

FIGURE 2.1.1. Schematic diagram of the setup of the landfill bioreactor. (1) Anaerobic phase, (2) Aerobic phase. a) leachate recycling pipe, b) peristaltic pump, c) leachate sampling and dilution port, d) leachate outlet, e) water jacket, f) leachate inlet, g) manometer outlet, h) additional gas measurement outlet, i) methane outlet, j) gas trap, k) gas sampling port, l) air inlet, m) methane inlet port, n) gas volume measurement outlet, o) Tygon piping.

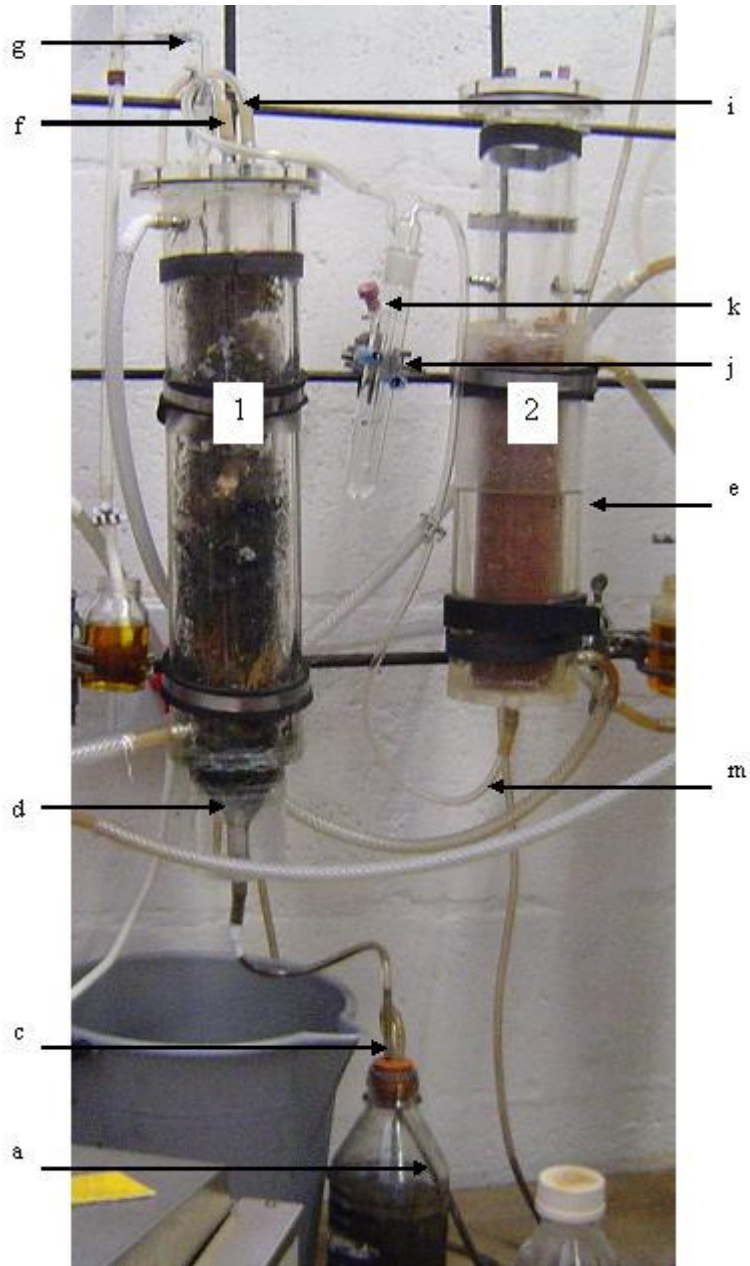


Figure 2.1.2. Anaerobic (1) and Aerobic (2) phases representing the MSW waste and landfill cover soil components, respectively.

**Table 2.1.1.** Composition of refuse used as the MSW fraction in this study

<b>COMPONENT</b>	<b>% BY WET WEIGHT</b>	<b>SUB-COMPONENT</b>
<b>Paper</b>	13.30	Cardboard Newspapers/ Directories Magazines Office paper
<b>Textiles</b>	5.09	Brushed nylon towelling other
<b>Plastics</b>	7.64	Shopping bags Bottles (Ace) Bottles (Coca-Cola) Perspex
<b>Metals</b>	6.36	Aluminium cans Lathe shavings Off-cuts
<b>Putrescibles</b>	24.05	Meat, bones, bread Grass, fruit / veg. Mixed garden waste Rice, noodles, oats
<b>Other</b>	11.91	Polystyrene, wax, leather Batteries, tyres, soap
<b>Glass</b>	6.62	
<b>Ash</b>	25.04	

