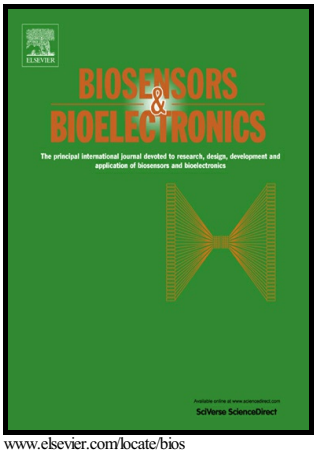

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PII: S0956-5663(18)30441-X
DOI: https://doi.org/10.1016/j.bios.2018.06.011
Reference: BIOS10531

To appear in: *Biosensors and Bioelectronic*

Received date: 13 February 2018
Revised date: 3 June 2018
Accepted date: 5 June 2018

Cite this article as: Huan You, Lijuan Bai, Yonghua Yuan, Jing Zhou, Yan Bai and Zhaode Mu, An amperometric aptasensor for ultrasensitive detection of sulfadimethoxine based on exonuclease-assisted target recycling and new signal tracer for amplification, *Biosensors and Bioelectronic,* https://doi.org/10.1016/j.bios.2018.06.011

An amperometric aptasensor for ultrasensitive detection of sulfadimethoxine based on exonuclease-assisted target recycling and new signal tracer for amplification

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Abstract: The risks caused by veterinary drug residues in animal foodstuffs are of great concern to the public. Accordingly, this work reported an amperometric aptasensor for highly sensitive detection of sulfadimethoxine (SDM). Functionalised fullerene (C_{60})-doped graphene (C_{60}-rGO) nanohybrid was designed and prepared to load electroactive toluidine blue (Tb) through the π-π stacking, forming a C_{60}-rGO-Tb nanocomposite. Furthermore, the as-prepared nanocomposite was decorated with gold nanoparticles and used for the immobilization of signal probes to form a new signal tracer, which was coupled with exonuclease-catalyzed target recycling for amplification. To construct the aptasensor, a thiolated double-stranded DNA (dsDNA) of aptamer-capture probe complex was immobilised on a gold electrode surface through strong Au-S bond. In the presence of SDM, the aptamer perferred to form an aptamer-SDM complex, which led to the dissociation of dsDNA. Then aptamer could be selectively digested by $RecJ_f$ exonuclease, resulting in liberated SDM molecules to participate in the next reaction cycling and achieve signal amplification. Then, capture probes released from the cyclic processes were hybridized with the signal tracer,

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