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Dual Mode Mobile Based Detection of Endogenous Hydrogen Sulfide for Determination of Live and Antibiotic Resistant Bacteria

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Abstract : Increasing incidence of antibiotic-resistant bacteria is a big concern for the treatment of pathogenic diseases. The effect of treatment of patients with antibiotics often leads to the evolution of antibiotic resistance in the pathogens. The detection of antibiotic or antimicrobial resistant bacteria (microbes) is quite essential as it is becoming one of the big threats globally. Here we propose a novel technique to tackle this problem. We are taking a step forward to prevent the infections and diseases due to drug resistant microbes. This detection is based on some unique features of silver (a noble metal) nanorods (AgNRs) which are fabricated by a physical deposition method called thermal glancing angle deposition (GLAD). Silver nanorods are found to be highly sensitive and selective for hydrogen sulfide (H2S) gas. Color and water wetting (contact angle) of AgNRs are two parameters what are effected in the presence of this gas. H_2S is one of the major gaseous products evolved in the bacterial metabolic process. It is also known as gasotransmitter that transmits some biological singles in living systems. Nitric Oxide (NO) and Carbon mono oxide (CO) are two another members of this family. Orlowski (1895) observed the emission of H_2S by the bacteria for the first time. Most of the microorganism produce these gases. Here we are focusing on H_2S gas evolution to determine live/dead and antibiotic-resistant bacteria. AgNRs array has been used for the detection of H_2S from micro-organisms. A mobile app is also developed to make it easy, portable, user-friendly, and cost-effective.

Keywords : antibiotic resistance, hydrogen sulfide, live and dead bacteria, mobile app
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