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Coupling reaction of Phenolic Side Chain in Silk Fibroin by Tyrosinase

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Silk fibroin (SF) could be crosslinked without any chemical crosslinking agent, such as glutaraldehyde and toluene diisocyanate. Tyrosinase (EC 1.14.18.1) responsible for the oxidation of phenolic substrates with oxygen molecules oxidized phenolic side chain of tyrosine in SF resulting in the production of *o*-quinone group. The activated groups in SF were reacted to inter- or intramolecular crosslinking bonds through nonenzymatic process. Oxygen concentration in the solution was sharply decreased in the initiated step indicating that the tyrosyl residues in SF were mostly oxidized to quinone group by tyrosinase. The coupling reaction of quinone group introduced by tyrosinase and the supplementary information about the enzymatic oxidation of tyrosyl group could be observed from the measurements of UV and H-NMR.