

SYNTHESIS OF QUERCETIN FUNCTIONALIZED CHITOSAN AND DETERMINATION OF ANTIOXIDANT PROPERTIES

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Abstract. This paper is dedicated to the synthesis of a copolymer with reducing properties obtained by functionalizing chitosan with quercetin and determining the antioxidant activity of the derivatives obtained depending on the molar mass of the polymer. For this purpose, low molecular weight chitosan was obtained by oxidizing industrial chitosan with hydrogen peroxide and functionalizing with quercetin by the covalent grafting method. The functionalization process was performed through the following steps: functionalization of chitosan with ethyl chloroformate to increase the reactivity of the amine group to the hydroxyl group of quercetin and grafting the quercetin molecule to the synthesized intermediate. The comparative antioxidant properties of the composite obtained by grafting technical chitosan with quercetin and by grafting low molecular weight chitosan were studied by the DPPH method. The obtained results indicate that a decrease in the molecular weight of chitosan contributed to its grafting with quercetin. As a result, the functionalized polymer composite acquired a higher antioxidant activity and can be successfully used to inhibit the oxidation of various organic substrates in the cosmetic, food and pharmaceutical industries.

Keywords: chitosan, functionalization, grafting, quercetin, antioxidant activity.