An Examination of Mechanically Deboned Meat and Poultry

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The Food Safety and Quality Service (FSQS) of USDA wants to standardize rules for the labeling, use, and quality control of two quite similar but differently regulated products—mechanically deboned meat (MDM) and mechanically deboned poultry (MDP). Both are the result of the process introduced years ago that mechanically separates and removes most of the bone from any attached muscle tissue.

The development enables meat processors to increase the output of food by over a billion pounds a year. But the full potential has not been realized because of the rules governing the use of labeling of the products.

This article discusses the regulations that ensure that MDM and MDP are safe, that the process does not adversely affect the quality of meat products, and that products containing either MDM or MDP are appropriately labeled.

Regulations

The inconsistency between the regulations for MDM and MDP followed a 1976 court injunction against the further manufacture of MDM until several health and labeling issues were resolved. FSQS issued final rules for MDM in 1978 that:

- Changed the name of MDM to mechanically processed species (where species is beef, pork or lamb) product, MP(S)P;
- Set standards for the protein, fat, bone size, and calcium content of MP(S)P and a quality standard for protein;
- Limited the use of MP(S)P in certain products such as franks to 20 percent or less of the meat block and prohibited use in other products such as hamburger;
- Required plants to operate an approved quality control system before labels will be approved for products with MP(S)P; and
- Required qualifiers to be added to the name of a finished food product to indicate it is made with MP(S)P and "contains up to __ percent powdered bone."

The red meat industry alleges that the requirements are a disincentive and consequently, only a few million pounds of the potential output of up to 1 billion pounds of MDM are produced a year.

Far more lenient regulations for MDP were set in 1966, well before the controversy over MDM began. MDP is made essentially the same way as MDM—from skeletal parts of chickens and turkeys. At present, MDP regulations limit the bone content to 1 percent. No requirements exist for nutrient labeling, use standards, quality control, and product name qualifiers. With less restrictions than MDM, the use of MDP now exceeds 300 million pounds a year, half the potential output. It is used in chicken or turkey rolls, chicken loafs, chicken bologna, and many other products. However, this situation raises numerous questions similar to those raised about MDM, questions about safety, quality, and labeling.

Safety

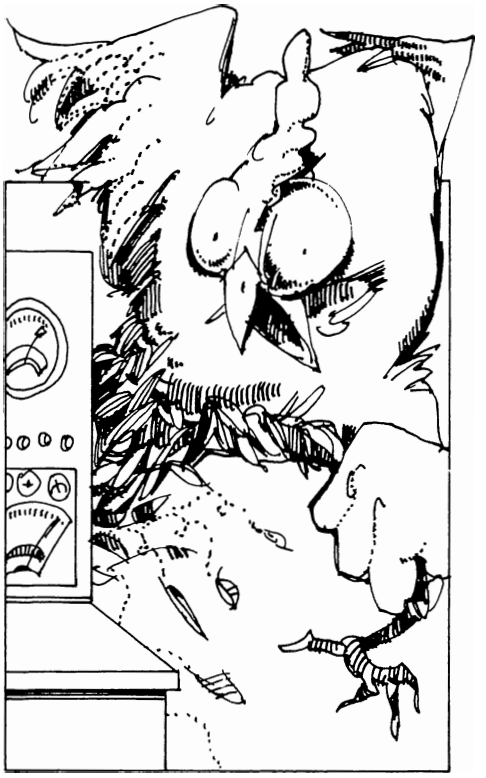
FSQS organized a panel of experts from the Food and Drug Administration (FDA), the National Institutes of Health (NIH), and USDA to conduct and evaluate studies of the health and safety aspects of the use of MDM and MDP. The safety of the mechanical deboning process was questioned because it generates a certain amount of heat, which could create bacterial problems, and a small amount of bone particle is left with MDM or MDP. The possibility of toxic levels of substances deposited in the bone marrow was also considered a potential health and safety concern.

Microbiology

The panel concluded that the microbiology of MDM and MDP production presents no unique hazards and should not be a problem if good manufacturing practices and quality control programs are used. In considering the need for additional microbiological standards, the relevant question is whether benefits from fewer health risks are large enough to outweigh the associated costs of additional standards.

Bone Particle Size

The panel concluded that slivers of bone and large angular pieces that might cause injury are more likely to be present in hand deboned meat and poultry than in MDM or MDP. The bone particles remaining in MDM are about the size of ground pepper and those in MDP are even smaller. The expert panel concluded that these bone particles would not injure any part of the digestive system and in most cases would furnish beneficial calcium and bulk to the diet.



The panel's recommendation for standards limiting maximum bone particle size has been adopted in regulations for MDM but not for MDP. It appears, however, that MDP producers may already meet the recommended standards or could do so with little problem. The amount of bone present in MDM and MDP is controlled by calcium content restrictions for lack of a suitable particle size assay test.

