

Advances in Meat Research

Volume 3

Restructured Meat
and Poultry Products



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and Poultry Products

Edited by

A. M. Pearson

T. R. Dutson

Department of Food Science and
Human Nutrition
Michigan State University
East Lansing, Michigan

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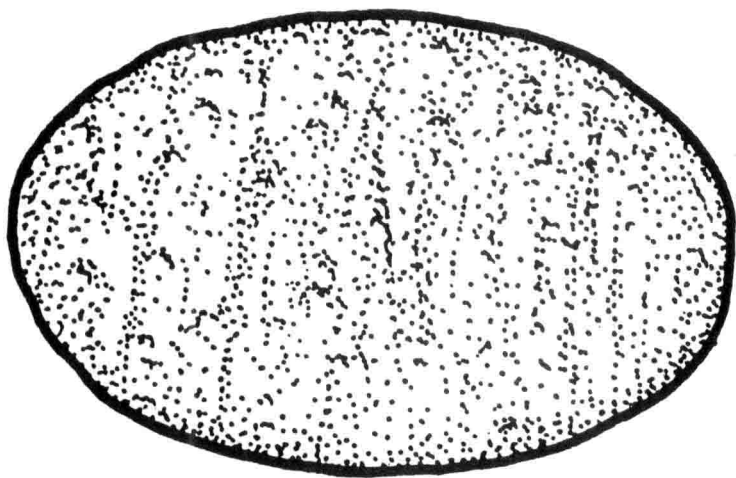
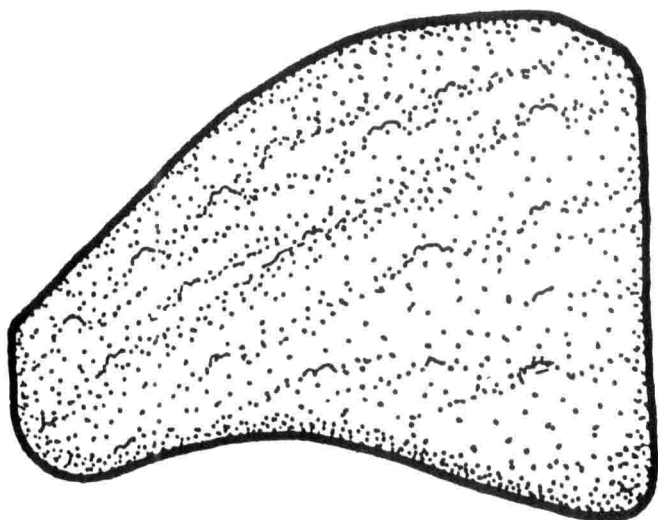
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**Volume 3
Restructured Meat
and Poultry Products**



Contributors

- B. W. BERRY. (161, 271)¹ Agricultural Research Service and the Food Safety and Inspection Service¹, U.S. Department of Agriculture, Beltsville, MD 20705
- A. M. BOOREN. (351). Department of Food Science and Human Nutrition, Michigan State University, East Lansing, MI 48824
- J. C. CORDRAY. (383). A. C. Legg Packing Co. Inc., P.O. Box 10283, Birmingham AL 35202
- B. S. EMSWILER-ROSE. (161). Agricultural Research Service and the Food Safety and Inspection Service, U.S. Department of Agriculture, Beltsville, MD 20705
- J. G. ENDRES. (331). Central Soya Company, Inc., Research and Engineering Center, Fort Wayne, IN 46801-1400
- T. A. GILLET.² (73). Union Carbide Corporation, Films-Packaging Division, Food Science Institute, Chicago, Illinois 60638
- J. I. GRAY. (221). Department of Food Science and Human Nutrition, Michigan State University, East Lansing, MI 48824
- B. R. HARTE. (433). School of Packaging, Michigan State University, East Lansing, MI 48824-1223
- C. A. HOLLINGSWORTH. (489). Armour Food Company, 15101 North Scottsdale Road, Scottsdale, AZ 85260
- D. L. HUFFMAN. (383). Department of Animal and Dairy Sciences, Auburn University, Auburn, AL 36849
- M. C. HUNT. (125). Department of Animal Sciences and Industry, Kansas State University, Manhattan, KS 66506
- N. L. KING. (21). CSIRO Division of Food Research, Meat Research Laboratory, P.O. Box 12, Cannon Hill, Queensland, Australia, 4170

¹Numeral in parentheses indicates the page on which the author's contribution begins.

