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PAWEENA UPPANAN : SCREENING AND CHARACTERIZATION OF
BACTERIA CAPABLE OF BIOTRANSFORMATION OF TOXIC ARSENIC
COMPOUND IN SOIL. THESIS ADVISORS : PORNSAWAN
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Out of 188 bacterial strains isolated from soil and mine-tailing samples collected from the arsenic contaminated area in Ron Phibun District, Nakhon Si Thammarat Province, southern Thailand. 113 bacterial strains are resistant to 700 mg l⁻¹ arsenic compounds. Within these groups, two of them are found to be highly capable of oxidizing arsenite to arsenate, and were identified as *Alcaligenes xylooxidans* subsp. *xylooxidans* and designated as strain no.2/6 and strain no.3/18. Bacterial oxidation occurred in the range of 65% to 90% of added sodium arsenite (NaAsO₂) in medium at concentrations 10, 100, and 1,000 mg l⁻¹. At the concentration of 1,000 mg l⁻¹ of sodium arsenite, there was some inhibitory effect in bacterial oxidation. Optimum arsenite oxidation occurred under aerobic conditions at a pH between 4.0 and 9.0 and at temperature 27 °c and 37 °c. Under this optimum condition the strain no.2/6 and strain no.3/18 reached the stationary phase in 24 and 8 hours, respectively. *Alcaligenes* strains were likely to utilize toxic arsenite as an electron donor aerobically because (I) during experiment, while the concentration of arsenite was decreased, the concentration of arsenate was increased and (II) the growth of *Alcaligenes xylooxidans* accompanied the decrease of toxic arsenite in mineral medium.

These results suggest that the oxidation of arsenite to arsenate at the contaminated area by the isolated bacteria can play an important role in controlling the overall mobility of arsenite and in detoxifying the more toxic arsenite to less toxic arsenic.