**Development of Conductive Dextran Based-on Cardiac Patches**

***Esra Pervin KARAKUZU KIZILCAOĞLU1 , Bengi ÖZKAHRAMAN 2,\****

*1* **0009-0001-0293-6502** *Faculty of Engineering, Department of Polymer Materials Engineering, Hitit University, Çorum, Türkiye*

*2* **0000-0003-1535-4381** *Faculty of Engineering, Department of Polymer Materials Engineering, Hitit University, Çorum, Türkiye*

|  |
| --- |
| **Abstract** In this study, the aim was to develop modified dextran-based conductive cardiac patches that biomimicked heart tissue to prevent myocardial degeneration after acute myocardial infarction. With the scope of study, dextran and alginate natural polymer was modified with methacrylic anhydride. The resulting modified polymers were confirmed using Fourier Transform Infrared Spectroscopy (FTIR) and Proton Nuclear Magnetic Resonance Spectroscopy (1H-NMR). We synthesized methacrylated dextran and methacrylated alginate films with varying amounts of inductive graphene oxide (iGO) incorporated to impart electroconductive properties and Vitamine-E to enhance healing performance [1-3]. The cardiac films were prepared by crosslinking using UV methods in the presence of photoinitiator 2-hydroxy-4’-(2-hydroxyethoxy)-2-methylpriophenone (Irgacurre 2959) [4]. The development biomimicked cardiac patches were characterized FTIR, X-Ray Diffraction (XRD), conductivity analysis as well as *in vitro* swelling, and degradation tests [5]. The antioxidant activity of Vitamine E loaded cardiac patches were determined by the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay [6]. The cytotoxicity of the dextran based cardiac patches was evaluated on L929 fibroblast cell line using the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. The results suggest that the developed dextran based conductive cardiac patches exhibit promising potential for use as biomaterials in cardiac tissue engineering. AcknowledgementThis study is the Master’s Thesis of titles “Development of Dextran Based-on Conductive Cardiac Patches” prepared at Hitit University, and it has been supported by the Research Fund of the Hitit University, Project Number MUHMİTEK19004.24.002.**References:** **[1]** Li, P., Hu, J., Wang, J., Zhang, C., Wang, L., & Zhang, C. (2023). The Role of Hydrogel in Cardiac Repair and Regeneration for Myocardial Infarction: Recent Advances and Future Perspectives. *Bioengineering*, 10(2), 165. **[2]** Song, Y., Wang, H., Yue, F., Lv, Q., Cai, B., Dong, N., Wang, Z., & Wang, L. (2020). Silk-Based Biomaterials for Cardiac Tissue Engineering. *Advanced Healthcare Materials*, 9(23), 2000735.**[3]** Pang, J., Bi, S., Kong, T., Luo, X., Zhou, Z., Qiu, K., Huang, L., Chen, X., & Kong, M. (2024). Mechanically and functionally strengthened tissue adhesive of chitin whisker complexed chitosan/dextran derivatives based hydrogel. *Carbohydrate Polymers*, 237, 116138.**[4]** Bozer, B., Özkahraman, B., & Mert, H. (2024). Photocrosslinked methacrylated pectin and methacrylated hyaluronic acid wound dressing loaded with oleuropein as bioactive agent. *International Journal o Polymeric Materials and Polymeric Biomaterials,* 73(11), 961.**[5]** Morsink, M., Severino, P., Luna-Ceron, E., Hussain, M A., Sobahi, N., & Shin, S. R. (2022). Effects of electrically conductive nano-biomaterials. Efects of electrically conductive nano-biomaterials on regulating cardiomyocyte behavior for cardiac repair and regeneration. *Acta Biomaterialia*, 139, 141.**[6]** Mirzaei-Mohkam, A., Garavand, F., Dehnad, D., Keramat, J., & Nasirpour, A. (2019). Optimisation, antioxidant attributes, stability and release behaviour of carboxymethyl cellulose films incorporated with nanoencapsulated vitamin E. *Progress in Organic Coating*, 134, 333. |

|  |
| --- |
| Keywords: Modified Dextran, Cardiac Patches, Vitamine E, Antioxidant Activities  |