²Present address: Viskase Corporation, 6855 West 65th Street, Chicago, IL 60638.

- A. W. KOTULA. (161). Agricultural Research Service and the Food Safety and Inspection Service, U.S. Department of Agriculture, Beltsville, MD 20705.
- D. H. KROPP. (125). Department of Animal Sciences and Industry, Kansas State University, Manhattan, KS 66506
- J. J. MACFARLANE. (21). CSIRO Division of Food Research, Meat Research Laboratory, P.O. Box 12, Cannon Hill, Queensland, Australia, 4170
- R. W. MANDIGO. (351). Animal Science Department, University of Nebraska-Lincoln, Lincoln, NE 68583-0821
- W. J. MEANS.³ (469). Department of Animal Sciences and Department of Food Science and Human Nutrition, Colorado State University, Fort Collins, CO 80523
- C. W. MONAGLE. (331). Central Soya Company, Inc., Research and Engineering Center, Fort Wayne, IN 46801-1400
- A. M. PEARSON. (221). Department of Food Science and Human Nutrition, Michigan State University, East Lansing, MI 48824
- G. R. SCHMIDT. (307, 469, 489). Department of Animal Sciences and Department of Food Science and Human Nutrition, Colorado State University, Fort Collins, CO 80523
- J. L. SECRIST. (1). Food Technology Division, Food Engineering Laboratory, U.S. Army Natick Research and Development Center, Natick, MA 01760
- R. B. SLEETH. (489). Armour Food Company, 15101 North Scottsdale Road, Scottsdale, AR 85260
- G. R. TROUT. (307). Department of Animal and Dairy Science, Auburn University, Auburn AL 36849
- P. D. WEINER.⁴ (405). BIL MAR FOODS, Inc., 8300 96th Avenue, Zeeland, MI 49464

³*Present address:* Department of Animal Sciences, University of Kentucky, Lexington, KY 40546-0215.

⁴*Present address:* Shenandoah Products, Inc., P.O. Box 238, Bridgewater, VA 22812.

Preface

The central theme of this volume deals with the technology of producing restructured meat products, a relatively new process that permits upgrading of lower-priced meat cuts into higher-valued products. Although meat packers and processors have long been interested in producing steaks, chops, and oven roasts from the entire carcass, the anatomical structure and physical properties of the carcass and its component parts have proven to be a formidable obstacle to the upgrading process. Production of boneless cuts or grinding of the muscles to form a homogeneous mass represented the first attempts to upgrade the cheaper cuts, but these processes either were not adapted to all parts of the carcass or else failed to duplicate the characteristic structure of steaks and oven roasts that make them desirable to consumers.

With the development of a whole new generation of high-speed processing equipment, it is now possible to disassemble lower-priced meat cuts and to add to their value by production of restructured steaks, chops, and roasts. Although development of restructured meat products has led to new opportunities, it has also resulted in some challenges that must be surmounted if this fast-developing segment of the meat industry is to have a sound basis. Thus, this volume will concentrate on the opportunities and challenges for manufacturers of restructured meat products.

Discussions herein focus on the history and present status of restructured meats, the role of muscle proteins, the influence of fatty and connective tissues, color and appearance, rancidity and warmed-over flavor, and the microbiology of these products. Other topics covered include discussions on texture and its measurement, nonprotein meat additives, nonmeat protein additives, production principles and equipment, formulations for restructured red meat and poultry products, packaging, the technology involved in producing a new fresh

meat product without using salt or phosphate, and the prospects for the future of restructured meat products.

