

## Adsorption of *Escherichia coli* in Different Soils

Ling T Y, Goh S H and Kasing A  
Faculty of Resource Science & Technology  
Universiti Malaysia Sarawak

### Abstract

Adsorption of *E. coli* on soils determines its availability for movement during runoff events. In this study, adsorption of *E. coli* is determined in two different soils, a silt loam and a clay loam. Clay loam was found to adsorb significantly more *E. coli* than silt loam. Clay loam absorbed 81.5% and 86.2% of *E. coli* at low and high initial concentrations respectively whereas silt loam was found to adsorb 39.4% and 75.3% at low and high initial concentrations respectively. Results show that adsorption isotherm could be represented by linear adsorption isotherm. Distribution coefficient was found to be 0.65 and 3.13 ml/g for silt loam and 4.40 and 6.29 ml/g for clay loam. The distribution coefficient is dependent on the initial concentration of *E. coli*.

*Keywords:* survival, *Escherichia coli*, soil, pH, temperature, die-off

### Introduction

Wastewater from animal farm could be land applied to recover resources as well as reduce microbial contamination of surface water. However, due to the potential contamination of groundwater and surface water during rainfall events, quantity of *E. coli* adsorbed on soil and suspended in water has to be quantified. There have been some studies of adsorption of different bacteria in temperate soil (Ling et al. 2002; Gromyko et al. 1986; Weaver et al. 1978, Marshall 1971). However, information on adsorption of *E. coli* is scarce and certainly lacking for tropical soils as tropical soils are generally more acidic (Pedro 1976). Therefore, in this study the adsorption of *E. coli* in different soils were investigated.

### Materials and Methods

#### Bacteria and soil used

Two soil samples were collected around Kuching, Sarawak. Particle size analysis was carried out using the Pipette method (Gee and Bauder, 1986). Soil pH was determined by a pH meter. Total organic matter of the soils was determined by the Loss-on-ignition method (Nelson and Sommers, 1996).

*Escherichia coli* was isolated from fresh pig farm wastewater. Identification of the isolates was confirmed by Gram reaction tests and API 20E diagnostic kit (BioMerieux, France). Adsorption studies of *E. coli* on different soils at room temperature (25°C) were carried out according to the weak adsorption method employed by Ling *et al.* (2002). Cultures were grown in LB media (Fluka BioChemika) at 37°C. Inoculum concentrations