Record Nr.	UNINA9910800121503321
Titolo	Bioactive Extraction and Application in Food and Nutraceutical Industries / / edited by Tanmay Sarkar and Siddhartha Pati
Pubbl/distr/stampa	New York, NY : , : Humana, , [2024] ©2024
ISBN	1-0716-3601-4
Edizione	[First edition.]
Descrizione fisica	1 online resource (480 pages)
Collana	Methods and Protocols in Food Science Series
Disciplina	664.024
Soggetti	Bioactive compounds
	Food science
	Functional foods
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro Preface to the Series Preface Contents Contributors Chapter 1: Technologies for Extraction of Bioactive Compounds and Its Applications 1 Introduction 2 Extraction of Bioactive Compounds 3 Conventional Extraction Techniques 3.1 Maceration 3.2 Percolation 3.3 Hydro Distillation 3.4 Soxhlet Extraction 4 Advanced Extraction Techniques 4.1 Supercritical Fluid Extraction (SFE) 4.2 Ultrasound-Assisted Extraction (UAE) 4.3 Microwave- Assisted Extraction (MAE) 4.4 Pulsed Electric Field (PEF)-Assisted Extraction 4.5 Enzyme-Assisted Extraction (EAE) 4.6 Pressurized Liquid Extraction (PLE) 4.7 Combination of Modern Techniques for Effective Extraction of Bioactive Compounds 5 Purification of the Bioactive Compounds 6 Extraction of Bioactive Compounds from Agro-industrial Waste 7 Nano Emulsion as Potential Delivery Systems for Bioactive Compounds 8.2 Food Preservatives 8.3 Pharmaceuticals 9 Conclusion and Future Perspective References Chapter 2: Extraction of Bioactive and Nutraceuticals from Plants and Their Application 1 Introduction 2 Primary and Secondary Metabolites 3 Bioactive Compounds 4 Bioactive Compound Types ``Natural Phenols´´ 5 Techniques for the Extraction, Isolation, and Purification of Bioactive Compounds 5.1 Extraction Methodology

1.

5.2 Identification and Characterization -- 5.3 Purification of the Bioactive Molecules -- 5.3.1 UV-Visible Spectroscopy (UV-Vis) -- 5.3.2 Infrared Spectroscopy (IR) -- 5.3.3 Fourier Transforms Infrared Spectroscopy (FTIR) -- 5.3.4 Nuclear Magnetic Resonance Spectroscopy (NMR) -- 5.3.5 Identification of Chemical Compounds Using Mass Spectrometry -- 5.3.6 Nonchromatographic Techniques -- 5.3.7 Phytochemical Screening Assay.

6 Bioactive Compounds: Their Role in the Prevention and Treatment of Diseases -- 6.1 Use of Natural Bioactive Compounds in the Food and Pharmaceutical Industries -- 6.2 Use of Bio-Based Compounds as Food Additives -- 6.3 Neuroprotective Effects of Biological Activity and Toxicity of Plant Nutraceuticals -- 7 Future Perspectives -- 8 Conclusions -- References -- Chapter 3: Extraction of Bioactive and Nutraceuticals from Marine Sources and Their Application -- 1 Introduction -- 2 Novel Extraction Technologies -- 2.1 Ultrasound --2.2 PEF -- 2.3 MAE -- 2.4 Supercritical CO2 Extraction -- 3 Bioactivities and Nutraceutical Application of Bioactive Compounds from Marine Sources -- 3.1 Bioactivity -- 3.1.1 Antioxidant Property --3.1.2 Antimicrobial Property -- 3.1.3 Antihypertensive Property --3.1.4 Anticancer Property -- 3.1.5 Anticoagulant Property -- 3.1.6 Wound Healing Property -- 3.1.7 Neuroprotective Property -- 3.2 Nutraceutical Property -- 4 Food Application of Bioactive and Nutraceuticals Derived from Marine -- 5 Conclusion -- References --Chapter 4: Microwave-Assisted Extraction of Bioactive and Nutraceuticals -- 1 Introduction -- 2 Mechanism of MAE Process -- 3 Factors Affecting MAE -- 3.1 Microwave Power -- 3.2 Extraction Time -- 3.3 Extraction Solvent and Sample-to-Solvent Ratio -- 3.4 Matrix Characteristics -- 3.5 Temperature -- 4 Some Techniques of MAE --4.1 Solvent-Free MAE (SFM) -- 4.2 Focused-MAE (FMAE) -- 4.3 Ionic Liquid-Based MAE (ILMAE) -- 4.4 Ultrasonic MAE (UMAE) -- 4.5 Microwave Hydro-distillation (MHD) -- 4.6 Microwave Hydro-diffusion and Gravity (MHG) -- 4.7 Microwave-Assisted Subcritical Extraction (MASE) -- 5 Conclusion -- References -- Chapter 5: Ultrasound-Assisted Extraction for Food, Pharmacy, and Biotech Industries -- 1 Introduction -- 2 Ultrasonic System for Extraction -- 2.1 Bath Systems -- 2.2 Probe Systems.