It is anticipated that this volume should prove helpful not only to those presently engaged in manufacturing restructured meat products, but also to those who may become involved in this promising area in the future. The discussions should answer questions of importance for all who are interested in the production and marketing of restructured meats.

A. M. Pearson

T. R. Dutson

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Contents

Contributors	ix
Preface	xi
1 Restructured Meats—The Past and Present	1
<i>John L. Secrist</i>	
Development of the Restructuring Concept	2
Methods of Restructuring Meats	6
Advantages of Restructured Meats	11
Problems with Restructured Meats	12
Economics of Restructured Meats	15
Summary	18
References	18
2 Muscle Proteins	21
<i>N. L. King and J. J. MacFarlane</i>	
Classification of Muscle Proteins	21
Contribution of Muscle Protein Fractions to Meat Toughness	36
Function of Meat Proteins in Restructured Meats	40
Extraction of Myofibrillar Proteins	50
Summary	56
References	58
3 Adipose and Connective Tissue	73
<i>T. A. Gillett</i>	
Classification of Connective Tissue	74
Collagen—Structure and Biosynthesis	75
Morphology of Mammalian Connective Tissue in Muscle	85
Noncollagenous Connective Tissue	88
Particle Size Reduction	89
Action of Proteolytic Enzymes on Collagen	93
Use of Collagen Residues from Deboners and Desinewers	95
Effect of Cooking	96

Role of Collagen in Meat Flavor	100
Elastin	101
Adipose Tissue Development	101
Fat Components	103
Health Concerns Related to Dietary Fats	106
Sensory Properties of Adipose Tissue	109
Conclusions	112
References	113
 4 Color and Appearance	 125
<i>M. C. Hunt and D. H. Kropf</i>	
Muscle Pigments	126
Chemistry of Muscle Pigments	127
Evaluation of Color and Other Appearance Traits	137
Factors Affecting Meat Color—Theory and Practice	144
Summary and Research Needs	154
References	155
 5 Microbiology of Restructured Meat and Poultry Products	 161
<i>A. W. Kotula, B. W. Berry, and B. S. Emswiler-Rose</i>	
Factors Influencing Microbial Levels	162
Microbiological Standards	169
Microorganisms on Red Meat	171
Microorganisms on Poultry	176
Microorganisms on Fish and Shellfish	179
Microorganisms in Nonmeat Proteins	182
Microbial Growth and Death During Fabrication of Restructured Meats	189
Microbiological Profile of Restructured Meats	207
Summary	210
References	210
 6 Rancidity and Warmed-Over Flavor	 221
<i>J. I. Gray and A. M. Pearson</i>	
Role of Lipids	222
Factors Influencing Composition and Stability of Specific Lipids	227
Measurement of Rancidity	235
Factors Influencing Rancidity and WOF Development in Restructured Meats	243
Prevention of Oxidation and WOF in Restructured Meat Products	249
Future Research Needs	257
Summary	259
References	259

7	Texture in Restructured Meats	271
	<i>B. W. Berry</i>	
	Texture Problems	272
	Methods of Measuring Texture	275
	Effect of Processing Factors	281
	Effect of Cooking Factors	299
	Avoiding Texture Problems	300
	Summary	301
	References	302
8	Nonprotein Additives	307
	<i>G. R. Trout and G. R. Schmidt</i>	
	Additives That Affect Functional Properties	308
	Additives That Affect the Curing Process	318
	Additives That Affect Flavor	320
	Additives That Affect Product Stability	324
	Summary	325
	References	326
9	Nonmeat Protein Additives	331
	<i>J. G. Endres and C. W. Monagle</i>	
	Preparation, Composition, and Selected Properties	331
	Utilization in Restructured Meat and Poultry Products	341
	Economics and Market Considerations	345
	Summary	346
	References	346
10	Fundamentals of Production	351
	<i>A. M. Booren and R. W. Mandigo</i>	
	Production Principles	351
	Equipment	359
	Production Systems	370
	Production Factors Affecting Bind	375
	Heating and/or Smoking	378
	Freezing, Crust Freezing, and Tempering	379
	Summary	379
	References	380
11	Formulations for Restructured Red Meat Products	383
	<i>D. L. Huffman and J. C. Cordray</i>	
	Beef Products	384
	Pork Products	390
	Lamb Products	401
	Summary	402

