

Colorimetric bacteria detection method using chitosan-coated magnetic nanoparticles

VU TRUNG HIEU, Thao Nguyen Le, 김문일[†]

가천대

(moonil@gachon.ac.kr[†])

Nowadays, many serious diseases are related to bacterial infection, and thus, it is highly required to develop an efficient bacteria detection method enabling simple, rapid, reliable, and sensitive identification for early diagnosis and timely treatment of diseases. Herein, we developed a simple but efficient colorimetric bacteria detection method using peroxidase-like chitosan-coated magnetic nanoparticles (CS-MNPs). When bacterial cells present on the sample, the CS-MNPs show high affinity toward broad-spectrum bacteria, majorly due to the electrostatic attraction between the negatively charged bacterial membrane and positively-charged CS-MNPs, resulting in significant reduction of the peroxidase activity of CS-MNPs. Using this strategy, bacteria down to 100 CFU mL^{-1} was detected by spectrophotometry and 10^4 CFU mL^{-1} was distinguished by naked eyes. Thereby, we expect that CS-MNPs strategy could be practically utilized for detecting bacteria on site.