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Principles And  
Applications

# **Food Processing Principles And Applications**

Food Processing:  
Principles and  
Applications is a  
comprehensive  
resource that explores

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Principles And  
Applications  
the basic and applied  
aspects of food

processing. It  
describes the  
physical, chemical,  
and microbiological  
basis for each method  
of preservation.

Particular emphasis is  
placed on the  
application of three  
of the most

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universally used  
commercial

processes: thermal  
processing, freezing,  
and dehydration.

Thermal processing  
– perhaps the most  
widely used  
technology in the  
world – is examined  
in thorough  
discussions of the

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microbial basis of the process and on microbial destruction kinetics. Also described is the characterization of the heating behavior of foods and the equipment used for thermal processing. Low temperature preservation is also

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demonstrated with a focus on freezing.

The fundamentals of the freezing process, and the techniques and equipment used in commercial freezing operations are also explained.

The thermophysical properties and the modeling of freeze

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times are meticulously addressed in sequence. Aspects of dehydration are detailed from drying fundamentals to drying equipment, modeling, and storage stability. In the final section, separation processes

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are highlighted:  
evaporation,  
membrane  
processing, freeze  
concentration,  
extraction, and  
osmotic dehydration.  
This book is ideal for  
undergraduate  
students in food  
science who are  
taking courses in

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food processing. It is also a must have resource for food process engineers and researchers to forecast results of food processing methods.

To the layman, adhesion is a simple matter of how well two different



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materials stick together, and adhesion measurements provide some indication of the force required to separate them. However, a more detailed look at adhesion shows that it is a very important

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feature of food throughout its manufacturing, packaging and storage. Chapters are fully devoted to the fascinating topic of adhesion in foods. Key features of the book include, but are not limited to: definition and

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nomenclature of  
adhesion; adhesion  
mechanisms and  
measurements;  
stickiness in various  
foods and its relation  
to technological  
processes; perception  
of stickiness;  
hydrocolloids as  
adhesive agents for  
foods; adhesion

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phenomena in coated, battered, breaded and fried foods; electrostatic adhesion in foods; multilayered adhered food products, and adhesion of substances to packaging and cookware. Adhesion in Foods:

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Fundamental  
Principles and  
Applications is  
dedicated not only to  
the academic  
community but also  
to the broader  
population of  
industrialists and  
experimentalists who  
will find it to be not  
only a source of

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knowledge, but also a launching pad for novel ideas and inventions. In particular, this book is expected to be of interest to personnel involved in food formulation, food scientists, food technologists, industrial chemists

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and engineers, and those working in product development.

This book concentrates on the more recent methods and techniques for separating food components and products of the biotechnology

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industry. Each chapter deals with a specific type or area of application and includes information on the basic principles, industrial equipment available, commercial applications, and an overview of current research and



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development. Much of the emphasis is on extraction of macromolecules, increasing the added value of foods and recovering valuable components from by-products and fermentation media. Many of the methods discussed are now in

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commercial practice, while others are being vigorously researched.

Separation and filtration technology is of major importance in food processing and biotechnology. This book provides a very detailed examination

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of the most important, advanced separation processes now in use.

Postharvest and  
Postmortem  
Processing of Raw  
Food Materials, a  
volume in the Unit  
Operations and  
Processing  
Equipment in the

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Food Industry series, presents the processing operations and handling of agricultural crops, animal products, and raw food materials after their harvesting/ slaughtering and entrance into food production factories. Chapters in this new

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release cover an  
Introduction to  
postharvest and  
postmortem  
technology, Primary  
operations in  
postharvest  
processing,  
Disintegration of raw  
agricultural crops,  
Disintegration with  
little changes in form

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(Husking, Shelling,  
Pitting, Coring,  
Snipping and  
Destemming),  
Disintegration with  
considerable changes  
in form  
(Cutting/dicing,  
crashing and  
grinding,  
Slaughtering,  
Shredding, Sheeting),

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and much more.

Written by experts in the field of food engineering, and in a simple and dynamic way, this book targets all who are engaged in food processing operations worldwide, giving readers good knowledge on the

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basics of food  
engineering

principles and  
applications.

Thoroughly explores  
novel applications of  
postharvest/postmort  
em operations in  
processing food  
products Brings  
perspectives about  
the postharvest



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processing of  
different agricultural  
crops and  
postmortem  
processing of  
different animal  
meats Helps to  
improve the quality  
and safety of food  
products with postha  
rvest/postmortem  
operations

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Engineering  
Applications

Interventions in

Agricultural

Processing

Principles of Food

Processing

Principles and

Applications of

Modified

Atmosphere

Packaging of Foods

Food Processing

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Principles And  
Technology  
Applications

Radio-Frequency  
Heating in Food  
Processing

*Modified atmosphere packaging (MAP) has proved to be one of the most significant and innovative growth areas in retail food packaging of the past two decades. Bulk modified atmosphere*

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Applications

*MAP packs have been an accepted form of packaging for meat and poultry in the USA since the early 1970s, but MAP is only now of being widely adopted. Today there is a substantial wholesale on the verge market for bulk packaged fresh vegetables and fruit, and the most significant retail MAP products are*

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Applications

*fresh pasta, pre-cooked poultry and sausage, and biscuits (a unique American product). The United Kingdom is the biggest single market for the modified atmosphere packaging of fresh chilled food products, accounting for about half of the total European market. A further quarter is represented by France.*

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Applications

*The success of MAP in both the British and French markets can be attributed to the large, highly sophisticated food retailing multiples and dense populations existing in both countries.*

*Advances in food science, technology, and engineering are occurring at such a rapid rate that*

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*obtaining current,  
detailed information is  
challenging at best.*

