

# HANDBOOK OF MEAT SCIENCE

Foods of animal origin with high biological value are very important source of animal proteins and other important nutrients for human being. There is heavy demand for the muscle foods and the consumers are very much aware about their health benefits. Accordingly lots of research and developments are going on in this area to provide quality meat and meat products. Recently, the Veterinary Council of Indian has revised the curriculum for undergraduate study (BVSc&AH) and the course contents are thoroughly revised (MSVE, 2016). Under the department of Livestock Products Technology one of the important portions in the syllabus is "Meat Science" (Unit-4). This book is designed as a "Handbook" as an easy digest of the subject with precise points, charts, tables, figures especially for the average students. The syllabus on Meat Science is covered under 17 topics including two topics on eggs as per the syllabus. Each topic/chapter is designed in such a way that it can be covered in one lecture and thus the whole syllabus can be covered in 17 lectures which is justifiable.

**Prabhat Kumar Mandal**  
Associate Professor

Department of Livestock Products Technology  
Rajiv Gandhi Institute of Veterinary  
Education and Research, Kurumbapet, Puducherry-605009  
e-mail : mandalpkm@gmail.com

**Ashim Kumar Biswas**  
Senior Scientist (LPT)

Division of Post-Harvest Technology, ICAR-CARI,  
Izatnagar, Bareilly-243122 (U.P.)  
e-mail: biswaslpt@gmail.com



**SATISH SERIAL PUBLISHING HOUSE**

403, Express Tower, Commercial Complex, Azadpur, Delhi - 110033 (India)  
Phone : 011-27672852, Fax : 91-11-27672046  
E-mail : info@satishserial.com, hkjain1975@yahoo.com  
Website : www.satishserial.com



Rs. : 950.00

HANDBOOK OF  
MEAT SCIENCE

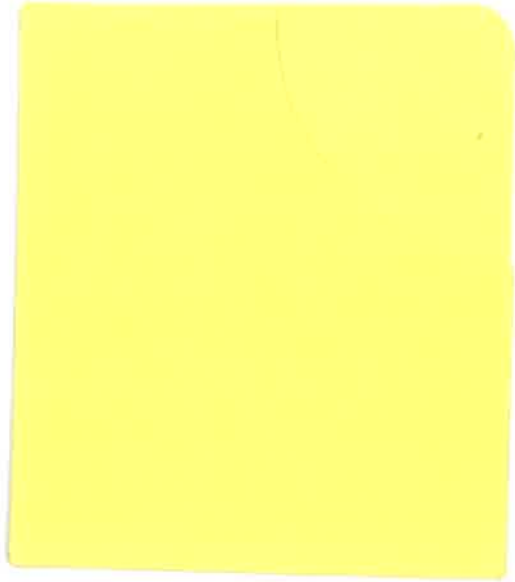
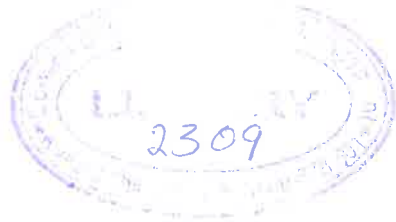
PRABHAT KUMAR MANDAL  
ASHIM KUMAR BISWAS



# HANDBOOK OF MEAT SCIENCE



**PRABHAT KUMAR MANDAL**  
**ASHIM KUMAR BISWAS**



2309

**COLLEGE OF AVIAN SCIENCES & MANAGEMENT  
KVASU CAMPUS, THIRUVAZHAMKUNNU**

Acc. No. 2309.....

Call No.....

**This book should be returned on or before the  
date last given below.**

--	--	--

---

Hand Book of  
**MEAT SCIENCE**



---

# Hand Book of MEAT SCIENCE

---

Authors

**Prabhat Kumar Mandal**

Associate Professor

Department of Livestock Products Technology

Rajiv Gandhi Institute of Veterinary

Education and Research, Kurumbapet

Puducherry-605009

*e-mail : mandalpkm@gmail.com*

**Ashim Kumar Biswas**

Senior Scientist (LPT)

Division of Post-Harvest Technology, ICAR-CARI,

Izatnagar, Bareilly-243122 (U.P.)

*e-mail: biswaslpt@gmail.com*



**SATISH SERIAL PUBLISHING HOUSE**

403, Express Tower, Commercial Complex

Azadpur, Delhi-110033 (India)

Phone : 011-27672852, Fax : 91-11-27672046

*e-mail : info@satishserial.com, hkjain1975@yahoo.com*

Website : [www.satishserial.com](http://www.satishserial.com)

Published by :

### **SATISH SERIAL PUBLISHING HOUSE**

403, Express Tower, Commercial Complex, Azadpur, Delhi-110033 (INDIA)  
Phone : 011-27672852 Fax : 91-11-27672046  
E-mail : info@satishserial.com, hkjain1975@yahoo.com

© **Publisher**

ISBN 978-93-86200-41-9 (HB)

© 2018. All rights reserved, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher and also the copyright, rights of the printing, publishing, e-book of this edition and subsequent editions will vest with the publisher. All Computer floppies, CD's, e-book and in any other form relating to this book will be exclusive property of the publisher.

