

Thesis Title	Bioremediation of Arsenic Contaminated Soil in the Southern of Thailand
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Abstract

In this work, we study the feasibility of using bioremediation technique for treating soil polluted with arsenic in Ron Phiboon District, Nakorn Sithamarat Province. The experiments were conducted in both scales of flask and 10 L bioreactor. The bacterial strain *Thiobacillus ferrooxidans* was used to convert the ferrous to ferric ions which subsequently oxidized trivalent arsenic to pentavalent arsenic. Pentavalent arsenic generated then reacted with ferric ions again and formulated dissoluble compounds and stabilized in soil.

First, we collected 14 samples of soil from the site in Ron Phiboon Distric. The analytical results showed that 51.1- 99.3 percent of the arsenic in soil was in the form of pentavalence. The concentrations of trivalent, pentavalent arsenic and ferrous ions were 0-1.85, 0.24-42.95 and 132.3 ppm (mg of arsenic/kg of soil) respectively. The pH of soil was ca 2.1-6.3. Since there was abundant of ferrous ions available in soil with low pH, therefore it was possible to use the bacterial strian *Thiobacillus ferrooxidans* for the bioremediation.

In treatment of arsenic in shake flask , trivalent arsenic have a rate $-r_{As} = 0.583[As]^{1.0226}$ mol/l.h, pentavalent have a rate of precipitation $-r_{As} = 0.268[As]^{0.0372}$ mol/l.h. When using in pilot plant, with initial arsenic 0.816-42.577 ppm, ferrous 30-150 ppm, we found that arsenic will decrease rapidly 90 percent in 1-2 days in the rate $-r_{As} = 1.2369[As]^{0.542}$ mol/l.h

Keywords : Arsenic Contaminated Soil Remediation / *Thiobacillus ferrooxidans* / Ferrous