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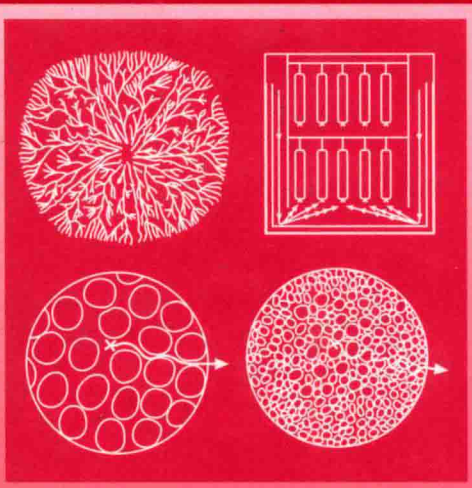

Meat products handbook

Practical science and technology

Gerhard Feiner

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Meat products handbook

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Preface

Several years ago it became apparent to me that there was a need for an all-in-one book about meat processing which clearly outlined the parameters to be considered during the various steps of processing. However, in order to understand processing properly, the basic principles of meat science and the composition and function of additives have to be understood first. Therefore these would have to be covered in detail in the book as well.

The purpose of this book is to give clear and helpful guidelines to professionals within the meat-processing industry, such as technical, production, quality control and research and development managers. Butchers handling meat and meat products on a daily basis will also greatly benefit from it, as will undergraduate and postgraduate students, who will, I hope, find the book an invaluable tool for their studies.

Having worked all over the world in the meat-processing industry, conducting seminars for customers as well as lecturing at a university, I was often asked about the availability of such an all-in-one book. Books available today focus either on meat science or on manufacturing at various levels of detail but not on both at the same time. As such, this book combines a scientific and yet still hands-on approach and covers all three major aspects of meat technology. These are the raw materials themselves, the 'world' of additives and, finally, the technologies used to combine them. Microbiology related to meat and meat products is also discussed as it plays an integral role in the production process and in the safety and shelf life of meat and meat products.

Acknowledgements

This book summarizes both my practical and my theoretical knowledge gained from working within the meat industry in several countries. My theoretical knowledge gained over the years is the result of both having been taught by and having worked with extremely knowledgeable people during my study of the Master Butcher Diploma and especially during my study of Meat Technology in Kulmbach (Germany). Therefore, I want to express deep gratitude to those who taught me over all those years, namely Titus Kaibic, Dipl.-Ing. Thomas Eberle, Dr Gerhard Hartmann, Dr Siegfried Guenther, Dr Fredi Schwaegele, Dr Guenther Hammer, Dipl.-Ing. Hans-Georg Hechelmann, Dr Klaus Fischer, Professor Lothar Leistner, Dr Herman Hecht, Professor Christoph Augustini, Dr Wolfgang Schneider, Dr Ulrike Fischer-Naegele, Dr Peter Braun, Dr Andrea Maurer, Udo Kuenzel, Barry Doesburg and Dr Joe Chen. I also want to thank all those people whom I no longer even remember who have given me ideas and help over the years. However the biggest thank you must go to my patient wife. She endured many lonely months whilst I wrote this book and has been a wonderful support during the research, writing and editing of the book.

During the course of my studies several books were of great help, namely:

Breuer, H., *dtv-Atlas zur Chemie II: Organische Chemie und Kunststoffe*, 5th edition, Deutscher Taschenbuch Verlag, München, 1992.

Kulmbacher Reihe, Band 2, *Beiträge zur Chemie und Physik des Fleisches*, Foerderergesellschaft der Bundesanstalt fuer Fleischforschung, Kulmbach, 1981 (articles by K. Hofmann, by K. Potthast, by R. Hamm, by C. Fischer, by K.O. Honikel and by L. Toth).

Kulmbacher Reihe, Band 4, *Technologie der Brühwurst*, Foerderergesellschaft der Bundesanstalt fuer Fleischforschung, Kulmbach, 1984 (articles by G.F. Hammer, by F. Worth and by P.-G. Klettner).