*While almost everyone  
engaged in these  
disciplines has  
accumulated a vast  
variety of data over  
time, an organized,  
comprehensive resource  
containing this data  
would be invaluable to  
have. The*

*The second edition of*

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*this fascinating work examines the concepts needed to characterize rheological behavior of fluid and semisolid foods. It also looks at how to use various ingredients to develop desirable flow properties in fluid foods as well as structure in gelled systems. It covers the crucially important*



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*application of rheology to sensory assessment and swallowing, as well as the way it can be applied to handling and processing foods. All the chapters have been updated to help readers better understand the importance rheological properties play in food science and utilize these properties to characterize food.*

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*Food Plant Safety: UV Applications for Food and Non-Food Surfaces discusses the fundamental principles of ultraviolet (UV) light technology, and gives practical recommendations on UV processes and systems design for specific processing operations, as well as how microbial efficacy*

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*of UV light can improve the quality of existing product lines. Innovative research of ultraviolet light for food applications has been growing worldwide. With increased consumer demand for fresher, minimally processed but safe foods, comes the need for novel technologies to meet*

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*that demand.*

*Ultraviolet technology has been taking its niche in food production as a non-chemical treatment to control and enhance safety of processing plants and storage facilities. This concise resource covers the fundamentals of this promising technology and its applications; it*

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*will benefit a broad audience of professionals in food engineering, processing, and product development, as well as graduate level students. Focuses on plant processing operations in the food industry Presents the benefits of UV light technology applications for air quality, and safety of*

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*non-food and food  
contact surfaces Covers  
the cost benefits and  
energy and  
environmental  
advantages of using UV  
technologies  
Unit Operations and  
Processing Equipment  
in the Food Industry  
Principles and  
Applications of Gas  
Chromatography in  
Food Analysis*

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Principles And  
*Food Irradiation*  
*Handbook of Food*

*Processing*  
*Principles and*  
*Applications*

In 1997 the FDA approved the use of low-dose ionizing radiation to eliminate pathogens in red meat. This

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food processing technology can improve the safety of food and extend the shelf life of certain foods by eliminating pathogenic bacteria, parasites, and other microorganisms



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that cause food-borne disease.

Currently, forty-two countries practice some form of food irradiation.

Food

Irradiation:  
Principles and  
Applications  
provides a

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comprehensive,  
up-to-date  
account of food  
irradiation  
principles,  
effects,  
applications,  
and  
limitations,  
including  
global  
regulatory  
issues and the

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economics of  
food

irradiation.

Written by an  
international  
panel of  
scientists,  
this book  
focuses on  
science and  
technology and  
offers thorough  
coverage of the

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current use of  
food  
irradiation  
around the  
world. The  
contributors in  
this book  
present  
irradiation as  
a truly  
critical  
control point  
for raw, solid

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foods of animal  
origin. Food

Irradiation:

Principles and  
Applications

discusses such  
topics as:

-Radiation

inactivation of  
microorganisms

-Disinfestation  
of stored

grains, pulses,

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dried fruits,  
and nuts

-Irradiation as  
a quarantine  
treatment

-Irradiation of  
meat and  
poultry, fish  
and shellfish,  
fruits and  
vegetables, and  
tuber and bulb  
crops

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-Radiation  
decontamination  
of spices,  
herbs,  
condiments, and  
other dried  
food  
ingredients  
-Process  
control and  
dosimetry in  
food  
irradiation

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Food professionals in both academia and industry, as well as food safety experts, food scientists, research scientists, and food processing managers, will



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find Food

Irradiation:

Principles and  
Applications a  
reliable and  
valuable  
reference.

A high standard  
of hygiene is a  
prerequisite  
for safe food  
production, and  
the foundation

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on which HACCP  
and other  
safety  
management  
systems depend.  
Edited and  
written by some  
of the world's  
leading experts  
in the field,  
and drawing on  
the work of the  
prestigious

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European  
Hygienic

Engineering and  
Design Group  
(EHEDG) ,

Hygiene in food  
processing  
provides an  
authoritative  
and  
comprehensive  
review of good  
hygiene

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practice for  
the food  
industry. Part  
one looks at  
the regulatory  
context, with  
chapters on the  
international  
context,  
regulation in  
the EU and the  
USA. Part two  
looks at the

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key issue of  
hygienic  
design. After  
an introductory  
chapter on  
sources of  
contamination,  
there are  
chapters on  
plant design  
and control of  
airborne  
contamination.

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These are followed by a sequence of chapters on hygienic equipment design, including construction materials, piping systems, designing for cleaning in

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place and  
methods for  
verifying and  
certifying  
hygienic  
design. Part  
three then  
reviews good  
hygiene  
practices,  
including  
cleaning and  
disinfection,

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personal hygiene and the management of foreign bodies and insect pests. Drawing on a wealth of international experience and expertise, Hygiene in food processing is a standard work



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for the food industry in ensuring safe food production. An authoritative and comprehensive review of good hygiene practice for the food industry Draws

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on the work of  
the prestigious  
European  
Hygienic  
Engineering and  
Design Group  
(EHEDG) Written  
and edited by  
world renowned  
experts in the  
field

Part I:

Fundamentals of

*Page 58/257*

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ultrasound This part will cover the main basic principles of ultrasound generation and propagation and those phenomena related to low and high intensity ultrasound applications.

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The mechanisms involved in food analysis and process monitoring and in food process intensification will be shown.

