

Turn-On Fluorescence Aptasensor on Magnetic Nanobeads for Aflatoxin M1 Detection Based on an Exonuclease III-Assisted Signal Amplification Strategy

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Conjugation of Magnetic beads to the Biotinylated Aptamers.

To test the capability of the magnetic beads, an excess of aptamers (50 μL , 5 μM) was added to 50 μL 1 mg mL^{-1} of streptavidin-coated magnetic beads. The conjugation reaction was carried out under gentle mixing for 30 min. The captured aptamers were separated together with the magnetic beads in a magnetic field. The concentration of free aptamers left in the solution were measured with the NanoDrop, which showed a concentration of 1.6 μM in the solution. It indicated that 0.9 μM of aptamers were captured by 1 mg/mL of magnetic beads. Subsequently, the resultant magnetic beads were added to 30 μL 4.7 μM of C-strand DNA solution. After a gentle mixing for 30 min, 2.3 μM of C-strand were detected in the left solution, which showed 2.4 μM of aptamer/C duplex were formed onto 1 mg/mL of magnetic nanobeads.

Table S1. The DNA sequences used in the experiments.

DNAs	Sequences
Aptamer	5'-ACTGCTAGAGATTTTCCACAT-C6-biotin-3'
C-strand	5'-CAAACCTCTCTATCAGTGG-3'
T-strand	5'-AAAACCCAAAACCCAAAACCCACTGATAGAGAGTTTG-3'
G-strand	5'-CTAGCAGAGGGTTTTGGGTTTTGGGTTTTGGGAGCTA-3'

Table S2. The comparisons of the previous fluorescence aptasensors and our aptasensor.

Developed aptasensors	Strategy	Detection range	LOD
Guo et al ¹	A target-induced DNA machine amplification fluorescence assay	0.06-0.6 nM	0.01 ng mL^{-1}
Yin et al ²	A G-quadruplex-specific fluorescence probe amplification method	0.01-2.0 ng mL^{-1}	17.79 ng kg^{-1}
Seyyed et al ³	An electrochemiluminescence (ECL) aptasensor	10-200 ng mL^{-1}	0.05 ng mL^{-1}
Atul et al ⁴	A structure-switching signaling aptamer assay based on the FAM-TAMRA quenching-dequenching mechanism	1-2000 ng kg^{-1}	5.0 ng kg^{-1}
Our method	A fluorescence aptasensor based on a magnetic nanomachine and an Exonuclease III-assisted signal amplification strategy	0.01-2 ng mL^{-1}	9.73 ng kg^{-1}

Reference

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