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2.2 Primary Metabolites 2.2.1 Saccharides (Sugars); 2.2.2 Lignin; 2.2.3 Amino Acids, Peptides, and Proteins; 2.2.4 Fatty Acids, Lipids; 2.2.5 Organic Acids; 2.3 Secondary Metabolites; 2.3.1 Simple Phenols and Phenolic Acids; 2.3.2 Polyphenols; 2.3.3 Terpenes; 2.3.4 Alkaloids; 2.4 Stability of Isolated Compounds; 2.5 Conclusion; References; 3 Separation and Purification of Phytochemicals as Co-Products in Biorefineries; 3.1 Introduction; 3.2 Conventional Separation Approaches; 3.2.1 Steam Distillation; 3.2.2 Conventional Solid-Liquid Extraction; 3.2.3 Ultrasound-Assisted Extraction 3.2.4 Microwave-Assisted Extraction 3.2.5 Pressurized Subcritical Liquid Extraction; 3.3 Supercritical Fluid Extraction; 3.4 Separation and Purification of Phytochemicals from Plant Extracts and Dilute Solution in Biorefineries; 3.4.1 Liquid-Liquid Extraction; 3.4.2 Membrane Separation; 3.4.3 Molecular Distillation; 3.5 Summary; References; 4 Phytochemicals from Corn: a Processing Perspective; 4.1 Introduction: Corn Processes; 4.1.1 Dry Milling; 4.1.2 Wet Milling; 4.1.3 Alternative Wet Milling Processes; 4.1.4 Dry Grind; 4.1.5 Alternative Dry Grind Processes; 4.1.6 Nixtamalization 4.2 Phytochemicals Found in Corn 4.2.1 Introduction; 4.2.2 Phytosterols; 4.2.3 Carotenoids; 4.2.4 Polyamine Conjugates; 4.3 Corn Processing Effects on Phytochemical Recovery; 4.3.1 Research with Corn Fiber Obtained from Wet Milling and Dry-Grind-Based Processes; 4.3.2 Research on Phytochemicals and the Nixtamalization Process; 4.4 Conclusions; References; 5 Co-Products from Cereal and Oilseed Biorefinery Systems; 5.1 Introduction; 5.2 Cereals; 5.2.1 Wheat; 5.2.2 Barley; 5.2.3 Sorghum; 5.3 Oilseed Biorefineries; 5.3.1 Oil- and Oilseed-Based Products; 5.3.2 Industrial Products; 5.4 Conclusions References 6 Bioactive Soy Co-Products; 6.1 Introduction; 6.1.1 Industrial Agricultural Biomass; 6.1.2 Processing of Co- and Byproducts; 6.1.3 Value Addition and Sustainability; 6.2 Co-Products Obtained from Industrial Biorefineries; 6.2.1 Cereal- and Legume-Based Industrial Co-Products; 6.2.2 Legume Co-Products - Soy; 6.3 Technologies Used to Extract Co-Products; 6.3.1 Extractive Distillation; 6.3.2 Adsorption; 6.3.3 Membrane Separation; 6.3.4 Supercritical and Subcritical Fluid Extractions; 6.4 Bioactivities and Nutritional Value in Biorefinery Co-Products; 6.4.1 Anti-Disease Properties 6.4.2 Food Products

Sommario/riassunto

In order to successfully compete as a sustainable energy source, the value of biomass must be maximized through the production of valuable co-products in the biorefinery. Specialty chemicals and other biobased products can be extracted from biomass prior to or after the conversion process, thus increasing the overall profitability and sustainability of the biorefinery. Biorefinery Co-Products highlights various co-products that are present in biomass prior to and after processing, describes strategies for their extraction, and presents examples of bioenergy feedstocks that contain h