Part II: Low intensity ultrasound applications

Low intensity

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ultrasound applications have been used for non-destructive food analysis as well as for process monitoring. Ultrasonic techniques, based on velocity,

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attenuation or  
frequency  
spectrum  
analysis, may  
be considered  
as rapid,  
simple,  
portable and  
suitable for on-  
line  
measurements.  
Although  
industrial

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applications of  
low-intensity  
ultrasound,  
such as meat  
carcass  
evaluation,  
have been used  
in the food  
industry for  
decades, this  
section will  
cover the most  
novel

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applications,  
which could be  
considered as  
highly relevant  
for future  
application in  
the food  
industry.

Chapters  
addressing this  
issue will be  
divided into  
three



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subsections:

(1) food  
control, (2)  
process  
monitoring, (3)  
new trends.

Part III: High  
intensity  
ultrasound  
applications  
High intensity  
ultrasound  
application

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constitutes a way to intensify many food processes. However, the efficient generation and application of ultrasound is essential to achieving a successful effect. This

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part of the  
book will begin  
with a chapter  
dealing with  
the importance  
of the design  
of efficient  
ultrasonic  
application  
systems. The  
medium is  
essential to  
achieve

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efficient transmission, and for that reason the particular challenges of applying ultrasound in different media will be addressed. The next part of this section

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constitutes an up-to-date vision of the use of high intensity ultrasound in food processes. The chapters will be divided into four sections, according to the medium in

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which the  
ultrasound  
vibration is  
transmitted  
from the  
transducers to  
the product  
being treated.  
Thus, solid,  
liquid,  
supercritical  
and gas media  
have been used

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for ultrasound  
propagation.

Previous books  
addressing  
ultrasonic  
applications in  
food processing  
have been based  
on the process  
itself, so  
chapters have  
been divided in  
mass and heat

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transport,  
microbial  
inactivation,  
etc. This new  
book will  
propose a  
revolutionary  
overview of  
ultrasonic  
applications  
based on (in  
the authors'  
opinion) the



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most relevant  
factor

affecting the  
efficiency of  
ultrasound  
applications:  
the medium in  
which  
ultrasound is  
propagated.  
Depending on  
the medium,  
ultrasonic

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phenomena can be completely different, but it also affects the complexity of the ultrasonic generation, propagation and application. In addition, the effect of high intensity

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ultrasound on  
major  
components of  
food, such as  
proteins,  
carbohydrates  
and lipids will  
be also  
covered, since  
this type of  
information has  
not been deeply  
studied in

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previous books.

Other aspects related to the challenges of food industry to incorporate ultrasound devices will be also considered.

This point is also very important

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since, in the last few years, researchers have made huge efforts to integrate fully automated and efficient ultrasound systems to the food production lines but, in some cases, it

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was not  
satisfactory.

In this sense,  
it is necessary  
to identify and  
review the main  
related  
problems to  
efficiently  
produce and  
transmit  
ultrasound,  
scale-up,

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reduce cost,  
save energy and  
guarantee the  
production of  
safe, healthy  
and high added  
value foods.

The production  
of  
environmentally  
friendly,  
sustainable,  
chemical-free

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food continues  
to challenge  
the food  
industry,  
spurring on  
investigations  
into  
alternative  
food processing  
techniques that  
are more  
sophisticated  
and diverse



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than current  
practices.

Exploring one  
of these  
emerging  
solutions,  
Ultraviolet  
Light in Food  
Technology:  
Principles and  
Applications  
incorporates  
the

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fundamentals of  
continuous and  
pulsed UV light  
generation and  
propagation;  
current food  
regulations;  
recommendations  
for optimal UV  
reactor design,  
selection, and  
validation;  
information on

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both commercially available and under-development UV sources; and the outlook for future food applications. After reviewing essential terms, definitions,

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and current applications, the book emphasizes the need to properly assess the physical and chemical properties in foods that influence the effectiveness of UV treatment

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and impact  
inactivation  
kinetics. It  
also addresses  
the effects of  
UV processing  
on food  
quality, before  
considering the  
engineering  
aspects of UV  
light  
treatment, such

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as transport  
phenomena,  
process  
calculations,  
and continuous-  
flow reactor  
geometries. The  
book then  
describes the  
principles of  
validating UV  
reactors as  
well as the

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principles and  
applications of  
UV pulsed  
light,  
including  
microbial  
inactivation in  
water, meat,  
fruits,  
vegetables, and  
packaging  
materials. For  
anyone working

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in food  
research,  
development,  
and operations,  
this resource  
provides broad,  
accessible  
information on  
the science and  
applications of  
UV light  
technology. It  
shows how UV



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light  
irradiation can  
be used as a  
physical  
preservation  
method in food  
processing.

Rheology of  
Fluid and  
Semisolid

Foods:

Principles and  
Applications

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Image

Processing

Ultrasound:

Advances in

Food Processing

and

Preservation

A Comprehensive

Review

Hygiene in Food

Processing

**Engineering**

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Interventions in  
Agricultural  
Processing  
presents recent  
advanced  
research on  
biological  
engineering,  
bioprocessing  
technologies, and  
their applications  
in agricultural

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food processing,  
and their  
applications in  
agriculture  
science and  
agricultural  
engineering,  
focusing on  
biological science,  
biological  
engineering, and  
bioprocessing

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technology. With contributions from a broad range of leading researchers, this book presents several innovations in the areas of processing technologies in agriculture. The

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book is divided  
into three parts,  
covering  
agricultural  
processing:  
interventions in  
engineering  
technologies novel  
practices in  
agricultural  
processing  
agricultural

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processing: health  
benefits of  
medicinal plants  
With contributions  
from a broad  
range of leading  
researchers, this  
book presents  
several new  
innovations in the  
areas of  
processing

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technologies in  
agriculture that  
will be helpful to  
researchers,  
scientists,  
students, and  
industry  
professionals in  
agriculture.

