

## CHAPTER III

### MATERIALS AND METHODS

#### 3.1 Materials

##### 3.1.1 Wastewater

The domestic wastewater was collected every 3-5 days from grit chamber at Huaykwang sewage treatment plant during 7.00-7.30 A.M. and was taken to laboratory within 1 hour. Immediately, it was analyzed for chemical and bacteriological characteristics as shown in table 1 while the other was applied to the soil columns. The remaining of wastewater was stored at 4°C and was held until it reached room temperature before added to the columns again.

##### 3.1.2 Soils

Seven soil series were used in the experiment. The locations, where soil sample were collected, are as followed:

Soil Series	Location	
Muak Lek	Wat Pakklong,	Saraburi
Chon Buri	Ban Serd	
Ban Bung	Ban Donhualor	Chon Buri
Sattahip	Wat Nongree	
Klaeng	Ban Nongkratum	
Kampaeng Saen	Wat Tabluang	Nakornpatom
Thon Buri	Bang Khunnon	Bangkok

The soil at the surface, 0-50 cm, was collected by driving PVC cylinder, with 7.5 cm diameter and 100 cm depth, into soil until 50 cm of soil in length was obtained. The sample at 50-100 cm in depth was collected in the same manner of the same hole. Duplicate sample were used in the experiment. Then, all soil sample in cylinder were covered with plastic lids at both ends until they were put to use. Some physical and chemical properties of every soils at 25 cm from the top of each soil was analyzed by the methods according to Table 2.

### 3.2 Method

In order to collect the effluent after passing wastewater through a soil column, the instruments and soil were set according to Figure 1. Soil column, the bottom end, was placed in a polyethylene bottle having perforated bottom, with 1.5 mm diameter of each 375 openings. The bottle was on top of a plastic fannel and a collecting flask was under the funnel. Two holes were made in a rubber stopper which plugged in a plastic lid on top of soil column. One hole was for graduate ponding indicator. The other was for water applicator, Thristle tube was used during the experiment to minimize the disturbance of soil surface from splash effect of dropped water from the applicator.

One and a half liters of domestic wastewater was used first on soil column. The initial level of the water was marked at graduate ponding indicator. Every day, the level of wastewater was recorded before adding wastewater to the initial level. The recorded data was used in calculating the volume remained on soil by equation which was

shown in Appendix A. The effluent was collected in a sterile 500 ml Erlenmeyer flask. During the experiment, the flask had been changed everyday. The effluent was analyzed for several parameters within 24 hours. The results presented are the average from 3 replicates.

Table 1. The procedures used in water analysis.

Characteristics	Analytical method
pH	glass electrode method (Franson, 1976)
COD (mg/l)	dichromate reflux method (Franson, 1976)
NH <sub>4</sub> -N (mgN/l)	Kjeldahl method for the influent and direct nesslerization for the effluent (Franson, 1976)
Total nitrogen (mgN/l)	Kjeldahl method (Franson, 1976)
NO <sub>3</sub> -N (mgN/l)	brucine method (Franson 1976)
orthophosphate (mgP/l)	vanadomolybdophosphoric acid colorimetric method (Franson, 1976)
Total phosphate (mgP/l)	persulfate digestion (Franson, 1976)
Total bacteria (col/ml)	total plate count (Franson, 1976)
Fecal coliform (col/ml)	total plate count (Franson, 1976)

Table 2 The procedures used in soil physical and chemical analysis.

Characteristics	Analytical method
Moisture content (%)	gravimetric method (Black, 1965 a)
Texture	pipet method (Black, 1965 a)
pH	potentiometric method (Black, 1965 b)
CEC (meq/100 g)	ammonium acetate method (Black, 1965 b)
Organic carbon (%)	Walkley-Black method (Black, 1965 b)
Total bacteria (col/g soil)	Total plate count (Bell and Bole, 1978)
Fecal coliform (col/g soil)	Total plate count (Bell and Bole, 1978)

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

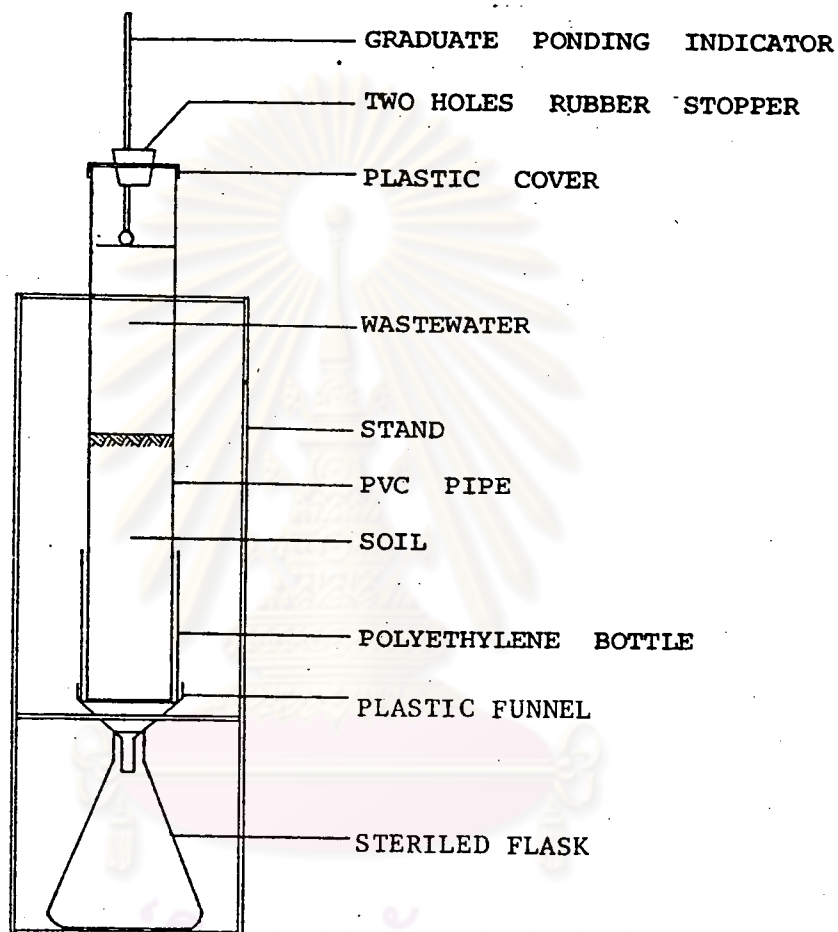


Figure 1 Typical soil column used in the experiment.