Development of a Bioconjugate for Reducing Serum Uric Acid in Gout Disease

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Gout is a purine metabolism disorder caused by accumulated urate crystals in joints. Extremely severe pain is felt since such crystals affect joints, and lower the life quality of patients seriously. It is reported that gout cases have been doubled in the last two decades. Medication and apparatus used in its treatment do not provide definite treatment. We started the project by designing a medical technical textile for removing of uric acid from blood and wound. For this purpose, Polyacrylonitrile (PAN) fabric was enzymatically modified with nitrilase, and the fabric prepared for reaction for uricase (EC 1.7.3.3.) immobilization. The project was carried out after forming various control groups and experiment groups. As a result of these studies, optimum conditions for activation of modified PAN fabric with EDC were determined as 10 mg EDC, pH 4 and 100 mM phosphate buffer concentration. Uricase was immobilized covalently onto the modified PAN fabric. Optimum conditions for uricase immobilization were determined as pH 5, 10 mM phosphate buffer concentration, 0.3 U enzyme amount, 4°C medium temperature, 250 rpm stirring speed and 6 hours of stirring time. Modification and immobilization were approved with characterization processes. Lastly, the effect of the bioconjugate was examined in removing uric acid from commercial horse blood. Consequently, 87.75% of uric acid could be removed by bioconjugate in 30 minutes and reduced to reference interval under optimum conditions. Our project is significant as developed bioconjugate is effective in uric acid removal, reusable, economical and commercial. We hope to contribute to the literature since we developed a new approach in symptomatic treatment of the disease.

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