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A NOVEL ELECTROCHEMICAL ASSAY BASED BIOLOGICAL SYNTHESIS NANOPARTICLES FOR SOME HYDROCARBONS USING SINGLE-STRANDED DNA-BINDING APTAMER

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Abstract
Water samples were collected from Hammar Mushrif plant from three stages to determine the hydrocarbon compounds .A novel electrochemical treatment method was fabricated and modified for rapid, highly sensitive and specific detection of hydrocarbons based on aptamer probe as single-stranded DNA-binding nanoreceptors with electroactive redox probe (Ferrocene) to the surface of screen-printed gold electrode. The results showed six PAHs compounds (Anthracene, B (K) Fluoranthene, IND (1, 2, 3-CD) +Di, B (B) Fluoranthene, pyrene, B (A) pyrene) which appeared in three stations before nanotreatment in station 1 their concentrations were (619.71, 23.375, 114.22, 41.221, 17.862, 48.422 mg/l), and in station 2 the concentrations were (488.26, 16.582, 105, 39.509, 18.575, 17.017), while in station 3 the concentrations were (295.31, 13.334, 88.43, 17.336, 10.864, 10.972). The treatment efficiency rang was (2.79% -100%).The designed electrochemical assay exhibited high specificity toward hydrocarbons. Moreover, the developed treating method was successfully applied for removing of target analytes which present in water samples polluted with hydrocarbons.
Keywords: Novel, single-stranded DNA, magnetic iron oxide, carcinogenic hydrocarbons, aptamer.

Introduction

Water is a vital resource for sustaining life, however in present scenario the access to clean safe water around the world has become a burning concern especially in developing and countries attributing to increase in population, climate change and environmental water pollution by sewages, industrial effluents, chemicals, domestic wastes, pesticides, pharmaceuticals (Gonzalez 2012; Uner 2016).

Aquatic resources are among the media most affected by lack of basic sanitation, disposal of plastic wastes and contamination with pesticides, pharmaceuticals, and industrial effluents (Schwarzenbach *et al,* 2010). Industrial effluent is all the liquid waste generated in the various stages of a production process, that is, all the water that is used in an industry and then discarded (A.Al-Ghouti *et al,* 2019). In refining industry, produced water is considered as the largest waste stream, which contains relatively higher concentration of hydrocarbons, heavy metals and other