# APTAMER NANOBIOSENSOR ASSAY FOR ESTROGENOUS ENDOCRINE DISRUPTING CHEMICALS IN TREATED WASTEWATER

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## ABSTRACT

Environmental chemicals that disrupt normal endocrine functions in living organisms including humans, are of great concern globally. These chemicals as a group are known as endocrine disrupting compounds (EDCs). EDCs may imitate modulate and block hormone synthesis. Estrogenic compounds that are present in the environment above a certain concentration (threshold limit value), are known to have adverse effects on health and reproductive patterns in wildlife species. Analytical and biological detection methods currently utilised, are time consuming, costly and require highly skilled operators. Electrochemical sensors and biosensors are well established in literature as simple and sensitive technology for a wide range of environmental analysis. We have developed a highly responsive aptamer-immuno electrochemical protocol which is inexpensive and easy to implement. An objective of this study is to develop an aptamer-immuno sensor for rapid, highly specific and simultaneous determination of low levels of EDCs in treated wastewater. We report an aptamer-immunosensor assay for 17-betaestradiol developed using poly (2, 5 dimethoxyaniline) doped with polyvinyl sulfonic acid (PVSA) in the presence of Zinc Oxide nanoparticle, coated on glassy carbon electrode. The undoped poly (2, 5 DMA) and doped PVSA will be prepared in hydrochloric acid respectively by electrochemical oxidative polymerisation and the polymer will be investigated in detail electrochemically and spectroelectrochemically. Electrodeposited or coated films will be studied as multifunctional platforms for immobilizing biorecognition agents (antibody, aptamer) to achieve selective electrochemical aptamer-immunosensor for 17-betaestradiol. The platform and the aptamer- immunosensor will be interrogated by voltammetry and impedimmetry and applied in real water samples. The results will be compared with conventional analytical methods based on high pressure liquid chromatography (HPLC) and enzyme linked immunosorbent assay (ELISA) techniques.