Electrodeposition of a magnetic and redox-active chitosan film for capturing and sensing metabolic active bacteria.

Rapid and portable detection of viable pathogen is highly desired to minimize the risk of foodborne pathogen outbreaks. Here we report the fabrication of redox-active and magnetic chitosan film using electrodeposition for this purpose. In this method, a redox capacitor was assembled using chitosan with the addition of a redox mediator, which enables the detection of metabolic activity in the sample. This magnetic redox capacitor was designed for use in an external magnetic field to enable easy handling and further analysis. Importantly, the fabrication demonstrated here is simple, controllable, and reagentless.