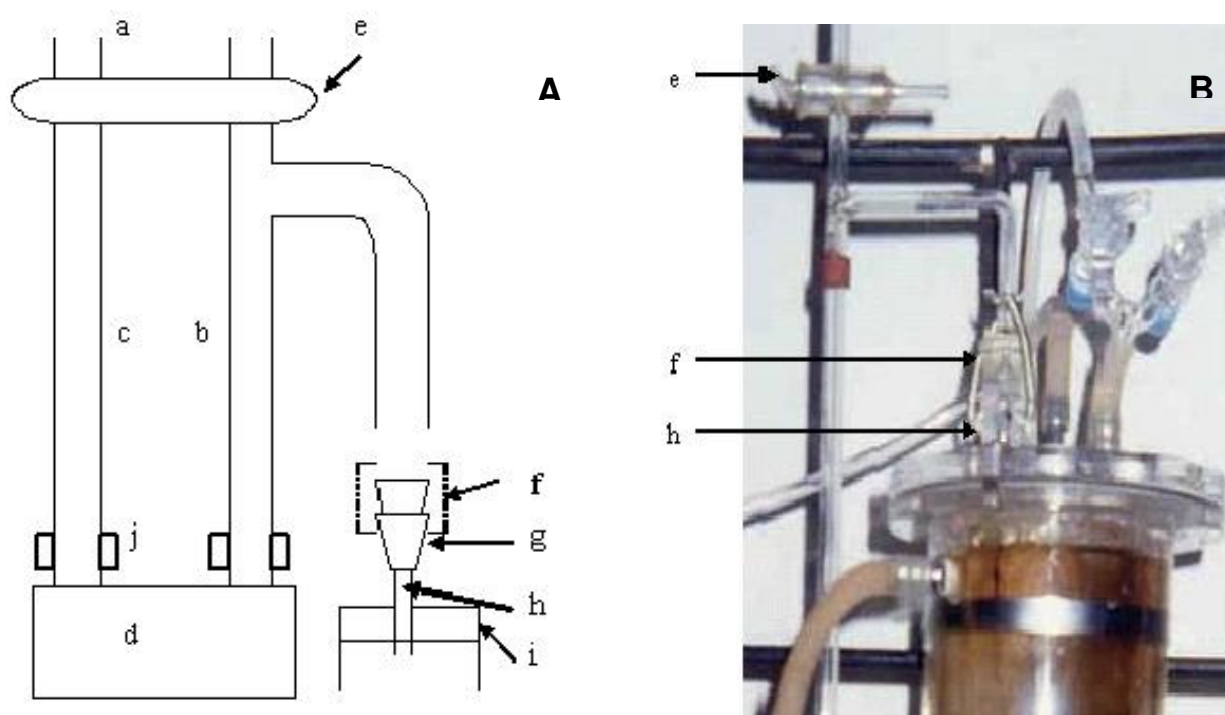


Figure 2.1.3. Schematic diagram illustrating the pressure manometer (A) and corresponding photograph (B): a) Linseed oil inlet capillary b) Second capillary tube, c) manometer arm with linseed oil, d) Clamped Tygon piping to hold the oil reservoir, e) 3 – way tap, f) spring with clamps, g) ground glass, h) ground glass tube location in solid Perspex cap, i) solid Perspex cap (anaerobic reactor), j) clamps for manometer support.

**Table 2.1.2.** Morphological characteristics of the anaerobic reactor leachate

<b>Morphological characteristic</b>	<b>Week 0 (Run start)</b>	<b>Week 1</b>	<b>Week 2</b>	<b>Week 21 (Run end)</b>
<b>Leachate colour</b>	opaque	Murky brown	Clear yellow	Clear yellow
<b>Waste height</b>	40 cm	38 cm	37 cm	31 cm
<b>Additional – slime formation</b>	None	Black slime on upper walls	Black slime is more pronounced on inner walls	Black slime has completely dried on inner walls
<b>Anaerobic indicator strip</b>	Pink (aerobic)	White (anaerobic)	White (anaerobic)	White (anaerobic)

