# Chemiluminescent Aptasensor Capable of Rapidly Quantifying Escherichia coli O157:H7

Chung, Kang

Cost-effective and easy-to-use biosensor was developed for the rapid quantification and monitoring of Escherichia (E.) Coli O157:H7 in a sample using E. Coli O157:H7 aptamer, graphene oxide (GO)/iron nanocomposites, and guanine chemiluminescence detection. E. Coli O157:H7 aptamer-conjugated 6-carboxyfluorescein (6-FAM) with excellent specificity captured E. Coli O157:H7 in a sample when the mixture was incubated for 1 hour at 37 °C. Free E. Coli O157:H7 aptamers remaining in the sample after the incubation were removed with GO/iron nanocomposites based on the principle of p–p stacking interaction between free aptamer and GO/iron nanocomposites. Then, E. Coli O157:H7 bound with aptamer-conjugated 6-FAM in the sample emitted strong light when guanine chemiluminescent reagents (e.g., 3,4,5-trimethoxylphenylglyoxal hydrate, Tetra-n-propylammonium hydroxide) were added in the sample. The strength of light emitted in guanine chemiluminescence reaction was proportionally enhanced with the increase of E. Coli O157:H7 concentration. The limit of detection (LOD) of biosensor capable of quantifying E. Coli O157:H7 with good accuracy, precision, and reproducibility was as low as 4.5 x 103 cfu/ml. I expect that the rapid analytical system can be applied in the field of food safety as well as public health.

**Awards Won:**