal joints and, in the case of swine, the coccygeal vertebrae, and intended for establishments approved in accordance with EU-regulation.

Source material

When bones are used for mechanical recovery they must be treated in the same way as meat. Careful handling, adequate refrigeration and limited storage time are all essential if mechanically recovered meat suitable for human consumption is to be obtained. The process of separation is usually located at sausage factories. In this case it is no problem to keep to the hygienic terms. Bacterial contamination, lipid oxidation, haem pigment release and marrow content of the product all influence the storage properties of mechanically separated meat.

Meat must not be deboned from the bones of other than inspected animals and accepted for human consumption. Meat (red meat) must not be deboned from the bones of the head, leg bones below the front knee and hock joint, or from pig's tail bones. Spinal cord must be removed before the separation process. Meat (poultry) must not be deboned from head, feet and neckskin.

If raw material from own slaughtering are used the bones for recovering should not be older than 7 days and recovered not later than 1 day from deboning.
If the bones for recovering are collected from other slaughterhouses the bones cannot be older than 5 days. The bones have to be transported in chilled form at a max temperature of 3°C
Frozen bones cannot be used as a raw material for MRM.

The mechanically recovered meat shall be chilled immediately afterwards to below 3°C

Handling and use of the mechanically recovered meat (MRM)

Only machinery accepted by the authorities can be used.

The single separation unit has to bear the veterinary approval number.

During mechanical separation the room temperature shall not exceed 12°C.

The mechanically recovered meat shall be used within 24 hours. If not it has to be frozen within 12 hours after production.
MRM can be transported from separation unit to the processing plant. The transportation temperature shall be max 3°C and time max 2 hours.

If the MRM is freezed, the freezing layers shall not be thicker than 15 cm and reach a core temperature of - 18°C or less within 3 hours. Frozen MRM shall not be stored more than 3 months. Frozen MRM has to be kept below -8°C during transport.

MRM must not be used in foodstuffs other than in which the temperature during processing increases to + 70°C or higher.

Use of MRM has to be indicated in the labelling.

Hygienic quality and quality control of MRM

Microbial tests must be carried out on MRM minimum on a daily basis. These tests must be carried out either in the production plant, if it is recognized by the competent authority, or in an approved laboratory.

Recommended bacteriological criteria for MRM

	Total Plate count 25°C/ 4d (ISO)		Enterococci (NMKL)	
	m	M	m	M
MRM Red meat	5×10^5	5×10^6	5×10^3	5×10^4
MRM poultry	5×10^5	5×10^6 (5×10^5)	5×10^3	5×10^4

Inspection
Production plants which produce MRM shall be subject to monitoring by the competent authority once a day.

Cleaning and disinfection of the machinery
Machines must be cleaned at least 2 times a day.