Residue analysis  
in food is an  
essential science



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in terms of the number of laboratories and analysts involved worldwide and the range of analytical techniques available. This text uniquely combines the principles and applications of the

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various  
techniques  
employed in  
residue analysis,  
so as to provide  
the reader with a  
thorough  
understanding  
and pr

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second edition is the fully revised new edition of this best-selling food technology title. Advances in food processing continue to take place as food scientists and food engineers adapt to the challenges

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imposed by emerging pathogens, environmental concerns, shelf life, quality and safety, as well as the dietary needs and demands of humans. In addition to covering food

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processing principles that have long been essential to food quality and safety, this edition of Food Processing: Principles and Applications, unlike the former edition, covers microbial/enzyme

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inactivation kinetics, alternative food processing technologies as well as environmental and sustainability issues currently facing the food processing industry. The book

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is divided into two sections, the first focusing on principles of food processing and handling, and the second on processing technologies and applications. As a hands-on guide to the essential

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processing  
principles and  
their applications,  
covering the  
theoretical and  
applied aspects of  
food processing in  
one accessible  
volume, this book  
is a valuable tool  
for food industry  
professionals



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across all  
manufacturing  
sectors, and  
serves as a  
relevant primary  
or supplemental  
text for students  
of food science.

Engineering  
Principles of Unit  
Operations in  
Food Processing,

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volume 1 in the  
Woodhead  
Publishing Series,  
In Unit Operations  
and Processing  
Equipment in the  
Food Industry  
series, presents  
basic principles of  
food engineering  
with an emphasis  
on unit

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operations, such as heat transfer, mass transfer and fluid mechanics.

Brings new opportunities in the optimization of food processing operations

Thoroughly explores applications of

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food engineering  
to food processes

Focuses on unit  
operations from  
an engineering  
viewpoint

Fundamental  
Principles and  
Applications

Microstructural  
Principles of Food  
Processing and

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Engineering  
High Pressure  
Processing of Food  
Recent Advances  
Alternatives to  
Conventional Food  
Processing  
Image processing-  
from basics to  
advanced  
applications Learn  
how to master

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image processing  
and compression  
with this outstanding  
state-of-the-art  
reference. From  
fundamentals  
to sophisticated  
applications, Image  
Processing:  
Principles  
and Applications  
covers multiple  
topics and provides

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a fresh perspective  
on future directions  
and innovations in  
the field, including: \*

Image

transformation

techniques,

including wavelet

transformation and

developments \*

Image enhancement

and restoration,

including noise

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modeling

and filtering \*

Segmentation

schemes, and

classification and

recognition

of objects \* Texture

and shape analysis

techniques \* Fuzzy

set theoretical

approaches in

image processing,

neural networks, etc.



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- \* Content-based image retrieval and image mining \*
- Biomedical image analysis and interpretation, including biometrical algorithms such as face recognition and signature verification
- \* Remotely sensed images and their

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Principles and  
applications of  
dynamic scene  
analysis and  
movingobject  
detection and  
tracking \*

Fundamentals of  
image compression,  
including the JPEG  
standardand the  
new JPEG2000

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standard Additional features include problems and solutions with each chapter to help you apply the theory and techniques, as well as bibliographies for researching specialized topics. With its extensive use of examples

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and illustrative figures, this is a superior title for students and practitioners in computer science, wireless and multimedia communications, and engineering. The food analyst plays an important role in modern

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society. Stricter control over additives in food and concern about the effects of contamination of food by industrial and agricultural chemicals are among the developments which are leading to an increasing emphasis

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on detailed and accurate analysis of food. However, analysis of food is required for many reasons, including detection of toxic components, monitoring legislation, detecting adulteration, formulation of controlled diets,

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controlling  
formulation during  
product  
development and  
detecting changes  
in food during  
storage and  
processing. Foods  
comprise a complex  
mixture of  
components and  
food analysis  
requires efficient

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methods of separation with high sensitivity or specificity of detection. Although many food components are involatile or thermally labile and therefore not suitable for analysis by gas chromatography,



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other components are volatile and this technique is the preferred analytical method.

Developments in methods of derivatization, injector design and column technology have also extended the applicability of gas chromatography to

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the analysis of relatively involatile compounds.

Adapting High Hydrostatic Pressure (HPP) for Food Processing Operations presents commercial benefits of HPP technology for specific processing operations in the

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food industry, including raw and ready-to-eat (RTE) meat processing, dairy and seafood products, drinks and beverages, and other emerging processes. The book presents high hydrostatic pressure processing (HPP) for treatment of

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different groups of raw and finished products, focusing on specific pressure-induced effects that will lead to different biological impacts, and the information necessary for specifying HPP process and equipment. It also discusses

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phenomena of  
compression  
heating, the HPP in-  
container principle,  
requirements for  
plastic materials,  
factors affecting  
efficacy of HPP  
treatments, and  
available  
commercial  
systems.

Additionally, the

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book provides updated information on the regulatory status of HPP technology around the world. This book is an ideal concise resource for food process engineers, food technologists, product developers, federal and state regulators,

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equipment  
manufacturers,  
graduate students,  
and educators  
involved in research  
and development.  
Includes case  
studies for HPP  
treatment of  
commercially  
produced foods with  
information  
regarding different

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HPP processing equipment Gives examples of specific applications for meat and poultry products treatments, fresh juices and beverages, and seafood Covers energy savings, environmental aspects of HPP technology, and



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regulatory status  
An Aspen Food  
Engineering Series  
Book. This new  
edition provides a  
comprehensive  
reference on food  
microstructure,  
emphasizing its  
interdisciplinary  
nature, rooted in the  
scientific principles  
of food materials

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science and  
physical chemistry.

The book details the techniques available to study food microstructure, examines the microstructure of basic food components and its relation to quality, and explores how microstructure is

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affected by specific unit operations in food process engineering.

