Graduate Certificate in Therapeutic Baking

# Food Science and Technology

Food Science and Technology are essential disciplines that play a crucial role in the production, preservation, and enhancement of food products. In the context of the Graduate Certificate in Therapeutic Baking, understanding key terms and vocabulary related to Food Science and Technology is fundamental to mastering the art of therapeutic baking. Below is a comprehensive explanation of important terms in these fields:

1. Food Science:
Food Science is a multidisciplinary field that encompasses various aspects of food, including its composition, properties, production, processing, and preservation. It combines principles from disciplines such as chemistry, biology, and engineering to understand the scientific aspects of food.

2. Food Technology:
Food Technology focuses on the application of scientific knowledge and techniques to improve food production processes, develop new food products, and ensure food safety and quality. It involves the use of advanced technology and equipment to enhance the efficiency and effectiveness of food manufacturing.

3. Therapeutic Baking:
Therapeutic Baking is a specialized form of baking that focuses on using ingredients and baking techniques to promote health and well-being. It involves creating baked goods that provide nutritional benefits and cater to specific dietary requirements or health conditions.

4. Gluten:
Gluten is a protein found in wheat, barley, and rye that gives dough its elasticity and helps it rise. It is responsible for the chewy texture of bread and other baked goods. Gluten is a common allergen, and some people have gluten intolerance or celiac disease, which requires them to avoid gluten-containing foods.

5. Leavening Agents:
Leavening agents are substances that help baked goods rise by producing carbon dioxide gas, which creates air pockets in the dough or batter. Common leavening agents include yeast, baking powder, and baking soda. They play a crucial role in the texture and volume of baked products.

6. Fermentation:
Fermentation is a biological process in which microorganisms, such as yeast or bacteria, convert sugars into alcohol or acids. In baking, fermentation is essential for producing carbon dioxide gas, which leavens the dough and helps it rise. Fermentation also enhances the flavor and texture of baked goods.

7. Enzymes:
Enzymes are biological molecules that act as catalysts in various chemical reactions. In baking, enzymes play a crucial role in the breakdown of complex carbohydrates, proteins, and fats, which helps improve the

texture, flavor, and shelf life of baked products. Examples of enzymes used in baking include amylase and protease.

8. Emulsifiers:
Emulsifiers are substances that help stabilize emulsions by reducing the surface tension between two immiscible liquids, such as oil and water. In baking, emulsifiers improve the texture, volume, and shelf life of baked goods by creating a uniform and stable mixture. Common emulsifiers used in baking include lecithin and mono- and diglycerides.

9. Preservatives:
Preservatives are substances added to food products to prevent spoilage, microbial growth, and chemical degradation. In baking, preservatives help extend the shelf life of baked goods by inhibiting the growth of mold, yeast, and bacteria. Common preservatives used in baking include sorbic acid and calcium propionate.

10. Antioxidants:
Antioxidants are compounds that inhibit the oxidation of fats and oils, which can lead to rancidity and off-flavors in baked goods. In baking, antioxidants help maintain the freshness and quality of products by preventing the formation of free radicals. Common antioxidants used in baking include vitamin E and ascorbic acid.

11. Functional Foods:
Functional foods are food products that provide additional health benefits beyond basic nutrition. In therapeutic baking, functional foods are used to target specific health conditions or promote overall well-being. Examples of functional ingredients used in baking include whole grains, nuts, seeds, and probiotics.

12. Allergens:
Allergens are substances that can trigger allergic reactions in some individuals. Common food allergens include nuts, eggs, milk, soy, and wheat. In therapeutic baking, it is essential to identify allergenic ingredients and provide alternative options for individuals with food allergies or intolerances.

13. Nutrient Density:
Nutrient density refers to the concentration of essential nutrients in a food product relative to its calorie content. In therapeutic baking, focusing on nutrient-dense ingredients allows for the creation of baked goods that are rich in vitamins, minerals, and antioxidants while being lower in added sugars, fats, and empty calories.

14. Glycemic Index:
The glycemic index is a scale that ranks carbohydrate-containing foods based on their effect on blood sugar levels. Foods with a high glycemic index cause a rapid increase in blood glucose, while those with a low glycemic index result in a slower and more stable rise. In therapeutic baking, using low-glycemic ingredients can help manage blood sugar levels and promote overall health.

15. Whole Grains:
Whole grains are grains that contain the entire kernel, including the bran, germ, and endosperm. They are

rich in fiber, vitamins, minerals, and antioxidants, making them a nutritious choice for therapeutic baking. Whole grains promote digestive health, reduce the risk of chronic diseases, and provide sustained energy.

16. Enriched Flours:
Enriched flours are refined flours that have been fortified with essential nutrients, such as iron, folic acid, and B vitamins. In therapeutic baking, using enriched flours can help improve the nutritional value of baked goods by adding back nutrients lost during the refining process. Enriched flours are commonly used in baking bread, cakes, and pastries.