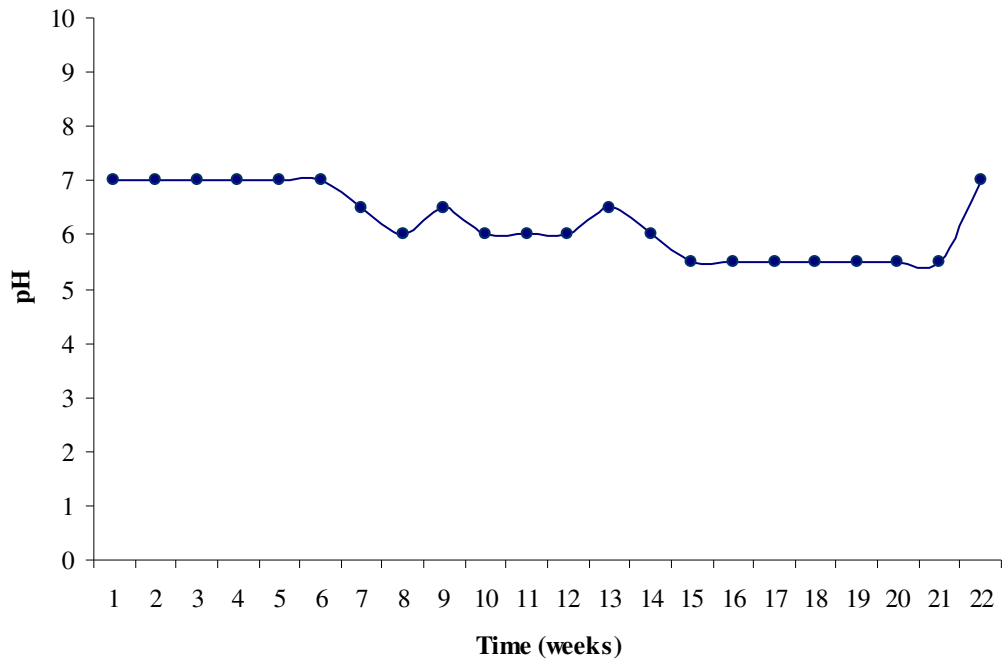


Figure 2.1.4. pH profile of leachate from the anaerobic reactor showing pH changes over a 21 week period.

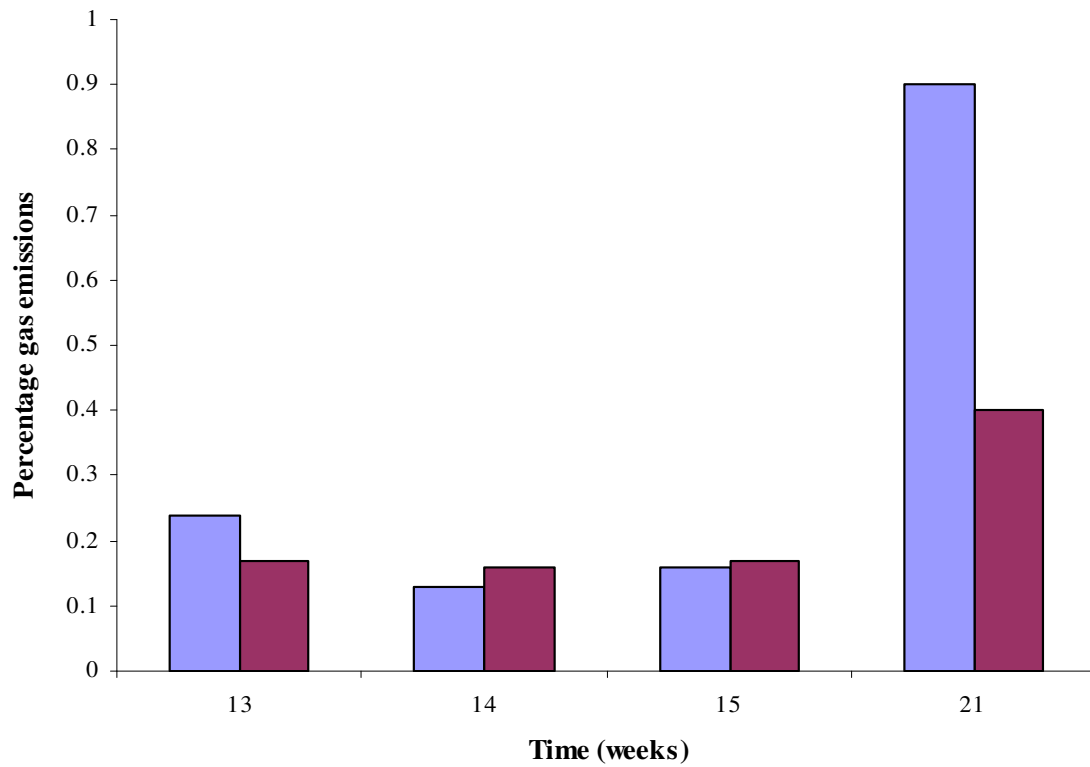


Figure 2.1.5. Gas emission profile of the anaerobic reactor showing methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) levels over a 21 week period.