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**QTF-Based Mass Sensitive Immunosensor for Phenylketonuria Diagnosis**

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The diagnosis of phenylketonuria in early stage prevents potentially serious consequences in many newborn. To avoid these consequences, it is compulsory to analyze each newborn blood by law in East European and Caucasian countries even in Turkey. However, today's protocol do not meet the requirements such as low response time, cost, and false positive or/and negative rate. With this research, we aimed to produce QTF-based immunosensor, which is far from false negative results, and have response time in minutes to decrease the expenses. For this purpose, QTF prongs should be functionalized to immobilize antibody and kept its properties in liquid medium. Therefore, n-Hexane was chosen as a pre-coating precursor for plasma polymerization process. All experiments were achieved at low pressure RF plasma system. After pre-coating step, QTF were functionalized again by plasma polymerization technique by using ethylenediamine as a amine source with different exposure times (1, 5, 10 min) and power (25, 50, 75, 100 W). Aging test also applied to ethylenediamine coating to understand the preservation period of forks. Surface activation was achieved by using 25 % (v/v) glutaraldehyde solution. Finally, Anti-L-phenylalanine immobilization was performed and the response to L-phenylalanine was studied. The surface physical and chemical characterization of modified quartz tuning forks was performed with Attenuated Atomic Force Microscopy (AFM), Contact Angle Analyzer, X-ray Photoelectron Spectroscopy (XPS). The results showed that plasma polymerization technique is useful tool for QTF's prongs functionalization. The coatings provide good stability in liquid mediums which is crucial for biomedical applications. QTF based immunosensor for phenylketonuria diagnosis was successfully achieved by the utilization of plasma polymerization systems.

**Keywords**

Plasma polymerization  
thin film  
biosensor  
amine-rich thin films  
piezoelectric