



FOOD SCIENCE AND TECHNOLOGY

Standard XII



The Coordination Committee formed by GR No. Abhyas - 2116/(Pra.Kra.43/16) SD - 4 Dated 25.04.2016 has given approval to prescribe this textbook in its meeting held on 30.01.2020 and it has been decided to implement it from academic year 2020-21.

Food Science and Technology

STANDARD TWELVE



Download DIKSHA App on your smartphone. If you scan the Q.R. Code on this page of your textbook, you will be able to access full text and the audio-visual study material relevant to each lesson provided as teaching and learning aids.



2020

**Maharashtra State Bureau of Textbook Production and
Curriculum Research, Pune.**

First Edition :
2020

© **Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune - 411 004.**

The Maharashtra State Bureau of Textbook Production and Curriculum Research reserves all rights relating to the book. No part of this book should be reproduced without the written permission of the Director, Maharashtra State Bureau of Textbook Production and Curriculum Research, 'Balbharati', Senapati Bapat Marg, Pune 411004.

Subject Committee

Dr. Wazid Ali Khan

(Chairman)

Dr. Naikare Shriram Maruti

Dr. Anuradha Anil Nagpal

Dr. Madhuri V. Kaley

Dr. Abhijeet Arun Gatade

Dr. Rinku Sudarshan Agrawal

Dr. Jaysheela Baswant Manohar

Dr. Iranna S. Udachan

Shri. Rajiv Arun Patole

(Member Secretary)

Review Committee

Dr. Chandrashekhar V. Murumkar,

Dr. Naikare Shriram Maruti

Coordinator

Shri. Rajiv Arun Patole

Special Officer Science

Food Science and Technology

Illustrations and cover

Shri Vivekanand S. Patil

Typesetting

DTP Section, Textbook Bureau, Pune

Paper

70 GSM Creamwove

Print Order

Printer

Production

Shri Sachchitanand Aphale

Chief Production Officer

Shri Liladhar Atram

Production Officer

Publisher

Shri Vivek Uttam Gosavi

Controller

Maharashtra State Textbook

Bureau, Prabhadevi,

Mumbai - 400 025



The Constitution of India

Preamble

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvida-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

India is my country. All Indians
are my brothers and sisters.

I love my country, and I am proud
of its rich and varied heritage. I shall
always strive to be worthy of it.

I shall give my parents, teachers
and all elders respect, and treat
everyone with courtesy.

To my country and my people,
I pledge my devotion. In their
well-being and prosperity alone lies
my happiness.

Preface

Dear Students,

It is a matter of pleasure and pride to place this exposition on food science and technology book in the hand of the young generation. This textbook aims to create awareness about the food science and technology as food processing industry is highly significant for India's development because of vital linkages and synergies, it promotes between the two pillars of our economy, industry and agriculture. In India, the food sector has emerged as high growth and high profit sector due to its immense potential for value addition particularly within the food processing industry.

This book is designed for the food science and technology students and offers the learner tremendous scope for life skill development. The National Curriculum Framework (NCF) was formulated in 2005 and the State Curriculum Framework (SCF) in 2010. Based on the given these two frameworks, reconstruction of the curriculum and preparation of a revised syllabus has been undertaken which will be introduced from the academic year 2020-21. The textbook incorporating the revised syllabus has been prepared and designed by the Maharashtra State Bureau of Textbook Production and Curriculum Research, (Balbharti), Pune.

The new syllabus of food science and technology for Std. XII specifically focuses on the application of conceptual principles learned in Std. XI related to food processing sectors.

The textbook comprises 5 units with 12 chapters. The unit-1 and unit-2 more effectively tells about technology behind industrial food products like, milk and animal based products, beverages, bakery and confectionery products. Unit-3 deals with community nutrition, which will add to the knowledge of students about nutritional status and diet therapy for achieving good health through nutrition. Looking at the urgent need of food safety, to make the students aware unit-4 is dedicated for study related to food adulteration and its detection, knowledge about national and international food laws and regulations, and food waste management system. Being an important category of food industry, food service industry has been covered in unit-5.

The curriculum and syllabus confirm to the maxims of teaching such as moving from simple to complex, concrete to abstract, known to unknown and from part to whole.

Throughout the book, for quick understanding of concept in a constructive manner and grasping the matter, a better descriptive approach with numerous tables, figures, photographs and illustrations is used. For the first time in syllabus of food science and technology various independent activity have been introduced which not only help to comprehend the content but also understand its application. QR codes have been introduced for gaining the additional information about abstract of chapters and practice question/activities.

The efforts taken to prepare the textbook will not only enrich the learning experiences of the students, but also benefit other stakeholders such as teachers, parents, food entrepreneurs as well as candidates aspiring for the competitive examination.