Toxicants

Of the minerals present in bone particles and marrow—calcium, fluoride, and cadmium were given special attention. The panel noted that the additional calcium would be a nutritional benefit to most people. But it recommended that a product containing MDM or MDP should be labeled so that the small fraction of the population on low-calcium diets for medical reasons would be alerted to the presence of increased calcium in the product. Regulations applying to both MDM and MDP set maximum calcium or bone content standards.

The fluoride content of MDM would pose no health problems, according to the panel. Caution and lack of complete information led the panel to recommend that MDM

should not be allowed in baby, toddler, or junior foods until better data are available. This recommendation is part of the current regulatory use limitations for MDM.

The panel found two types of MDP in terms of fluoride content. MDP made from mature female chickens contains levels of fluoride similar to MDM, and the panel recommended it should have the same use restrictions. MDP made from young chickens, turkeys, or mature male birds contains only slightly more fluoride than hand deboned poultry. The panel concluded that no limits on its use were needed. These recommendations have not yet been incorporated into the regulations for MDP.

Cadmium in MDM was found to pose no health hazard. The panel concluded that any potential problem from cadmium in MDP could be eliminated by not allowing kidneys from mature chickens in MDP. Current regulations for MDP do not yet reflect this recommendation.

After reviewing data from studies on the health and safety aspects of using MDM and MDP, the panel also found no cause for concern with regard to a number of other possible toxicants. This list included zinc, lead, selenium, strontium-90, cobalt, arsenic, copper, iron, nickel, chlorinated hydrocarbon residues, purines, hemoglobin levels, tetracyclines, and mercury.

Quality

Use limitations for MDM and MDP, as well as fat and protein standards for these ingredients, have been proposed to ensure the quality of final processed meat products. A second major issue involves the necessity and effectiveness of the quality of regulations.

Use Limitations

Current regulations limit the use of MDM to no more than 20 percent of the meat portion of any final meat food product such as frankfurters. MDM also cannot be used as an ingredient or extender in several important products where consumers have come to expect muscle meat—most notably ground beef and hamburger, and fabricated steaks —because it might alter the appearance and consistency of these products.

The only limitation to MDP use is consumer acceptance. MDP may be used in any product in which poultry or poultry meat is allowed, including some processed red meat products such as bologna, salami, and frankfurters. It is also the principle ingredient found in several recently developed processed poultry products such as chicken frankfurters, poultry rolls, and loaves. MDP may comprise from 1 to 100 percent of the poultry or poultry meat portion of a poultry or meat food product. Chicken franks generally contain 100 percent MDP but poultry gravies may contain as little as 1 to 2 percent.

Current disparities in the use limitations for MDM and MDP are consistent with physical differences in the two ingredients. MDM has a grainier texture than MDP because beef and pork bones are generally heavier than poultry bones. Thus, even in absence of use limitations on ingredients to regulate product quality, consumer acceptance would limit the use of MDM in many foods.

Fat and Cholesterol

The panel concluded that the lipid spectrum of MDM and hand deboned red meats was comparable and that the use of MDM would not lead to any appreciable increase in dietary cholesterol or other lipids. The panel found that MDP tends to be higher in total fat and cholesterol than hand deboned poultry. Daily increases in cholesterol consumption from use of MDP would also be negligible.

The panel recommended that the fat content of MDM and MDP be restricted within limits of good manufacturing practices, that limits be placed on the fat content of products in which MDM is used, and that foods containing MDP be labeled to indicate its presence to individuals trying to control their cholesterol intakes. Current regulations set a 30-percent maximum fat content standard for MDM at the ingredient level rather than for the final products in which MDM is used. No similar standard exists for MDP.

Protein Quantity and Quality

The panel found that MDP was lower in protein quantity than hand deboned poultry. One measure of protein quality indicated that MDP was similar to hand deboned poultry while a second measure indicated that MDP was lower quality. The panel made no comparisons between MDM and hand deboned red meats, but merely concluded that current regulations setting minimum ingredient standards for MDM protein quantity and quality were reasonable. No similar standards currently exist for MDP, but the panel recommended that they be established.

A fundamental issue on safety and quality standards is whether they should be applied to MDM and MDP as ingredients or to the final products in which MDM and MDP are used. The economic consequences of the two approaches may differ significantly, depending on the restrictiveness of the standard. If final product standards are applied, MDM, MDP, and other ingredients (which might not individually meet the standards) can be blended to produce lower cost outputs which do comply with the final product standards. However, if ingredient standards are applied, any individual ingredient such as MDM or MDP not meeting the standards would be barred from the food chain.

Limitations in detecting and assessing health risks may make it prudent to apply joint MDM-MDP safety regulations at the ingredient level as is presently the case with MDM. Application of safety standards at the ingredient level prevents unsafe ingredients from contaminating safe ingredients and minimizes losses from condemned products. Producers are also better able to trace safety problems to their source at the ingredient level.

