Government Science College, Vankal

Department of Microbiology

Short Term Course

Course Code: STCMB04 **Course Name:** Probiotics **Duration:** 30 h

Introduction:

The field of probiotics in food has gained significant attention due to its potential health benefits. Available scientific literature on probiotics strongly suggests their significant role in human health and well-being. Probiotics have been proved to have important role in immunological, digestive and nervous functions in humans. Latest scientific research has shown that besides other effects as mentioned earlier the gut microbiota significantly effects humans behaviour and mood by secreting specific chemicals in the gut. Gut microbiota have important role in deciding the outcome of several antibiotic therapies. Realizing the importance of gut microbiota and the role of probiotic foods in establishing the microbiota and their future in healthcare and industry, the microbiology department of Government Science College, Vankal started a short term certificate course in Probiotics. This certificate course aims to provide an in-depth understanding of probiotics, their applications in the food industry, and their impact on human health.

Course objectives:

1. **Understanding Probiotics**: Gain foundational knowledge about probiotics, including their definition, types, and characteristics.
2. **Health Benefits**: Learn about the health benefits associated with probiotics, supported by scientific research.
3. **Food Applications**: Explore the various applications of probiotics in food products, including dairy, beverages, and functional foods.
4. **Regulatory Aspects**: Understand the regulatory landscape governing the use of probiotics in food.
5. **Quality Control**: Learn about the methods for ensuring the quality and efficacy of probiotic-containing foods.

Course Modules

1. **Introduction to Probiotics** **5 h**
    - Definition and history
    - Types of probiotics (e.g., Lactobacillus, Bifidobacterium)
    - Mechanisms of action
2. **Health Benefits of Probiotics**

- Digestive health
- Immune system support
- Other potential health benefits (e.g., mental health, skin health)

3. **Probiotics in Food Products** **5 h**
    - Incorporation of probiotics into various food matrices
    - Dairy products (yogurt, kefir, cheese)
    - Non-dairy products (juices, cereals, snacks)
4. **Regulatory and Safety Aspects** **5 h**
    - Global regulatory frameworks (FDA, EFSA, etc.)
    - Safety assessment and labeling requirements
    - Consumer perception and education
5. **Quality Control and Assurance** **5 h**
    - Methods for assessing probiotic viability and potency
    - Shelf-life and stability considerations
    - Good Manufacturing Practices (GMP)
6. **Emerging Trends and Research** **5 h**
    - Innovations in probiotic delivery systems
    - New strains and their potential benefits
    - Future directions in probiotic research

Course Outcomes:

On completion of this course, participants will be able to:

- Define and describe various probiotics and their benefits.
- Identify and discuss the role of probiotics in promoting health.
- Understand the applications of probiotics in different food products.
- Navigate the regulatory environment related to probiotics in food.
- Implement quality control measures to ensure probiotic efficacy.

Evaluation Scheme:

Two MCQ based exams of 15 marks each will be conducted during the course duration. One exam will be conducted upon 50% course completion and the other at the end of the course. The participants must score at least 40% marks in both exams to successfully complete the certificate course and be eligible to receive the course completion certificate**.**

ISSUE OF MARKSHEET AND CERTIFICATE

The college shall publish the result after evaluation and with the recommendations of course coordinator at the end of programme. After successful completion of the course, no marks will be given to students only grades will be given as per follows

Percentage Range of Marks (Theory + Practical)	**Remarks**
90-100	O
80-90	A
60-80	B
40-60	C
<40	F

COURSE COORDINATOR:

Dr. Anil Kumar Singh,
HoD, Microbiology Department,
GSC Vankal.

Government Science College, Vankal

Department of Chemistry

Short Term Course

Course Code: STCCH04	**Course Name:**	Chemistry in Daily Life	**Duration:** 30 h

Introduction to Chemistry in Daily Life

INTRODUCTION

Chemistry is deeply embedded in everyday life, affecting everything from the food we consume to the products we use. This short-term course offers an exploration of how chemical principles are applied in daily activities and consumer products. Focusing on real-world examples relevant to an Indian context, participants will learn about the chemistry involved in common products and processes and its implications for health, environment, and sustainability.