*This book contains information obtained from authentic and highly regarded sources. Reasonable efforts have been made to publish reliable data and information, but the publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The publisher have attempted to trace and acknowledge the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission and acknowledgements to publish in this form have not been obtained. If any copyright material has not been acknowledged please write and let us know so that we may rectify it.*

Composed, Designed & Printed in India

### **About the Authors**

**Dr. Prabhat Kumar Mandal** was born in 1967 in West Bengal, got BVSc. & A.H. from Bidhan Chandra Krishi Viswavidyalaya, Kolkata, in 1991 and did his MVSc & Ph.D majoring in Livestock Products Technology from Indian Veterinary Research Institute, Izatnagar in the year 1993 and 1996, respectively. He is a recipient of National Scholarship from GOI (1984-1991), JRF (1991-1993) and SRF (1993-1996) from IVRI. He worked for a short period (1996) as Scientist (ARS) in ICAR and then joined as Assistant Professor in Dept of LPT in September 1996, in Rajiv Gandhi College of Veterinary and Animal Sciences, Pondicherry. He was promoted as Associate Professor in March, 2005 and Associate Professor, Senior Grade from March, 2008.

Dr. Mandal is teaching several UG and PG courses related to Livestock Products Technology and engaged in research on Meat Science and Technology more than 20 years. His research achievements include development of chicken meat balls from spent hen meat, utilization of blood protein isolates in sausages and cakes, development of poultry products utilizing edible byproducts, low fat restructured chicken block using gizzard and natural preservatives. Presently he is working on development of functional meat foods with natural preservatives. Dr. Mandal has more than 150 publications to his credit.

He worked as Visiting Professor in Hankyong National University, South Korea and Konkuk University, Seoul from March, 2008 to February, 2010. He was Associate Editor/Editor, Journal of Meat Science published by IMSA since 2003-13. Presently Dr. Mandal is Chief Editor of International Journal of Meat Science, Journal of Meat Science and Journal of Food & Nutrition Research. He has edited an advance reference book "Animal Products Technology" and Co-author of books "Poultry, Egg and Fish Processing Technology" for PG level and "Abattoir, Byproducts and Wool" for U. G. Veterinary students and "Practical Meat Science". Dr. Mandal is a Fellow of Indian Poultry Science Association and Indian Meat Science Association.

**Dr. Ashim Kumar Biswas** Born on 05<sup>th</sup> March 1978 in West Bengal, got BVSc. & A.H. from WBUA& FSc, Kolkata in 2000, MVSc. (in 2002) and Ph.D (in 2005) in Livestock Products Technology from, Indian Veterinary Research Institute, Izatnagar. In 2005, he joined as Assistant Professor in the Department of LPT, SKUAST-Jammu. On Feb 2007, he joined as Assistant Professor in the Department of LPT, GADVASU, Ludhiana. Presently he is serving as Senior Scientist in Division of Post-Harvest

Technology at Central Avian Research Institute (ICAR), Izatnagar. He has more than 150 publications to his credit.

His main achievements in research is relating to evaluation of export buffalo meat for quality, development of enrobed meat products, restructured buffalo meat blocks, functional based & shelf stable value added meat products. His research also focused on development and validation of HPLC methodologies for detection of pesticide and veterinary drug residues in meat and meat products. He also standardized molecular techniques (PCR) for the detection of bacterial pathogens in livestock products. He teaches several LPT courses at the University and guides many undergraduate and postgraduate students since 2006. He handled or currently handling several research projects and grants funded by MFPI, DST, RKVY (Govt. of India), ICAR, etc. in the capacity of PI and Co-PI.

He has Co-edited an advance reference book "Animal Products Technology" and author of a text book "Poultry, Egg and Fish Processing Technology" for PG level and another text book "Abattoir, Byproducts and Wool" for U. G Veterinary students and "Practical Meat Science". Dr. Biswas is a fellow of Indian Poultry Science Association, NAAS Associate, Associate Editor, Journal of Meat Science and Indian Journal of Poultry Science.

## Preface

---

Foods of animal origin with high biological value are very important source of animal proteins and other important nutrients for life sustenance of human being. There is heavy demand for the muscle foods and the consumers are very much aware about the health benefits of muscle foods. Accordingly lots of research and developments are going on in this area to provide quality meat and meat products. India, is experiencing rapid growth in animal and poultry industry especially in meat industry. Presently, India ranks 5<sup>th</sup> in meat and poultry production in the world.

Recently, the Veterinary Council of Indian has revised the curriculum for undergraduate (BVSc&AH) study and the course contents are thoroughly revised under "Minimum Standard of Veterinary Educations" (MSVE) Regulations, 2016. Under the department of Livestock Products Technology one of the important portions in the syllabus is Meat Science (Unit-4). However, at present no proper text book is available covering this course for the ready reference of the students. We both have been teaching the earlier course from the beginning of the VCI syllabus, hence, we felt a book covering the new syllabus with a easy reading is very much necessary for the students. A hand book is one which deals with the basic information about a subject. This book is designed for easy understanding of the subject with precise points, especially for the students. The syllabus on Meat Science is covered under 17 topics, each to be covered in one lecture. The topics are presented in a very easy language with précised points, figures, tables and charts. We hope this Handbook will be very much useful to the under graduate students of veterinary and animal sciences, and teachers who are engaged in teaching students.

**Prabhat Kumar Mandal**  
**Ashim Kumar Biswas**