Descriptions of a number of food-related applications provide a better understanding of the complexities of the microstructural approach to food processing. Color

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plates.

Innovative Food  
Processing  
Technologies  
Principles and  
Practice, Third  
Edition  
Food  
Nanotechnology  
Food Safety,  
Quality, and  
Manufacturing  
Processes

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Handbook of Food  
Processing, Two  
Volume Set

Widely regarded as a standard work in its field, this book introduces the range of processing techniques that are used in food manufacturing. It explains the principles of each

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process, the  
processing  
equipment used,  
operating  
conditions and the  
effects of  
processing on  
micro-organisms  
that contaminate  
foods, the  
biochemical  
properties of foods  
and their sensory  
and nutritional

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qualities. The book begins with an overview of important basic concepts. It describes unit operations that take place at ambient temperature or involve minimum heating of foods. Subsequent chapters examine

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operations that heat foods to preserve them or alter their eating quality, and explore operations that remove heat from foods to extend their shelf life with minimal changes in nutritional quality or sensory characteristics.



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Finally, the book reviews post-processing operations, including packaging and distribution logistics. The third edition has been substantially rewritten, updated and extended to include the many developments in

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food technology that have taken place since the second edition was published in 2000. Nearly all unit operations have undergone significant developments, and these are reflected in the large amount of additional material in each

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chapter. In particular, advances in microprocessor control of equipment, 'minimal' processing technologies, genetic modification of foods, functional foods, developments in

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'active' or  
'intelligent'  
packaging, and  
storage and  
distribution  
logistics are  
described.  
Developments in  
technologies that  
relate to cost  
savings,  
environmental  
improvement or  
enhanced product

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quality are highlighted.

Additionally, sections in each chapter on the impact of processing on food-borne micro-organisms are included for the first time.

Ohmic heating provides rapid and uniform heating,

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resulting in less thermal damage than conventional heating and allowing manufacturers to obtain high-quality products with minimum sensorial, nutritional, and structural changes. Ohmic Heating in Food Processing covers several

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aspects of Ohmic heating: science and engineering, chemistry and physics, biochemistry and nutrition, quality and safety, and development and technology, both basic and applied. It describes the importance of Ohmic technology

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and how to implement it in practice, addressing basic theory, principles, and applications. Divided into nine sections, this volume covers the basics of Ohmic heating, including a historic overview and fundamental principles;



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electrical conductivity, its importance, factors that influence it, and data modeling; biological effects of electricity on foods and food components, including microorganisms, enzymes, proteins, carbohydrates, and fats; and Ohmic

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heating behavior and design parameters. The book also deals with issues in Ohmic heating equipment, Ohmic heating modeling issues, and process validation issues. The authors discuss various applications of Ohmic heating

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applied to different classes of foods, such as muscle foods (meat, poultry, and fish), dairy products, fruits, and vegetables. They also examine commercially successful applications of food products processed by Ohmic heating

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and considers applications of Ohmic heating where preservation is not the main focus, for example, blanching, Ohmic thawing, and the potential for Ohmic heating for long-duration space missions.

The biochemistry of food is the

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foundation on which the research and development advances in food biotechnology are built. In Food Biochemistry and Food Processing, lead editor Y.H. Hui has assembled over fifty acclaimed academicians and industry

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professionals to  
create this  
indispensable  
reference and text  
on food  
biochemistry and  
the ever-increasing  
development in the  
biotechnology of  
food processing.  
While biochemistry  
may be covered in  
a chapter or two in  
standard reference

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books on the chemistry, enzymes, or fermentation of food, and may be addressed in greater depth by commodity-specific texts (e.g., the biotechnology of meat, seafood, or cereal), books on the general coverage of food

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biochemistry are not so common. Food Biochemistry and Food Processing effectively fills this void. Beginning with sections on the essential principles of food biochemistry, enzymology and food processing, the book then



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takes the reader on commodity-by-commodity discussions of biochemistry of raw materials and product processing. Later sections address the biochemistry and processing aspects of food fermentation, microbiology, and

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food safety. As an invaluable reference tool or as a state-of-the-industry text, Food Biochemistry and Food Processing fully develops and explains the biochemical aspects of food processing for scientist and student alike.

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Ten years after the publication of the first edition of Fundamentals of Food Process Engineering, there have been significant changes in both food science education and the food industry itself. Students now in the food science

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curriculum are generally better prepared mathematically than their counterparts two decades ago. The food science curriculum in most schools in the United States has split into science and business options, with

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students in the science option following the Institute of Food Technologists' minimum requirements. The minimum requirements include the food engineering course, thus students enrolled in food engineering

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are generally better than average, and can be challenged with more rigor in the course material. The food industry itself has changed. Traditionally, the food industry has been primarily involved in the canning and freezing of

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agricultural  
commodities, and  
a company's  
operations  
generally remain  
within a single  
commodity. Now,  
the industry is  
becoming more  
diversified, with  
many companies  
involved in  
operations  
involving more

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than one type of commodity. A number of formulated food products are now made where the commodity connection becomes obscure. The ability to solve problems is a valued asset in a technologist, and often, solving



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problems involves nothing more than applying principles learned in other areas to the problem at hand. A principle that may have been commonly used with one commodity may also be applied to another commodity to produce unique

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products.

