

Article

A Novel and Label-Free Chemiluminescence Detection of Zearalenone Based on a Truncated Aptamer Conjugated with a G-Quadruplex DNzyme

Yue Guan ^{1,2,†}, Junning Ma ^{3,4,†}, Jing Neng ^{1,2}, Bolei Yang ^{3,4}, Yan Wang ^{1,2,*} and Fuguo Xing ^{3,4,*}

¹ College of Food Science and Technology, Zhejiang University of Technology, Hangzhou 310014, China

² Key Laboratory of Food Macromolecular Resources Processing Technology Research, Zhejiang University of Technology, China National Light Industry, Hangzhou 310014, China

³ Key Laboratory of Agro-Products Quality and Safety Control in Storage and Transport Process, Ministry of Agriculture and Rural Affairs, Beijing 100193, China

⁴ Institute of Food Science and Technology, Chinese Academy of Agricultural Sciences, Beijing 100193, China

* Correspondence: wangyan062006@zjut.edu.cn (Y.W.); xingfuguo@caas.cn (F.X.)

† These authors contributed equally to this work.

Table S1. DNA oligos used in this study.

Oligo names	Sequences
DNAzyme_ZEN	<u>TGGGTAGGGCGGGTTGGG</u> <u>AAAGATT</u> <u>CATCTATCTATGGT</u> <u>ACATTACTATCTGTAATGTGA</u>
DNAzyme_tZEN1	<u>TGGGTAGGGCGGGTTGGG</u> <u>AAAGATT</u> <u>CATCTATCTATGGT</u>
DNAzyme_tZEN2	<u>TGGGTAGGGCGGGTTGGG</u> <u>AAAGATT</u> <u>CATCTATCTATGGT</u> <u>ACATTACTAT</u>
auxiliary DNA	<u>AGTAATGTACCATAGATAGATGAATC</u> <u>TTTCCCAACCCGC</u> <u>C</u>
DNAzyme_tZEN3	<u>TGGGTAGGGCGGGTTGGG</u> <u>AAACATCTATCTATGGTACAT</u> <u>TACTATCTGTAAT</u>
auxiliary DNA3	<u>AGTAATGTACCATAGATAGATGT</u> <u>TTCCCAACCCGCC</u>

Note: red-colored letters represent DNAzyme or reverse-complement counterpart, while blue-colored letters denote ZEN aptamer or reverse-complement counterpart. Underlined letters indicate hybridized locations between DNAzyme-ZEN aptamer conjugate and the auxiliary DNA.

