

Isolation and characterisation of sulphur oxidizing bacteria isolated from hot spring in Malaysia for biological deodorisation of hydrogen sulphide in chicken manure

ABSTRACT

In this study, the isolation of sulphur oxidising bacteria (SOB) from hot spring in Malaysia was carried out in an enrichment culture using sodium thiosulphate as a sole energy and CO₂ as a sole carbon source. A total number of 80 SOB isolates were obtained from the agar plate and considered as positive SOB due to their abilities using thiosulphate for growth. All the isolates were initially screened for their fast growths in liquid medium and 13 isolates were selected for another screening process. Three SOB isolates namely isolate AH18, AH25, and AH28 were selected based on their abilities to grow faster, produce the highest sulphate ion and reducing the pH in the growth medium. The cells were Gram-negative and short rod-shaped. The effects of various variables including temperature (25-45 °C), pH (4-9), sodium thiosulphate concentrations (4-100 mM) and metabolic characteristic were evaluated on bacterial growth and their sulphur oxidation activities. The optimum pH of all the potential isolates occurred at pH 8.0. Meanwhile, the optimum temperature for isolate AH18, AH25 and AH28 occurred at 45 °C, 30 °C, and 30-45 °C, respectively. The three isolates were classified as facultative chemolithotroph with the capability of growth in thiosulphate concentration as high as 100 mM. Therefore, given the ability in the oxidation of thiosulphate, temperature and pH adaptabilities, with the metabolic flexibilities of isolates AH18, AH25, and AH28 could be a good H₂S biological deodorizing candidate.

Keyword: Sulphur oxidising bacteria; Hot spring; Biological deodorisation; Chicken manure; Hydrogen sulphide