Applications  
Ultrasound in Food  
Processing  
Food Plant Safety  
Separation  
Processes in the  
Food and  
Biotechnology  
Industries  
Engineering  
Principles of Unit  
Operations in Food  
Processing  
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***UV light is one of a number of emerging non-thermal food processing technologies that can be used in a broad range of applications producing food products with longer shelf-life, more safe, and***

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***with higher  
nutritional  
quality. The new  
edition of  
Ultraviolet Light  
in Food  
Technology:  
Principles and  
Applications will  
present recent  
understanding of  
the fundamentals  
of UV light along  
with new applied***

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***knowledge that  
has accumulated  
during the 7  
years since the  
first edition  
published in  
2009. The new  
edition of the  
book will have 11  
chapters  
including 2 new  
chapters--on  
chemical  
destruction with***

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***UV light and food  
plant***

***safety—along  
with 6 chapters  
greatly expanded  
and updated.***

***Nanotechnology  
offers great  
potential to  
revolutionize  
conventional  
food science and  
the food  
industry. The use***

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*of*  
Applications

***nanotechnology  
in the food  
industry  
promises  
improved taste,  
flavor, color,  
texture, and  
consistency of  
foodstuffs and  
increased  
absorption and  
bioavailability of  
nutraceuticals.***

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***Nanotechnology:***

***Principles and***

***Applications***

***examines the***

***current state of***

***nanoscale***

***phenomena and***

***processes,***

***benefits and***

***risks of***

***nanotechnology.***

***This work***

***contains 18***



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***chapters particularly focused on the design, production, and utilization of nanoparticles, with specific applications for the food industry. Through several studies, it has been proven that***

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***nanotechnology  
can offer distinct  
advantages over  
conventional  
methods in terms  
of functionality,  
targeted delivery  
of food bioactive  
compounds,  
improved food  
quality  
characteristics  
like texture,  
taste, sensory***

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***attributes and improved stability in the gastrointestinal tract, and controlled release profiles. Features Offers clear and concise coverage on application of nanotechnology in nutrient delivery, food***

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***Addresses both the technological aspects of delivering nano-based food products and the societal implications that affect take-up***  
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***including nanoe  
multisification,  
electrospraying,  
nanocomposites,  
plasma  
processing, and  
nanosensors  
Discusses  
different  
formulation and  
preparation  
methods for  
loading food  
bioactive***

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**compounds**

***Exploratory in nature, this book presents the latest of such data on all aspects of applications of nanotechnology in food systems. With its practical focus on the fabrication and application of***

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***nanotechnology  
in food, this book  
is a valuable  
resource for  
students,  
researchers, food  
process  
engineers.***

***Food materials  
are processed  
prior to their  
consumption  
using different  
processing***

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*technologies that  
improve their  
shelf life and  
maintain their  
physicochemical,  
biological, and  
sensory qualities.  
Introduction to  
Advanced Food  
Process  
Engineering  
provides a  
general  
reference on*



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***various aspects  
of processing,  
packaging,  
storage, and  
quality control  
and assessment  
systems,  
describing the  
basic principles  
and major  
applications of  
emerging food  
processing  
technologies.***

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***The book is divided into three sections, systematically examining processes from different areas of food process engineering. Section I covers a wide range of advanced food processing technologies***

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***including osmo-  
concentration of  
fruits and  
vegetables,  
membrane  
technology,  
nonthermal  
processing,  
emerging drying  
technologies, CA  
and MA storage  
of fruits and  
vegetables,  
nanotechnology***

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***in food  
processing, and  
computational  
fluid dynamics  
modeling in food  
processing.***

***Section II  
describes food  
safety and  
various non-  
destructive  
quality  
assessment  
systems using***

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**machine vision  
systems,  
vibrational  
spectroscopy,  
biosensors, and  
chemosensors.  
Section III  
explores waste  
management, by-  
product  
utilization, and  
energy  
conservation in  
food processing**

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***industry. With an emphasis on novel food processes, each chapter contains case studies and examples to illustrate state-of-the-art applications of the technologies discussed. Sustainability is becoming a***

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***major item for  
the food industry  
around the  
world, as  
resources  
become more  
restricted and  
demand grows.  
Food processing  
ensures that the  
resources  
required  
producing raw  
food materials***

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***and ingredients  
for food***

***manufacturing  
are used most  
efficiently.***

***Responding to  
the goals of  
sustainability  
requires the  
maximum  
utilization of all  
raw materials  
produced and  
integration of***



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***activities throughout all the production-to-consumption stages. To maximize the conversion of raw materials into consumer products, food engineering and food processing challenges should be met.***

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***Sustainable Food  
Processing and  
Engineering  
Challenges  
covers the most  
trend topics and  
challenges of  
sustainable food  
processing and  
food  
engineering,  
giving emphasis  
in engineering  
packaging for a***

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***sustainable food  
chain, food  
processing  
technologies,  
Industry 4.0  
applied to food,  
food digestion  
engineering,  
sustainable  
alternative food  
processing  
technologies,  
physico-chemical  
aspects of food,***

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***cold plasma  
technology,  
refrigeration  
climate control,  
non-thermal  
pasteurisation  
and sterilization,  
nanotechnology  
and alternative  
processes  
requiring less  
resources,  
sustainable  
innovation in***

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**food product  
design etc.**

***Edited by a  
multiple team of  
experts, the book  
is aimed at food  
engineers who  
are seeking to  
improve  
efficiency of  
production  
systems and also  
researchers,  
specialists,***

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***chemical  
engineers and  
professionals  
working in food  
processing.  
Covers the most  
trend topics and  
challenges of  
sustainable food  
processing and  
food engineering  
Brings  
developments in  
methods to***

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***reduce the  
carbon footprint  
of the food  
system Explores  
emerging topics  
such as Industry  
4.0 applied to  
food and Food  
digestion  
engineering  
Food Mixing  
Postharvest and  
Postmortem  
Processing of***

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Volume Set  
Sustainable Food  
Processing and  
Engineering  
Challenges  
Fundamentals of  
Food Process  
Engineering**



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Food process  
Applications,  
engineering, a  
branch of both  
food science and  
chemical  
engineering, has  
evolved over the  
years since its  
inception and  
still is a  
rapidly changing  
discipline.

