CHAPTER I

INTRODUCTION

Wastewater technology had its beginning more than a century ago in the exploitation of the dilution and self purification capacity of the water environment for the disposal of sewage and industrial wastes. With the increasing of population and industry, more proportions of wastewater being discharged into rivers and lakes, it has become obvious that there is an over-confidence in the natural capability of rivers and lakes to maintain the quality of the water at a level suitable for all recognized uses (Ref. 4).

To achieve adequate environmental protection, scientists and engineers have developed several controlled unit processes, that imitate the physical and self purification processes in nature, which is know as conventional processes. The natural processes are not only accelerated manifold in these unit processes of the plant, but the variables can also be controlled.

The concept of using physical-chemical processes have been studied over the past 20 years for potential applications to municipal and industrial wastewater treatment. This physicochemical systems have high degree of stability. Unlike conventional biological systems, which are sensitive to change in environmental conditions (Ref. 4 and 14).

Electrolytic treatment system is one of a physicochemical system that had been developed before 1930, for both wasts treatment and drinking water purification. At that time, due to high cost and questionable efficiency of the process, it was eventually abandoned. This method is simply defined as the use of direct current to cause sacrificial electrode ions to move into an electrolyte and remove undesirable contaminats either by electrolytic oxidation-reduction of the solutes and by causing colloidal materials to collide and then be precipitated. In some wastewater, electrical conductivity is too low, some ionizable chemical were added to increase conductivity and electrochemical reaction. In aqueous solution, electrochemical reaction will usually produce bactericide, which provides effective bacterial removal. In electrolytic treatment process electrode material is so important. In the past, eroding anodes have been used in which the metal ion is released to serve as a coagulant. Due to the high operating cost of eroding anodes, the noble anodes appear to have more potential. At present, due to technological advancement and more economical power supply together with the growing problem of treating wastewater, some new interests in this electrolytic process have been revived.

Purposes & scope

The purposes of this study are to investigate the capability and feasibility of using electrolytic treatment to cope with certain kind of wastewaters. The process might be used to replace conventional methods specially for a small community, industry, and toxic wastes,

for its simplicity in operation, and not subjected to environmental changes if it can be shown to be economic.

The main emphasis in this study is based on the oxidation reduction of organic pollutants only, and does not concern with electrolytic flocculation, The experiments have been performed in batch laboratory units with soft-drink wastewater. The study is divided into three parts, for each part the relationship of electricity dosage, power consumption, conductivity, and other data of interest to sanitary engineers are investigated as follows:

1. Current effects.
2. Effect of initial pH.
3. Effect of NaCl addition.