



**DEVELOPMENT OF QUARTZ CRYSTAL MICROBALANCE POLYANILINE  
DOPING WITH SPIN COAT METHOD FOR DETECTING BENZALDEHYDE**

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**ABSTRACT**

Detection of benzaldehyde, a volatile organic compound that can serve as a marker for kidney failure patients, was developed using a Quartz Crystal Microbalance (QCM) modified with polyaniline. To monitor the amount of benzaldehyde in the human body through breath, a benzaldehyde gas detection system is necessary to avoid severe symptoms or complications. The spin coating method was utilized to prepare the QCM sensor, followed by sensor characterization tests. Three different concentrations of polyaniline (2%, 4%, and 6%) were evaluated, and the results indicated that the QCM coated with PANI 6% had the highest sensitivity compared to the QCM coated with PANI 2% and 4%. Furthermore, the QCM coated with PANI 6% demonstrated good stability and high selectivity towards benzaldehyde over ethanol, methanol, acetone, and formaldehyde. The sensor detection limit was found to range from 50 to 200 ppm, and the high sensitivity and selectivity towards benzaldehyde were attributed to the strong covalent coordination bond formation.

Keywords: Benzaldehyde, Polyaniline, Spin Coating, Quartz Crystal Microbalance (QCM)