12	Formulations for Restructured Poultry Products	405
	<i>P. D. Weiner</i>	
	Breast and Thigh Products	405
	Rolls and Roasts	414
	Deli-Type Products	420
	Patties and Nuggets	427
	Summary	431
13	Packaging of Restructured Meats	433
	<i>B. R. Harte</i>	
	Role of Packaging in Maintaining Product Quality	435
	Headspace Control Techniques—Vacuum and Gas-Flush	
	Packaging	439
	Plastic Packaging Materials and Containers	442
	Permeability of Packaging Materials	453
	Flexible Packaging	455
	Thermoforming	459
	Product Application	461
	Cartons and Corrugated Boxes/Trays	464
	Packaging Equipment	465
	The Future	466
	Summary	466
	References	467
14	Restructuring Fresh Meat Without the Use of Salt or Phosphate	469
	<i>W. J. Means and G. R. Schmidt</i>	
	Cooked Binding	470
	Raw Binding	471
	Alginates	475
	Algin/Calcium Technology for Restructuring Meat	480
	References	483
15	Future of Restructured Meat and Poultry Products	489
	<i>G. R. Schmidt, C. A. Hollingsworth, and R. B. Sleeth</i>	
	Factors Restricting Consumption and Markets	490
	Raw Materials	492
	Processing Equipment	493
	Additives	494
	Conclusions	494
	References	495
	Index	497

Restructured Meats—The Past and Present

John L. Secrist¹

Development of the Restructuring Concept	2
Methods of Restructuring Meats	6
Advantages of Restructured Meats	11
Problems with Restructured Meats	12
Economics of Restructured Meats	15
Summary	18
References	18

This publication consists of 15 chapters devoted to a single subject, namely restructured meats. One might question why so much attention is given to a subject that is relatively obscure to the consumer. The answer lies in the motivation of those scientists who can visualize and project the constant and progressive changes taking place in the animal and associated industries. Animals are being grown today more for edible yield than for the eating satisfaction associated with marbling fat and interstitial fat deposits, which have been desired by consumers in the past.

Wholesale and retail meat price increases have occurred over the years, due in part to the increased cost of grain and of manufacture. In days gone by, animals were slaughtered, dressed, and divided into sides and quarters, which were shipped directly to the neighborhood butcher for customized breakdown to satisfy individual buyer preferences. Today, the pathway from pasture to plate consists of slaughterers, primal and subprimal breakers, renderers, further processors and packagers, precookers, commercial freezers, warehousers and shippers, etc. Thus, assets and debits are shared among the various participants responsible for delivering the end products to consumers, and the costs have risen accordingly.

Supporting the evolution in animal selection and growth to provide a

¹Advanced Engineering and Development Group, Product Development and Engineering Branch, Food Technology Division, Food Engineering Directorate, U.S. Army Natick Research, Development and Engineering Center, Natick, MA 01760

greater percentage of lean and lesser percentage of fat has been the growing awareness of consumers that saturated fat intake may be associated with health problems and decreased life expectancy. Responding to the challenge of national and private health authorities, the red meat industry has been forced into changing the standards for commercial meat grading. Beef quality factors, such as marbling and cover fat, have been revised repeatedly during the past 20 years so that today the U.S. Choice Beef Grade, commonly associated with retail sales, includes animals with lesser amounts of fat than in past years.