2.3 Probes Versus Baths -- 2.4 Online UAE System -- 3 Extraction Mechanism -- 3.1 Basic Principle -- 3.2 UAE Mechanism -- 3.3 Cavitation Effect in UAE -- 3.4 Factors Effecting UAE -- 3.4.1 Shape and Size of the Ultrasonic Reactor Device -- 3.4.2 Extraction Process Parameters: Power and Frequency -- 3.4.3 Solvent -- 3.4.4 Temperature and Time -- 3.4.5 Particle Size of the Matrix -- 4 Application of UAE in the Perspectives of Food, Pharmacy, and Biotech Industries -- 4.1 UAE of Fruits, Vegetables, and Their By-Products --4.1.1 Extraction of Pectin -- 4.1.2 Extraction of Polysaccharides and Other Functional Compounds -- 4.1.3 Extraction of Polyphenols --4.1.4 Extraction of Flavonoids -- 4.1.5 UAE of Anthocyanins and Carotenoids -- 4.1.6 Extraction of Edible Oils -- 4.1.7 Extraction of Proteins -- 4.2 UAE for Phytopharmaceutical Extraction -- 4.2.1 Extracts with Anticancer Properties -- 4.2.2 Extracts with Antimicrobial Properties -- 4.2.3 Extracts with Antidiabetic Properties -- 5 Hybridization of UAE for Industrial Application -- 5.1 Combination of UAE with Microwave Assisted Extraction -- 5.2 Combination of UAE with Supercritical Fluid Extraction -- 5.3 Combination of Ultrasound and Extrusion Extraction -- 5.4 Combination of UAE and Instantaneous Controlled Pressure Drop Process (DIC) -- 6 Conclusion -- References -- Chapter 6: Super- and Subcritical Fluid Extraction of Nutraceuticals and Novel Phytocompound -- 1 Introduction -- 2 Principle of Super-