We look forward to a positive response from the teachers and students.

Our best wishes to all !



(Vivek Gosavi)
Director

Pune

Date: 21 February 2020

Bhartiya Saur : 2 Phalgun 1941

Maharashtra State Bureau of Textbook
Production and Curriculum Research, Pune

For Teachers

Dear Teachers,

We are happy to introduce the textbook of Food Science and Technology for Std XII. This book is a sincere attempt to follow the maxims of teaching as well as develop a 'constructive' approach to enhance the quality of learning. The demand for more activity based, experiential and innovative learning opportunities is the need of the hour. The present curriculum has been restructured so as to bridge the credibility gap that exists between what is taught and what students learn from direct experience in the outside world. Guidelines provided below will help to enrich the teaching-learning process and achieve the desired learning outcomes.

- To begin with, get familiar with the textbook yourself.
- The present book has been prepared for constructive and activity-based teaching.
- Teachers must skillfully plan and organize the activities provided in each chapter to develop interest as well as to stimulate the thought process among the students.
- Always teach with proper planning.
- Use teaching aids as required for the proper understanding of the subject.
- Do not finish the chapter in short.
- Follow the order of the chapters strictly as listed in the contents because the units are introduced in a graded manner to facilitate knowledge building.
- Facilitate peer learning as much as possible by reorganizing the class structure frequently.
- Teaching-learning interactions, processes and participations of all students are very essential and so is your active guidance.
- Ask questions based on previous knowledge of different concepts of lesson.
- Do not use the boxes titled 'Do you know?' for evaluation. However, teachers must ensure that students read this extra information.
- Information provided in boxes and points to remember should be considered for evaluation.
- Exercises provided after each unit are prepared using different parameters like observation, co-relation, critical thinking, analytical reasoning etc.
- Evaluation pattern should be based on the above mentioned parameters. Equal weightage should be assigned to all the topics. Use different combinations of questions. Stereotype questions should be avoided.
- Use demonstration, discussion method for teaching.
- Use QR Code given in the textbook. Keep checking the QR Code for updated information.
- 'Activity' is used in lesson and exercise for better understanding and application of the content which studied.
- Exercise is given at the end of lesson. In exercise different type of questions/activities are given.
- Teacher should use their freedom to acquaint the students with different food products and recipies of given region.
- Remember that mathematical and statistical tools are also important to understand Food Science and Technology.
- Glossary, brief definitions and abbreviations are provided towards the end of the textbook for further clarification.

Best wishes for a wonderful teaching experience and fruitful welcome!

Competency Statements
Standard XII

Unit	Competency Statements After studying, the content in textbook students will...
Food Product Technology	<ul style="list-style-type: none"> • Be able to categorize the industrial food products into sectors like milk products, animal products and beverages • Explain the compositional difference between these three types of products • Elaborate different processes and techniques used for manufacturing these products
Bakery and Confectionery Technology	<ul style="list-style-type: none"> • Define different bakery and confectionery products • Understand the role of ingredients in developing quality product • Describe the manufacturing process for bakery and confectionery products
Community Nutrition	<ul style="list-style-type: none"> • Become aware about nutritional status and health • Be able to conduct nutritional assessment of nutritional status • Explain about importance of diet therapy in community nutrition
Food Safety Management	<ul style="list-style-type: none"> • Understand the need of food safety management system • Create awareness about food adulteration in society • Enlist different national and international standards applicable to food products to maintain food safety throughout in food chain • Be able to categorize food waste, and dispose or utilize it accordingly
Food Service Management	<ul style="list-style-type: none"> • Understand the food service industry • Elaborate the workplace, personnel and menu management in food service industry • Acquire knowledge about Indian cuisine and types of gravies • Become aware about instruments and different techniques used in Indian cookery

Contents

Sr. No.	Name of the lesson	Page No.
1.	Milk and Milk Products	2 - 10
2.	Meat, Poultry, Egg and Fish	11 - 22
3.	Beverage Technology	23 - 32
4.	Bakery Technology	34 - 45
5.	Confectionery Technology	46 - 52
6.	Assessment of Nutritional Status	54 - 61
7.	Diet Therapy	62 - 68
8.	Food Adulteration	70 - 77
9.	Food Laws and Regulations	78 - 84
10.	Food Waste Management	85 - 91
11.	Food Service Industry	93 - 99
12.	Basics of Indian Cuisines	100 - 109

DISCLAIMER Note : All attempts have been made to contact copy right/s (©) but we have not heard from them. We will be pleased to acknowledge the copy right holder (s) in our next edition if we learn from them.