While  
traditionally

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the main objective of food process engineering was preservation and stabilization, the focus today has shifted to enhance health aspects, flavour and taste, nutrition, sustainable production, food

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security and also to ensure more diversity for the increasing demand of consumers. The food industry is becoming increasingly competitive and dynamic, and strives to develop high

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quality, freshly prepared food products. To achieve this objective, food manufacturers are today presented with a growing array of new technologies that have the potential to improve, or replace,

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conventional processing technologies, to deliver higher quality and better consumer targeted food products, which meet many, if not all, of the demands of the modern consumer. These new, or innovative,

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technologies are  
in various  
stages of  
development,  
including some  
still at the R&D  
stage, and  
others that have  
been  
commercialised  
as alternatives  
to conventional  
processing  
technologies.

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Food process engineering comprises a series of unit operations traditionally applied in the food industry. One major component of these operations relates to the application of heat, directly

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or indirectly,  
to provide foods  
free from  
pathogenic  
microorganisms,  
but also to  
enhance or  
intensify other  
processes, such  
as extraction,  
separation or  
modification of  
components. The  
last three



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decades have  
also witnessed  
the advent and  
adaptation of  
several  
operations,  
processes, and  
techniques aimed  
at producing  
high quality  
foods, with  
minimum  
alteration of  
sensory and

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nutritive  
properties. Some  
of these  
innovative  
technologies  
have  
significantly  
reduced the  
thermal  
component in  
food processing,  
offering  
alternative  
nonthermal

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methods. Food  
Processing  
Technologies: A  
Comprehensive  
Review covers  
the latest  
advances in  
innovative and  
nonthermal  
processing, such  
as high  
pressure, pulsed  
electric fields,  
radiofrequency,

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high intensity  
pulsed light,  
ultrasound,  
irradiation and  
new hurdle  
technology. Each  
section will  
have an  
introductory  
article covering  
the basic  
principles and  
applications of  
each technology,

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and in-depth  
articles  
covering the  
currently  
available  
equipment  
(and/or the  
current state of  
development),  
food quality and  
safety,  
application to  
various sectors,  
food laws and

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regulations,  
consumer  
acceptance,  
advancements and  
future scope. It  
will also  
contain case  
studies and  
examples to  
illustrate state-  
of-the-art  
applications.  
Each section  
will serve as an

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excellent  
reference to  
food industry  
professionals  
involved in the  
processing of a  
wide range of  
food categories,  
e.g., meat,  
seafood,  
beverage, dairy,  
eggs, fruits and  
vegetable  
products,

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spices, herbs  
among others.

Radio-Frequency  
Heating in Food  
Processing:  
Principles and  
Applications  
covers the  
fundamentals of  
radio-frequency  
(RF) heating and  
the use of RF-  
heating  
technologies in



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modern food processing, preservation, and related industries. Focusing on industrial and lab-scale applications where RF heating has been employed successfully or reported to have

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academicians and  
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have  
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fully  
illustrated

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resource

examines the  
principles of  
food processing  
and demonstrates  
their  
application by  
describing the  
stages and  
operations for  
manufacturing  
different  
categories of  
basic food

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products. Ideal  
as an  
undergraduate  
text, Food  
Processing  
stands apart in  
three ways: The  
expertise of the  
contributing  
authors is  
unparalleled  
among food  
processing texts  
today. The text

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is written  
mostly by non-  
engineers for  
other non-  
engineers and is  
therefore user-  
friendly and  
easy to read. It  
is one of the  
rare texts to  
use commodity  
manufacturing to  
illustrate the  
principles of

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food processing.  
As a hands-on  
guide to the  
essential  
processing  
principles and  
their  
application,  
this book serves  
as a relevant  
primary or  
supplemental  
text for  
students of food

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science and as a  
valuable tool  
for food  
industry  
professionals.  
Modified  
atmosphere  
packaging may be  
defined as an  
active packaging  
method in which  
an altered  
atmosphere is  
created in the

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headspace that retards chemical deterioration while simultaneously retarding growth of spoilage organisms. Shelf lives of perishable products, such as dairy products, meat, poultry, fish,



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fruits and  
vegetables, and  
bakery items are  
limited by  
biochemical  
changes in the  
product  
catalysed by  
exposure to the  
normal  
atmosphere (21 %  
oxygen, 78%  
nitrogen and  
less than 0. 1 %

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carbon dioxide)  
and growth of  
spoilage  
organisms.

Modification of  
the atmosphere  
within a package  
containing these  
products helps  
to better  
maintain the  
quality of the  
food under  
longer storage

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conditions and retards the growth of undesirable organisms. Of course, deterioration is also slowed by chilling, which is required for the transport to market of highly perishable items like meat,

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poultry and fish that would either spoil or have the potential for contamination by certain food pathogens.

Chilling plus a modification of the atmosphere optimizes the keeping quality of food.

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Modification of the atmosphere has been known for over a century as a means of food preservation and has become a very popular means of food preservation in the latter part of the 20th century.

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Modified atmosphere packaging (MAP) is practised extensively in Europe, Canada and the USo Both vacuum packaging (rem oval of air from the package) and addition of gases within the package are

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considered MAP .  
Food Processing

Principles,

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Applications

Ultraviolet

Light in Food

Technology

Residue Analysis

in Food

UV Applications

for Food and Non-

Food Surfaces

Packed with case

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studies and problem  
calculations,

Handbook of Food  
Processing: Food  
Safety, Quality, and  
Manufacturing  
Processes presents  
the information  
necessary to design  
food processing  
operations and  
describes the  
equipment needed



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to carry them out in detail. It covers the most common and new food manufacturing processes while addressing rele  
Ultrasound is an emerging technology that has been widely explored in food science and

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technology since the late 1990s. The book is divided into three main areas. Chapters 1 to 5 focus on the basic principles of ultrasound and how the technology works on microbial cells, enzymes, and the chemistry behind the process.