17. Alternative Flours:
Alternative flours are non-traditional flours made from grains, legumes, nuts, seeds, or roots other than wheat. These flours are gluten-free and offer a variety of flavors, textures, and nutritional benefits. Examples of alternative flours used in therapeutic baking include almond flour, coconut flour, chickpea flour, and tapioca flour.

18. Sugar Substitutes:
Sugar substitutes are sweetening agents used in place of sugar to reduce the calorie content of baked goods or cater to specific dietary needs, such as diabetes. Common sugar substitutes include stevia, erythritol, xylitol, and monk fruit extract. In therapeutic baking, using sugar substitutes can help create healthier versions of traditional baked treats.

19. Plant-Based Proteins:
Plant-based proteins are protein sources derived from plants, such as legumes, nuts, seeds, and grains. These proteins are essential for muscle growth, repair, and overall health. In therapeutic baking, incorporating plant-based proteins into baked goods can increase their nutritional value and appeal to individuals following a vegetarian or vegan diet.

20. Fermented Foods:
Fermented foods are foods that have undergone fermentation by beneficial bacteria or yeast. Fermentation enhances the flavor, texture, and nutritional value of foods while promoting gut health and digestion. In therapeutic baking, using fermented ingredients like sourdough starter or yogurt can improve the digestibility and probiotic content of baked goods.

21. Food Safety:
Food safety refers to the practices and procedures implemented to ensure that food products are safe for consumption and free from contaminants, pathogens, and toxins. In therapeutic baking, maintaining proper hygiene, sanitation, and temperature control is essential to prevent foodborne illnesses and ensure the quality of baked goods.

22. Quality Control:
Quality control involves monitoring and evaluating the characteristics, properties, and performance of food products to meet predetermined standards and specifications. In therapeutic baking, implementing quality control measures helps ensure consistency, uniformity, and customer satisfaction. Quality control includes sensory evaluation, physical testing, and microbiological analysis.

23. Shelf Life:
Shelf life refers to the period during which a food product remains safe, edible, and retains its quality attributes. In therapeutic baking, extending the shelf life of baked goods is essential for commercial viability and consumer acceptance. Factors that affect the shelf life of baked products include moisture content, packaging, storage conditions, and preservatives.

24. Sensory Evaluation:
Sensory evaluation is a scientific method used to assess the appearance, aroma, flavor, texture, and overall acceptability of food products. In therapeutic baking, conducting sensory evaluation tests allows bakers to fine-tune recipes, optimize ingredient combinations, and meet consumer preferences. Sensory evaluation can be done through trained panels or consumer taste tests.

25. Food Labeling:
Food labeling involves providing accurate and informative labels on food products to communicate essential information to consumers, such as ingredients, nutritional content, allergens, and serving size. In therapeutic baking, labeling baked goods correctly is crucial for transparency, compliance with regulations, and meeting consumer demands for health-conscious products.

26. Sustainability:
Sustainability refers to the practice of producing food in a way that minimizes environmental impact, conserves natural resources, and supports social well-being. In therapeutic baking, adopting sustainable practices, such as sourcing organic ingredients, reducing food waste, and using eco-friendly packaging, contributes to a healthier planet and community.

27. Food Waste Reduction:
Food waste reduction involves minimizing the amount of food that is discarded or lost throughout the food supply chain, from production to consumption. In therapeutic baking, implementing strategies to reduce food waste, such as portion control, ingredient optimization, and donation programs, helps conserve resources, reduce costs, and support sustainability.

28. Clean Label:
A clean label refers to food products that contain simple, recognizable, and minimally processed ingredients without artificial additives, preservatives, or fillers. In therapeutic baking, offering clean label baked goods appeals to health-conscious consumers seeking transparency, authenticity, and natural flavors. Clean label products are perceived as wholesome, nutritious, and trustworthy.

29. Food Regulations:
Food regulations are laws, standards, and guidelines established by government agencies to ensure the safety, quality, and integrity of food products. In therapeutic baking, complying with food regulations is essential to prevent foodborne illnesses, maintain consumer trust, and avoid legal penalties. Regulatory aspects to consider include food labeling, hygiene practices, and allergen control.

30. HACCP (Hazard Analysis and Critical Control Points):
HACCP is a systematic approach to food safety that identifies, evaluates, and controls hazards throughout

the food production process. In therapeutic baking, implementing a HACCP plan helps prevent contamination, reduce risks, and ensure the safety of baked goods. Key principles of HACCP include hazard analysis, critical control points, monitoring, and corrective actions.

By mastering these key terms and vocabulary related to Food Science and Technology in the context of the Graduate Certificate in Therapeutic Baking, students can enhance their understanding of the scientific principles, techniques, and best practices involved in creating nutritious, delicious, and therapeutic baked goods. Incorporating these concepts into their baking endeavors will not only improve the quality, safety, and sustainability of their products but also contribute to the promotion of health and well-being through the power of food.