Synopsis of Original Research Paper

Synthesis of Silk Protein-Polyphenol Conjugates and Evaluation of Their Properties

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The biological and pharmacological effects of polyphenols have been demonstrated in numerous human, animal and in vitro studies. The present report describes synthesis and bio-related properties of polyphenol conjugates on poly(amino acid)s such as silk protein and poly(ε-lysine). In this study, chlorogenic acid, caffeic acid, and green tea catechin were used as polyphenol for the conjugation. At first, silk protein was chemically modified with the polyphenols by using dehydrating coupling agent, but the introduced ratio of the polyphenols was very low. Next, an enzymatic conjugation of the polyphenols on poly(ε--lysine) has been examined. The conjugates were successfully synthesized by the oxidation of the polyphenols using *Myceliophthora* laccase as catalyst in the presence of poly(ε-lysine). The antioxidant activity of the resulting conjugates was evaluated in terms of superoxide anion scavenging activity. The conjugates greatly scavenged superoxide anions in a concentration dependent manner on the polyphenol unit level, compared to the monomeric polyphenol. These data imply that the enzymatic conjugation enormously improved the antioxidant property of the polyphenols. Additionally, the conjugates showed good inhibitory effects toward disease-related enzymes, xanthine oxidase, collagenase, and hyaluronidase.