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Chapters 6 to 15 cover the application of ultrasound in specific food products and processes, discussing changes on food quality and presenting some innovations in food ingredients and enhancement of unit

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operations. Finally, Chapters 16 to 20 present some topics about manufacture of ultrasound equipment and simulation of the process, the use of the technology to treat food industry wastewater, and an industry perspective. The

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laws and regulations concerning emerging technologies, such as ultrasound, are also discussed, including the new Food Safety Modernization Act. Provides a clear and comprehensive panorama of ultrasound

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technology Contains  
updated research  
behind this  
technology Brings  
the current tested  
product and future  
uses Explores  
potential future use  
within the food  
industry  
High pressure  
processing  
technology has

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been adopted worldwide at the industrial level to preserve a wide variety of food products without using heat or chemical preservatives. High Pressure Processing: Technology Principles and

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Applications will review the basic technology principles and process parameters that govern microbial safety and product quality, an essential requirement for industrial application. This book will be of



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interest to scientists in the food industry, in particular to those involved in the processing of products such as meat, fish, fruits, and vegetables. The book will be equally important to food microbiologists and processing specialists in both

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the government and food industry.

Moreover, it will be a valuable reference for authorities involved in the import and export of high pressure treated food products. Finally, this update on the science and technology of high

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pressure processing will be helpful to all academic, industrial, local, and state educators in their educational efforts, as well as a great resource for graduate students interested in learning about state-of-the-art technology in food

# Download Free Food Processing Principles And engineering.

The approach to teaching the concepts of food processing to the undergraduate food science major has evolved over the past 40 years. In most undergraduate food science curricula, food processing has

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been taught on a commodity basis. In many programs, several courses dealt with processing with emphasis on a different commodity, such as fruits and vegetables, dairy products, meat products, and eggs. In most situations,

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the emphasis was on the unique characteristics of the commodity and very little emphasis on the common elements associated with processing of the different commodities. Quite often the undergraduate student was allowed

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to select one or two courses from those offered in order to satisfy the minimum standards suggested by the Institute of Food Technologists. The current 1FT minimum standards suggest that the undergraduate food science major be

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required to complete  
at least one food  
processing course.

The description of  
this course is as  
follows: One course  
with lecture and  
laboratory which  
covers general  
characteristics of  
raw food materials,  
principles of food  
preservation,



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processing factors  
that influence  
quality, packaging,  
water and waste  
management, and  
sanitation.

Prerequisites:  
general chemistry,  
physics, and  
general  
microbiology.

Introduction to  
Advanced Food

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Principles And  
Applications

Process

Engineering

Food Biochemistry

and Food

Processing

Adapting High

Hydrostatic

Pressure (HPP) for

Food Processing

Operations

Ohmic Heating in

Food Processing

Adhesion in Foods

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Principles And  
Applications

Authored by world experts, the

Handbook of Food Processing, Two-Volume Set

discusses the basic principles and

applications of

major commercial

food processing

technologies. The

handbook discusses

food preservation

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processes, including blanching, pasteurization, chilling, freezing, aseptic packaging, and non-thermal food processing. It describes com

This multi-authored book is edited by an expert in the field and includes chapters from

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international contributors. It is fully cross disciplinary relating green principles to the food industry, covering legal and policy issues, engineering, food processing and food science. It addresses the alternatives to

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conventional food processing that have reduced energy requirements or solvent use and how they affect final food quality. Initially, the principles of green chemistry and technologies are outlined to provide a justification and

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basis for the processing methods that are addressed. This is followed by a discussion of legal and policy issues in both the EU and the US which provide further justification for the need for such technologies and the constraints and benefits of

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current policies and regulations. The major green technologies available to the food industry are discussed, outlining the main principles and applications of each. The degree to which they are already in commercial use and



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developments needed to extend their use further are also covered.

The mixing of liquids, solids and gases is one of the most common unit operations in the food industry.

Mixing increases the homogeneity of a system by reducing

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non-uniformity or  
gradients

incomposition,  
properties or  
temperature.

Secondary  
objectives of mixing  
include control of  
rates of heat and  
mass  
transfer, reactions  
and structural  
changes. In food

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Applications  
processing applications,  
additional  
mixing challenges  
include sanitary  
design,  
complex rheology,  
desire for  
continuous  
processing and the  
effects of mixing on  
final product texture  
and sensory  
profiles. Mixing

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ensures delivery of a product with constant properties. Forexample, consumers expect all containers of soups, breakfastcereals, fruit mixes, etc to contain the same amount of eachingredient. If mixing fails to

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achieve the required product yield, quality, organoleptic or functional attributes, production costs may increase significantly. This volume brings together essential information on the principles and applications of

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mixing within food processing.

While there are a number of creditable references covering general mixing, such publications tend to be aimed at the chemical industry and so topics specific to food applications are often

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neglected. Chapters address the underlying principles of mixing, equipment design, novel monitoring techniques and the numerical techniques available to advance the scientific understanding of food mixing. Food

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mixing applications are described in detail. The book will be useful for engineers and scientists who need to specify and select mixing equipment for specific processing applications and will assist with the identification and solving of the wide



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range of mixing problems that occur in the food, pharmaceutical and bioprocessing industries. It will also be of interest to those who teach, study and research food science and food engineering.