In addition to these trends, consumers have demonstrated a decreased demand for roasts and an undiminished desire for the middle cuts, from which grilling and broiling steaks and chops are fabricated. This puts an added burden on the meat manufacturer since only 15–25% of a carcass yields these desired products. A large part of the carcass is processed into comminuted products such as ground meat and sausage products. As extensive as the markets are for these products, they do not satisfy current consumer demand for products with the eating characteristics of the solid muscle steaks and chops. Nor do they provide a profit margin to the various segments of the meat industry adequate to stabilize the price of the middle portion meats.

What is needed is a way to transform the secondary carcass parts into products of high value that have eating characteristics similar to those of the middle meat steaks and chops and are reasonable in price. Such a transformation is inherent in the various processes of meat restructuring as we recognize them today.

DEVELOPMENT OF THE RESTRUCTURING CONCEPT

Role of Military Food Procurement

World War II placed an immediate huge demand on the meat industry to provide meats for the rapidly increasing numbers of military personnel overseas. Innovations in carcass breakdown by slaughterers began in earnest. Carcasses were divided into primals and subprimals, which were further fabricated into boneless steaks, roasts, stew meat, ground meat, etc., and frozen for shipment. For many years following World War II, the marketing of animal carcasses remained essentially a total carcass utilization concept; that is, institutional buyers had to procure the secondary carcass parts to obtain the steaks, chops, and roasts desired. This meant that the various cuts had to be merchandised to their most economic advantage.

In the case of the military establishment, with over two million personnel to feed three meals daily, this became an unpleasant task for foodser-

vice management. To meet the constant demand for steaks and oven roasts, conversion of some of the better-quality secondary parts into those components was required. The lesser-quality secondary parts were the source of pot roasts, Swiss steaks, and stew meat. The remaining trimmings were converted into the ground meat component.

It was not until the late 1960s that major meat buyers, such as the military, were offered the opportunity to procure single carcass components solely on the basis of price. The introduction of hamburger outlets by McDonalds came about in the late 1950s with subsequent proliferation of that giant fast-food chain. Increasing numbers of ground beef competitors, as well as pizza, Mexican, roast beef sandwich, and other fast food outlets, followed. This provided the opportunity for major meat companies to fill orders for single meat items as well as multiple carcass parts. Grill steaks could be purchased in the amount preferred and affordable by the customer.

Although this might seem to be the answer that institutional foodservice officials had wished for, there also came some problems. The grill steaks under the military "six-way" concept were subsidized by the other components in the total carcass utilization approach. However, as the military demand for grill steaks increased beyond the percentage derived from the carcass, the cost of the single-commodity grill steaks offered by the meat industry was more than the military, limited by the daily basic food allowance established by Congress, could afford.

An answer to the military's demand for affordable steaklike products was provided by a piece of machinery manufactured by Bettcher Industries. Bettcher had recently purchased the rights to an existing mechanical meat press utilized until that time for pressing beef livers into liverlogs from which portionized liver slices could be obtained by mechanical slicers, bandsaws, etc. Bettcher's improvements in the design of the meat press and the introduction of the precision meat slicer enabled the military to purchase perfectly portioned beef grill steaks at a price equivalent to that previously paid for handcut steaks under the subsidized "six-way" breakdown system.

The gradual replacement of the manual fabrication of meats with sophisticated mechanically operated equipment came about during these years as the result of the buyer demand for reasonably priced portionized steaks and chops. Mechanization of formed and portion-controlled meats came of age during the late 1960s.

Development of Restructured Veal Products

As the 1960s became the 1970s, the veal industry, as the beef industry had previously done, offered to market single carcass parts to fill the requests of foodservice buyers. Users no longer had to contend with an inordinate percentage of the secondary carcass cuts. The demand, natu-