Kulmbacher Reihe, Band 5, *Mikrobiologie und Qualität von Rohwurst und Rohschinken*, Foerderergesellschaft der Bundesanstalt fuer Fleischforschung, Kulmbach, 1985 (articles by W. Rödel, by F.-J. Lüke and by H. Hechlelmann).

Kulmbacher Reihe, Band 6, *Chemisch-physikalische Merkmale der Fleischqualität*, Foerderergesellschaft der Bundesanstalt fuer Fleischforschung, Kulmbach, 1986 (article by K.O. Honikel, by H. Hecht and by K. Potthast).

Kulmbacher Reihe, Band 8, *Technologie der Kochwurst und Kochpökelware*, Foerderergesellschaft der Bundesanstalt fuer Fleischforschung, Kulmbach, 1988 (articles by G.F. Hammer, by F. Wirth, by W.-D. Müller, by A. Stiebing and by P.-G. Klettner).

Kulmbacher Reihe, Band 10, *Sichere Produkte bei Fleisch und Fleischerzeugnissen*, Foerderergesellschaft der Bundesanstalt fuer Fleischforschung, Kulmbach, 1990 (articles by L. Leistner, by H. Hechelman and R. Kasprowiak, by R. Geisen, by F.-K. Lücke and by L. Kröckel).

Kulmbacher Reihe, Band 11, *Qualitätssicherung im Fleischbereich*, Foerderergesellschaft der Bundesanstalt fuer Fleischforschung, Kulmbach, 1992 (article by K. Potthast).

Müller, G., *Grundlagen der Lebensmittelmikrobiologie*, Fachbuchverlag (on behalf of Dr. Dietrich Steinkopff Publishing), Leipzig, 1986.

Prändl, O., Fischer, A., Schmidhofer, T., and Sirell, H.-J. *Fleisch*, Eugen Ullmer, Stuttgart, 1988.

Disclaimer

All information in this book is based on practical knowledge gained by the author whilst working in factories as well as theoretical knowledge gained during his studies and should not be used as the basis for any legal claims. Hence, all information stated is not intended to credit, or discredit, any manufacturer of equipment or additives and is based purely on the opinion of the author.

Abbreviations

ADP	adenosine diphosphate
ATP	adenosine triphosphate
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BSE	bovine spongiform encephalopathy
CCP	critical control point
cfu	colony-forming unit
CL	chemically lean
CJD	Creutzfeldt–Jakob disease
CoA	coenzyme A
CP	creatine phosphate
CU	colour unit
DE	dextrose equivalent
DFD	dark firm dry
DNA	deoxyribonucleic acid
ETC	electron transfer chain
FAD	flavin–adenine dinucleotide
FFA	free fatty acid
GDL	glucono-δ-lactone
GI	glycaemic index
GM	genetically modified
GMO	genetically modified organism
GTP	guanosine triphosphate
HACCP	hazard analysis critical control point
HDL	high-density lipoprotein
HLB	hydrophilic lipophilic balance
HVP	hydrolysed vegetable protein
IEP	isoelectric point
IgE	immunoglobulin E
IP	identity preserved
LBG	locust bean gum

LDL	low-density lipoprotein
3-MCPD	3-monochloropropane-1,2-diol
MDM	mechanically deboned meat
MEM	moisture-enhanced meat
MSG	monosodium glutamate
MSM	mechanically separated meat
NAD	nicotinamide adenine dinucleotide
NFSS	non-fermented sliceable salami
OSI	oxidative stability index
PAH	polycyclic aromatic hydrocarbon
PCR	polymerase chain reaction
PHM	pork head meat
PPP	post-pack pasteurization
PSE	pale soft exudative
PV	peroxide value
RH	relative humidity
RSE	red soft exudative
SF_{FM}	solubility factor in fatty meat
SF_{M}	solubility factor in lean meat
SMBS	sodium metabisulphite
SPR	sarcoplasmic reticulum
STPP	sodium tripolyphosphate
TBA	thiobarbituric acid
TG	transglutaminase
TPC	total plate count
TSC	trisodium citrate
TVP	textured vegetable protein
UV	ultraviolet
VL	visual lean
WBC	water-binding capacity
WHC	water-holding capacity
WME	warm-meat effect
WOF	warmed-over flavour

Contents