Molecular imprinting based Quartz Crystal Microbalance (QCM) sensors for detection of synthetic cannabinoids

S. Akgonullu[1], D. Battal[2,3], M. S. Yalcin[3], H. Yavuz[1], A. Denizli[1]

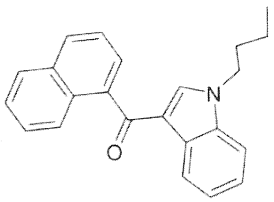
[1]Biochemistry Division, Department of Chemistry, Hacettepe University, Ankara, 06800, Turkey

[2]Faculty of Pharmacy, Department of Toxicology, Mersin University, Mersin, 33169, Turkey

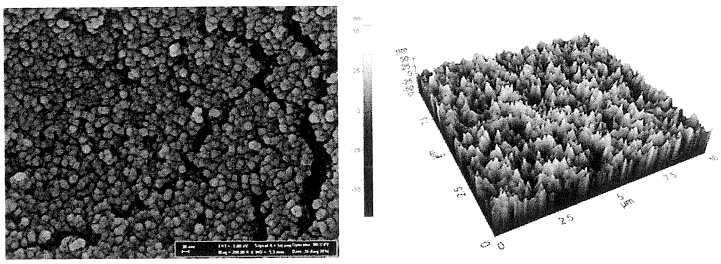
[3]Mersin University Advanced Technology, Education, Research & Application Center, Mersin, 33343, Turkey

semraakgonullu@hacettepe.edu.tr

The use and abuse of synthetic cannabinoids (CBs) have increased significantly in recent years. The two most well-known are JWH-018 and JWH-073 [1,2]. Quartz crystal microbalance (QCM) sensors, a member of mass-sensitive chemical sensors, have been getting researcher's attention because of their properties such as high selectivity, low cost, portability, stability, and simplicity. In order to create sensitive QCM sensor surface, although several methods can be applied, the most promising approach is molecular imprinting technique. The methodology mainly depends on the molecular recognition, is a type of polymerization which occurs around the interesting molecules called as a template and creates specific cavities in the highly cross-linked polymeric matrices [3]. In this study targeted preparation of selective molecularly imprinted QCM sensors for determining common use CBs JWH-073 and the major metabolite JWH-073 butanoic acid in the artificial urine and the saliva and availability of it are shown. Prepared non-imprinted, imprinted nanoparticles and the QCM sensor chip were characterized. Specificity and selectivity of imprinted and non-imprinted QCM sensor chips were determined and kinetics and isotherm parameters were calculated by applying association kinetics analysis. Reproducibility of the imprinted QCM sensors was tested in the final step. Real-time and fast measurement, high sensitivity and specificity, no need of labelled reagents are the unique properties of QCM sensors.



JWH-073



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