

Plant Based Polyphenol Associations with Protein: A Prospective Review

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This review discusses the classes of plant polyphenols along with their binding mechanisms with protein molecules. Generally, polyphenols bind in covalent and non-covalent orientations with protein molecules. Their addition to the protein usually results in undesirable flavors and tastes inside the proteins. They also affect the color of the food. Plant polyphenols are found to act in a protective way against cardiovascular disease, neurodegenerative diseases, diabetes, and cancer. In addition to redox activity, their modes of action include the inhibition of key enzymes, modulation of transcription factors or cell receptors, and finally, perturbation of protein aggregates. Dietary polyphenols usually play a key role in protein digestion by forming covalent and non-covalent bonds with proteins. In addition, polyphenols and plant phenolics possess the scavenging ability of reactive oxygen species (ROS), including radical/non-radical oxygen species including HOC•, H₂O₂, HOCl, ¹O₂ (singlet oxygen), and oxidatively generated radicals derived from LDL biomolecules such as ROOC• and oligonucleic acids.

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INTRODUCTION

Polyphenols have been defined as compounds having a large number of di/trihydroxy phenyls units, either in an oligomeric manner or multiple phenolic motifs displayed in a monomeric way. Based on this definition, lignin polymers generally would not be included in the category of polyphenols. The reasons for investigating polyphenols could be the range of basic structure to chemically elaborated complex and transformed oligo/polymeric substances and their biological/physicochemical properties, making them interesting and unique. The question arises as to why plants select heavy metabolite production with different phenolic components; the answer to this question is still debatable and may differ with different polyphenols (Treutter 2006; Hatier and Gould 2008; Lattanzio *et al.* 2008, 2009). Plant polyphenols have various functions, such as plant resistance to pathogens and animals from insects, solar radiation protection, reproduction,