The goal of this study was to create a new molecular imprinting-based sensor on a CuO nanostructured electrode for the selective detection of Danazol (DZ) as a doping agent in athlete biological fluid samples. CuO nanostructured film was electrodeposited on the screen-printed carbon electrode (CuO/SPCE) for the fabrication of modified electrodes, and molecularly imprinted polymer (MIP) was electropolymerized on CuO/SPCE. The analysis of FE-SEM images and XRD patterns on modified electrodes revealed that electropolymerization of amorphous MIP on CuO nanoparticles was successful. Electrochemical analyses using CV and amperometry revealed that the synergistic effect of CuO and MIPs significantly improved the electrocatalytic activity and selectivity of the MIP/CuO nanostructure. The results showed that a linear response from 0 to 6900 ng/mL was obtained. MIP/CuO/SPCE sensitivity was determined to be 0.02576 μA/ng.mL⁻¹, and the limit of detection was determined to be 0.10 ng/mL. When the proposed method was compared to some previously reported DZ sensors, MIP/CuO/SPCE demonstrated notable electrocatalytic performance with the lowest limit of detection value. The MIP/CuO/SPCE sensing system was studied for the analysis of DZ in real samples prepared from the urine of five bodybuilders, and the results showed that the RSD values (3.55% to 4.41%) are appropriate for valid and accurate practical analyses in urine and other biological fluids samples.

**Keywords:** CuO nanostructure; Molecularly Imprinted Polymers; Specificity; Danazol; bodybuilders; Amperometry

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