Chapter 8
An Introductory View of Bioinformatics in Food and Nutritional Science

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ABSTRACT

The multidisciplinary field of bioinformatics integrates information technology, biology, and computer science to analyze and comprehend biological data. It entails the creation and use of computational methods and tools to comprehend biological relationships and processes. The incorporation of bioinformatics into the field of food and nutritional science is examined in this chapter, with a focus on how it has revolutionized both research and practical applications. A thorough review of food science and nutritional research is given in the introduction, laying the groundwork for understanding how bioinformatics advances both disciplines. The foundations

DOI: 10.4018/979-8-3693-3192-7.ch008

of bioinformatics are examined, together with significant databases and computing instruments required for data processing and interpretation. This chapter explores the various uses of bioinformatics in food and nutritional research, highlighting developments that have advanced these fields.

INTRODUCTION

Food and Nutritional Science is a multidisciplinary field that explores the relationships between food, nutrients, and human health. It covers a wide range of topics, including the physiological, psychological, and social effects of eating and nutrition as well as the biological, chemical, and physical characteristics of food. Here's a detailed breakdown of the major components:

Food Science

Food Science focuses on understanding the composition, processing, safety, and sensory characteristics of food. Food Chemistry studies the chemical makeup of food, including carbohydrates, proteins, fats, vitamins, and minerals, and how these components interact during processing and storage. Food Microbiology examines the microorganisms that inhabit, create, or contaminate food, including beneficial microbes (like probiotics) and pathogens that can cause foodborne illnesses. Food Processing and Engineering investigates the methods used to transform raw ingredients into consumable food products, focusing on techniques that enhance safety, shelf-life, and nutritional value. Food Safety and Quality Control ensures that food products are safe for consumption and meet quality standards through regulatory practices, hazard analysis, and critical control points (HACCP).Sensory Science Studies how food's sensory attributes (taste, smell, texture) affect consumer preferences and eating behaviours.

Nutritional Science

Nutritional Science delves into how nutrients and other food components affect the body's health and function. *Nutrient Metabolism* investigates how the body processes and utilizes different nutrients, including macronutrients (carbohydrates, proteins, fats) and micronutrients (vitamins and minerals). *Diet and Disease Prevention* studies the role of diet in preventing and managing diseases such as obesity, diabetes, cardiovascular diseases, and cancer. *Nutritional Biochemistry* explores the biochemical pathways through which nutrients impact cellular and physiological functions.*Clinical Nutrition* applies nutritional knowledge to treat and manage