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Experimental Studies on Continuous Electrocoagulation Treatment of Peat Water in Sarawak with Copper Electrodes

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Abstract: Electrocoagulation is an electrochemical wastewater treatment method, which coagulates impurities particles and ions by using electrical current. In Sarawak, freshwater peat covers around 1.698 million hectares whereas the other 154,000 hectares are mangrove. Peat water is the water or moisture produced from these peatland or peat soil. Clean water availability in the rural coastal regions are limited due to the high financial cost of distribution of essential clean water resources to sparse population in the remote areas. Therefore, a cost-effective standalone electrocoagulation system for the treatment of peat water in Sarawak is one of the suggested solutions to this water supply problem. The main aim of this research is to develop a continuous electrocoagulation water treatment system by using copper electrodes to treat peat water in Sarawak. The peat water treated is targeted to achieve at least standard quality for domestic usage and the parameters studied to measure the optimal design of the treatment system are the turbidity, total suspended solids (TSS), total organic carbon (TOC), pH and chemical oxygen demand (COD) of the water treated. The experimental results meet the standard for Raw Water Quality and Drinking Water Quality with an optimum parameter of 20 electrodes, 0.7 cm inter electrodes spacing, current density of 5.99A/m2 and treatment time of 100 minutes. The total operating cost for the optimize parameters is RM 0.11 per litre of peat water. Overall, the treatment of peat water by using continuous electrocoagulation with copper electrodes is feasible.

Keywords: Continuous electrocoagulation process, peat water, copper electrodes

1. Introduction

There are several regions in the rural coastal areas of Sarawak experience water scarcity problems. Despite Malaysia high quantity of water resources [1], water scarcity is still a big problem with no proper solutions. One of the initiatives is to utilize peat water especially for rural coaster areas of Sarawak where peat water is available abundantly.

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