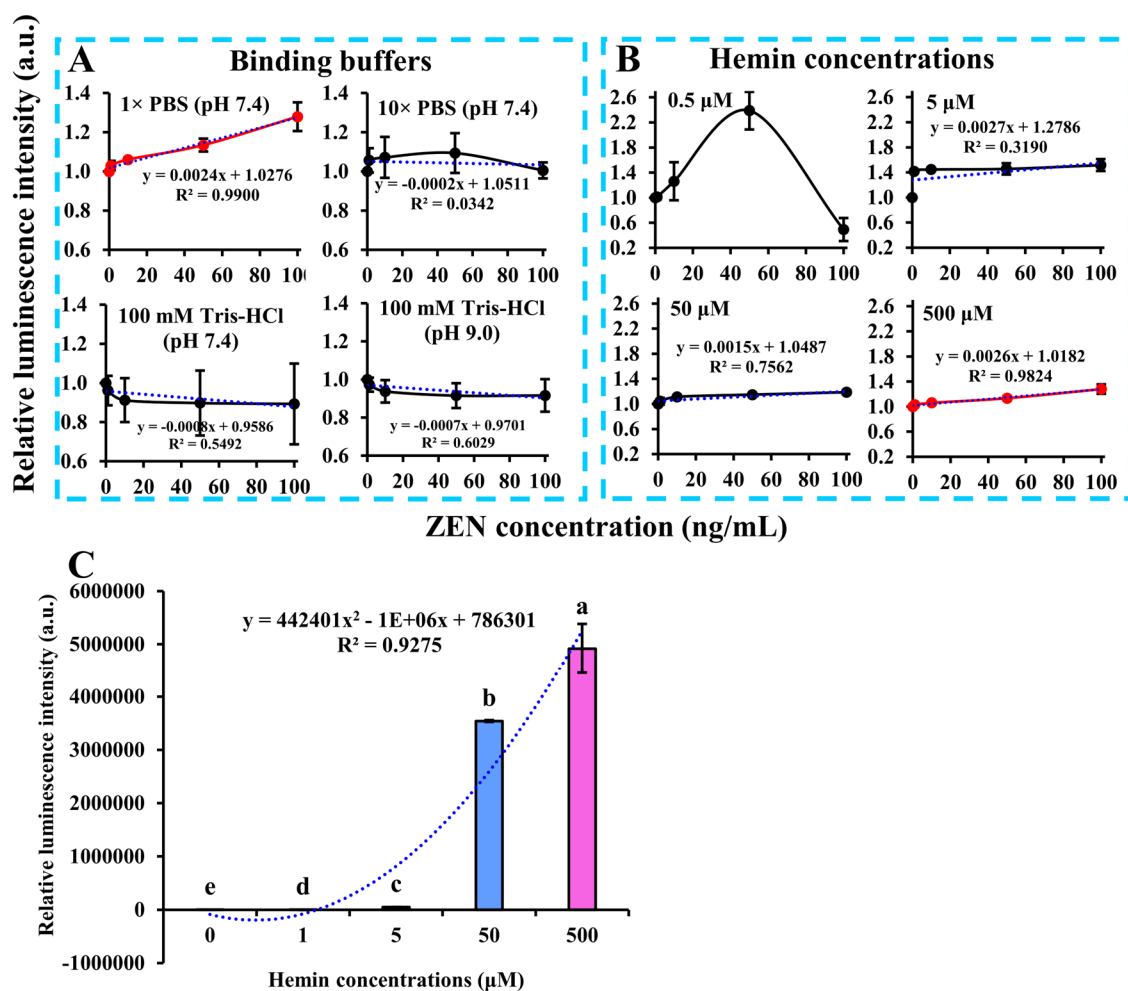


Figure S1. Feasibility exploration of label-free and chemiluminescence detection of ZEN based on a DNAzyme-aptamer conjugate by selection of various binding buffers (**A**) and hemin concentrations (**B** and **C**). Note: different letters denote significant difference ($p < 0.05$) determined by one-way ANOVA followed by Fisher's least significant difference.

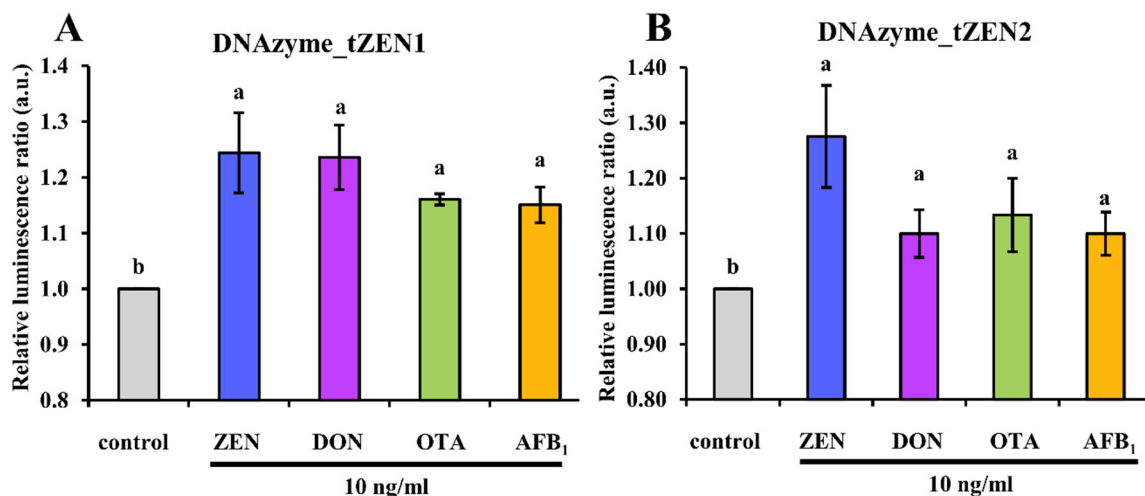


Figure S2. Detection specificity of the chemiluminescence aptasensor based on truncated aptamers: DNAzyme_tZEN1 (**A**) and DNAzyme_tZEN2 (**B**). Note: different letters denote significant difference ($p < 0.05$) determined by one-way ANOVA followed by Fisher's least significant difference.

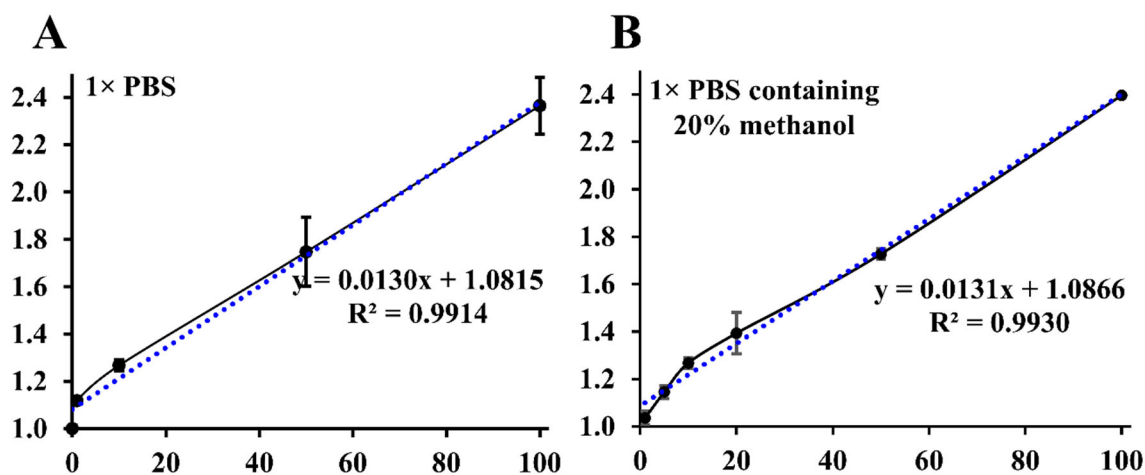


Figure S3. Effect of 20% methanol in 1× PBS binding buffer (**B**) on the performance of the chemiluminescence aptasensor as compared to 1× PBS control buffer (**A**).