

# CHAPTER I

## INTRODUCTION

### 1.1 Background

The use of plastic packaging has rapidly increased for many applications because of its light weight, strength, durability, moldability, colorability, and relatively low energy requirement in converting resin to manufactured products. In the future, the available resources (oil and natural gas) will decrease and the demand for such dwindling resources will inevitably result in increasing prices. Moreover, most of the used plastics go to landfills, which causes a large amount of solid waste. Plastic waste increases annually but only a small proportion of this waste is recycled. So the dependency on raw materials, especially non-renewable raw material such as oil and natural gas, in combination with plastic waste streams have forced both governments and industries to seriously consider plastic recycling.

At present, polymers produced from recycling are not as valuable as virgin polymers because the residual ink colors the polymer and change the physical properties of the polymer. These problems can be avoided if ink is removed from the plastic surface before recycling. Possible alternatives for plastic deinking include using either organic solvents, or surfactants. However, the use of surfactants has an important advantage in being environmentally friendly.

## **1.2 Objective**

The determination of optimum processing parameters to improve the effectiveness of deinking was focused on the removal of solvent-based ink from high density polyethylene surfaces using a cationic surfactant.

## **1.3 Scope of Research Work**

The effect of cationic concentrations below, above and at CMC were studied at initial conditions, 2 hours pre-soaking time, 2 hours shaking time, pH 12, and temperature 30°C. The presence and absence of abrasive material was also investigated.

Other studies were carried out on the effect of pre-soaking time and shaking time, pH, and temperature. Pre-soaking and shaking times were varied from zero to seven hours. pH levels were varied from 11 to 12 with increment of 0.25. Deinking temperatures were varied from 30 to 45°C.