On the other hand, regulations dealing primarily with food quality (fat and protein standards) may be more effective and efficient if applied as final product standards. For example, the effectiveness of the 30 percent fat limit on MDM as an ingredient is questionable because it merely ensures that the content of fat from MDM will not exceed 6 percent (30 percent of 20 percent) of the final product. The other 80 percent of the meat ingredients with which the MDM is blended may contain levels of fat that produce a final product with fat levels in excess of 30 percent if no comparable final product standards exist. Where final product standards do exist, ingredient stan-

dards for MDM and MDP are largely redundant and simply limit potential benefits to the consumer from blending.

Quality standards at the final product level are likely to be more effective and efficient. This is the approach commonly taken with other processed meat ingredients. For example, meat frankfurters with a maximum final product fat content standard of 30 percent are commonly produced with a blend of beef and pork trimmings including: 50 percent lean/50 percent fat beef trimmings which sold in early November 1980 for 68 cents per pound; 85 percent lean/15 percent fat beef trimmings selling for $1.19 per pound; 50 percent lean/50 percent fat pork trimmings selling for 48 cents per pound; and 80 percent lean/20 percent fat pork trimmings sellings for 85 cents per pound. If the 30 percent fat standard had been imposed at the ingredient level, two of these ingredients could not have been used and the price of frankfurters would most likely have been higher.

The same analogy could apply to MDM and MDP. Variability in the fat and protein content of the inputs that go into the mechanical deboning machines will result in variability in the fat and protein content of the resulting MDM and MDP. This variability is not always easily predicted or controlled. Quality standards at the input level would eliminate at least some of the ingredients from use in edible products. Standards at the final product level would permit greater cost savings through blending with greater assurance of final product quality. Of course, to the extent that blending of different batches of MDM or MDP is feasible, the cost of quality constraints on these products would be lessened.

Labeling and Economic Adulteration

The most complex and controversial regulatory issue is how products containing MDM and MDP should be labeled to disseminate accurate information. Labeling is also an important factor in dealing with the safety and quality issues discussed earlier.

Economic Adulteration

If MDM and MDP, which are relatively low cost ingredients, can be substituted for more expensive ingredients in processed meat products, the savings to consumers could be substantial. One estimate based on 1976 data places the potential price reduction at 9.7 cents per pound for processed pork products and 10.7 cents per pound for processed beef products. In competitive markets, prices should adjust downward over time, reflecting lower input costs. However, some fear exists that this substitution could result in economic adulteration —"cheapening" processed meat and poultry products without consumers' knowledge. Even when the products are still wholesome, safe, and sanitary, if quality is altered without the knowledge of the consumer, economic adulteration has occurred.

Use of MDM and MDP should result in a wider array of processed meat and poultry products as processors establish new product lines. Diversity of products and product qualities is generally regarded as desirable because it enlarges choice. Consumers should, however, be aware of quality differences to make informed choices and receive the benefits of any associated cost differences. Labeling requirements are intended to achieve this end.

Labeling

Some of the major labeling issues are:

- Should MDM and MDP be designated differently from other meat and poultry ingredients?
- If MDM and MDP are designated differently what should MDM and MDP be called?
- How should the presence of MDM and MDP be indicated—in the product name, in the ingredients statement, in a nutritional panel, in a descriptive paragraph, or some combination of these?
- Should attention be drawn to any of the distinguishing characteristics of MDM and MDP ingredients—calcium content, powdered bone content, fat content, cholesterol levels, protein quantity or quality?

Nowhere is the difference in the current regulatory treatment of MDM and MDP more apparent than in labeling. The names of products containing MDM must be qualified by the phrases "With Mechanically Processed (Species) Product," "Contains __ percent Powdered Bone," and MP(S)P must be listed in order of predominance in the ingredient statement. No special labeling is required on products containing MDP and the ingredients statement simply indicates the presence of poultry or poultry meat.

Questions have been raised as to whether the present designation for MDM, mechanically processed (species) product, conveys accurate or descriptively useful information to consumers. Meat processors argue that it does not. They say that all meat is mechanically processed with mechanical knives, saws, conveyors, and grinders, and that the word "product" implies something artificial. Numerous other names have been suggested for MDM, including "mechanically deboned meat," "mechanically trimmed meat," "mechanically separated meat," "mechanically recovered meat," "calcium enriched meat," and "tissue from ground bone."

The options available to FSQS are many and varied and the ones ultimately selected could have a significant impact on consumers, the red meat industry, and the poultry meat industry. Relaxing MDM rules could encourage growth in the use of this ingredient in new products and possible lower prices. Stricter rules for MDP could slow the rate of growth in use of this ingredient and increase prices of the products made from MDP. Some combination of changes that result in more lenient rules for MDM and less lenient for MDP might produce the environment where consumers and the two industries will all benefit. ■

References

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