OBJECTIVES

- Identify the role of chemistry in everyday products and processes.
- Understand the chemical principles behind common household items and foods.
- Analyze the impact of chemistry on health and environmental issues.
- Make informed decisions about products and practices based on their chemical properties.
- Communicate the relevance of chemistry in daily life effectively.

MODULES

Module 1: Introduction to Chemistry in Daily Life

- Overview of chemistry's impact on daily activities
- Importance of understanding chemistry in everyday contexts
- Examples of everyday chemical processes and products

Module 2: Chemistry of Food and Cooking

- Chemical reactions in cooking and food preservation
- Nutritional chemistry: vitamins, minerals, and food additives
- Role of chemistry in traditional Indian cooking and preservation methods

Module 3: Chemistry in Household Products

- Composition and chemical properties of common household cleaners
- Chemistry behind personal care products: soaps, shampoos, and cosmetics
- Safe usage and environmental considerations in the Indian context

Module 4: Chemistry of Pharmaceuticals and Medicine

- Basic principles of drug chemistry and pharmacology
- How medications work: absorption, metabolism, and effects
- Common pharmaceuticals in India and their chemical bases

Module 5: Chemistry and Environmental Impact

- Chemical pollutants and their effects on air, water, and soil in India
- Waste management and recycling chemistry
- Strategies for reducing chemical impact on the environment

Module 6: Chemistry of Textiles and Fabrics

- Chemical treatments and dyes used in textile production
- Properties of different fibers and fabrics used in Indian textiles
- Environmental and health impacts of textile chemicals

Module 7: Chemistry of Cleaning and Sanitizing

- Principles behind disinfectants and sanitizers
- Effectiveness of various cleaning agents
- Safe handling and use of cleaning chemicals in Indian households

Module 8: Chemistry in Personal Care and Hygiene

- Chemical components of skincare and grooming products
- Role of pH and active ingredients in personal care
- Impact of personal care products on health and environment in India

Module 9: Chemistry of Beverages and Alcohol

- Chemical processes in brewing and distillation
- Chemistry of flavour development and preservation
- Health considerations of alcoholic beverages and traditional Indian drinks

Module 10: Chemistry of Everyday Materials

- Chemical properties and uses of materials: plastics, metals, and glass
- Chemical reactions in material degradation and recycling
- Innovations in material chemistry relevant to Indian industry

Module 11: Chemistry in Energy and Fuels

- Chemical principles of energy production: fossil fuels, batteries, and renewable sources
- Chemistry of combustion and energy efficiency
- Environmental impacts and trends in energy chemistry in India

Module 12: Chemistry in Health and Wellness

- Role of chemistry in supplements, vitamins, and health foods
- Chemical basis of common wellness practices: traditional remedies and modern supplements
- Evaluating health claims and chemical interactions

LEARNING OUTCOMES

Upon completion of the course, students will be able to:

- Understanding Chemical Principles: Comprehend basic chemical principles and how they apply to everyday phenomena and products
- Chemical Reactions in Daily Life: Identify and explain common chemical reactions and processes that occur in daily activities, such as cooking, cleaning, and personal care
- Household Chemicals: Understand the chemistry behind household products, including detergents, disinfectants, and food additives, and their impacts on health and the environment
- Health and Safety: (Learn about the chemical basis of health-related products, such as pharmaceuticals, dietary supplements, and cosmetics, as well as safety measures for handling chemicals at home

REFERENCES

1. "Chemistry in Daily Life" by K. S. Rao (Publisher: New Age International)
2. "Basic Principles of Chemistry for Everyday Life" by A. K. De (Publisher: Books India)
3. "Understanding Chemistry in Everyday Life" by R. G. Das (Publisher: PHI Learning)
4. "Chemistry for Environmental and Earth Sciences" by R. M. Mukherjee (Publisher: Academic Publishers)
5. Applied Chemistry: Principles and Practices" by R. B. Sharma (Publisher: S. Chand Publishing)

ISSUE OF MARKSHEET AND CERTIFICATE

The college shall publish the result after evaluation and with the recommendations of course coordinator at the end of programme.

1. After successful completion of the course, no marks will be given to students only grades will be given as per follows

Percentage Range of Marks (Theory + Practical)	Remarks
90-100	O
80-90	A
60-80	B
40-60	C
<40	F

COURSE COORDINATOR:

Dr. Dharmesh Mahajan,
HoD, Chemistry Department,
GSC Vankal.