and Subcritical Fluid Extraction -- 3 Properties of Sub- and Supercritical Fluids -- 4 Factors Affecting Extraction Yields -- 4.1 Sample and Its Preparation -- 4.1.1 Sample Matrix and Size -- 4.1.2 Moisture and Equilibrium Time -- 4.2 Cosolvent/Modifier -- 4.3 Extraction Procedure -- 4.4 Extraction Parameters -- 4.4.1 Temperature -- 4.4.2 Pressure -- 4.4.3 Flow Rate -- 4.4.4 Time. 5 Comparison with Conventional Method -- 6 Novel Technology Integrated Sub- and Supercritical Fluid Extraction -- 7 Current Application of Super- and Subcritical Extraction -- 8 Characterization of Extracted Bioactive Compounds -- 8.1 Extracts Bioactivity -- 8.1.1 In Vitro Characterization -- 8.1.2 In Vivo Analysis (Clinical Trial/Animal Study) -- 8.1.3 Toxicity Assay -- 8.2 Stability of Bioactive Compounds -- 9 Advances and Future Outlook -- References -- Chapter 7: Novel Solvent Based Extraction -- 1 Introduction -- 2 Water as a Solvent -- 3 Organic Solvents -- 3.1 Subcritical Hot Water as a Solvent for Extraction -- 4 Renewable Water-Based Solvents -- 4.1 Aqueous Two-Phase Systems as Extractants -- 4.2 Supercritical Fluid Extractants -- 5 Ionic Liquids as Solvents for Extraction -- 5.1 Properties of ILs -- 5.2 Toxicology Considerations -- 6 Regeneration of Organic Phase -- 7 Bio-Derived Solvents in Water -- 8 Application of Solvent Extraction in Biotechnological Separations -- 8.1 Carboxylic Acids Separation -- 8.2 Amino Acids -- 8.3 Citric Acid -- 8.4 Extraction of Oil from Algae Biomass -- 8.5 Bioactive from Marine Algae -- 9 Pharmaceutical Separations -- 9.1 Production of Penicillin -- 10 Future Trends in the Development of New Solvents -- 11 Concluding Remarks -- References -- Chapter 8: Enzyme-Assisted Extraction -- 1 Introduction -- 2 Examples of Plant-Based Bioactives -- 2.1 Extraction Process -- 2.2 Solvents Used in Extraction -- 3 Process Development -- 3.1 The Disintegration of the Cell Wall by the Action of Enzymes -- 3.2 Steps Involved in the Extraction of Bioactive Compounds -- 3.3 Other Different Techniques Combined with EAE to Enhance the Extraction Process -- 3.4 Types of Bioactives That Can Be Extracted Using Enzyme-Assisted Extraction Method -- 3.4.1 Flavors and Colors -- 3.5 Enzyme-Enhanced Processes for Plant Materials. 3.6 A Review of Enzymes and Factors Influencing Bioactive Extraction -- 3.7 Advantages and Disadvantages of Enzyme-Assisted Extraction Method -- 3.7.1 Advantages of Enzyme-Assisted Extraction Method --3.7.2 Disadvantages of Enzyme-Assisted Extraction Method -- 3.8 Some of the Pharmaceutical Activities of Bioactive Compounds -- 4 Conclusion -- References -- Chapter 9: Pulsed Electric Fields as a Green Technology for the Extraction of Bioactive Compounds -- 1 Introduction -- 2 Extraction Approaches in Nutraceuticals and Bioactive Extraction: Conventional and Novel Techniques -- 3 PEF-Based Bioactive Extraction Technique: A Sustainable Greener Technology -- 4 Role of PEF Processing System in Bioactive Extraction -- 4.1 Mechanism of PEF-Based Bioactive Extraction Unit -- 4.2 Design and Fabrication of PEF-Based Bioactive Extraction Unit -- 4.3 Configuration and Requirements of PEF-Based Extraction Unit -- 4.4 PEF-Batch and Continuous Treatment Chamber -- 5 Factors Influencing the PEF-Based Bioactive Extraction -- 6 Overall Application of PEF Techniques in Bioactive Extraction -- 7 Integrated Extraction Technologies in Combination to PEF -- 8 Benefits of PEF-Based Bioactive Extraction -- 9 Future Perspective of PEF-Based Bioactive Extraction -- 10 Conclusions -- References -- Chapter 10: Pulsed Electric Field Extraction -- 1 Introduction -- 2 General Overview of PEF and Its Working Principle --3 Equipment Design of PEF-Assisted Extraction -- 3.1 Batch Method of PEF Extraction -- 3.2 Continuous Method of PEF Extraction -- 4 Factors Affecting the PEF Extraction -- 5 Factors Impacting the Effectiveness of

Pulsed Electric Field Treatment 5.1 Tissue Parameters 5	.2 Media
Parameter 5.3 Pulse Parameter 6 Extraction of Intracellu	lar
Bioactive Compound from Plant Sources Through PEF-Assis	ted Method
6.1 What Are Bioactive Compounds?.	
6.2 PEF-Assisted Extraction of Bioactive Compounds from Fr	uits and
Vegetable Sources.	