

UNIVERSITI TEKNOLOGI MARA

**COAGULANT FROM BANANA STEM JUICE
FOR TREATMENT OF OBSTINATE SPENT
COOLANT**

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ABSTRACT

Coagulation is one of very common processes in the water and wastewater treatment. An organic polymer Polyaluminium Chloride (PAC) and inorganic salt Aluminium Sulphate (Alum) are the most widely used coagulants in water treatment. In order to reduce the harmful of chemical coagulants, the naturally source products that are easily available and abundantly left without significant usage has been investigated and discovered. Banana stem waste is the abundantly available agricultural wastes in tropical and subtropical countries. Pulping of banana fiber is a new discovery and now banana stem has been enter to a new era as a cheaply and easily available for wastewater treatment. The natural polymer that available in the juice of the banana stem juice has been acted as the polymer that binds together the floc for easy sedimentation through coagulation and flocculation process. Jar Test method was used to conduct the coagulation process for spent coolant from camera lens manufacturing industries. Coolant can be recycled several times but it will lose the ability to reduce heat, remove excessive material, lubricating and shaping the lens. Currently, the treatment of spent coolant is using coolant distillation method. Cost of the machines and the energy consumption for this treatment are high and expensive. It is discovered that the juice has successfully removed 80.1% of COD, 84.1% for suspended solid removal and turbidity 98.5% of spent coolant through coagulation process. Inulin, the long chain and part of carbohydrate are found in the juice that might be acting as polymer to bind the suspended solid and resulted in biodegradable sludge. The biodegradable sludge that been produced can be reduced by using the Biomass Extract that contains microorganisms. The microorganism has reduced 7.5% total weight of the sludge by digesting the biodegradable sludge into water-soluble molecules and biogas.

Keywords : Natural coagulant, coagulation, banana stem juice

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CHAPTER 1

INTRODUCTION

1.1 Overview on Wastewater

Water is the most important thing in our life and it is a limited resource in the earth's closed ecosystem. With each passing year, the quality of the planet's water measurably deteriorates because of heavy development and lack of awareness of the water usage. The best that we can help the ecosystems, is to reduce the level of harmful and toxic discharges and perhaps reclaim and reuse some of the by-products, raw materials and the water itself that appears in the wastewater streams.

Wastewater must be treated in order to make it clean and fresh for the continued needs of lives, animals, plants and industries. Wastewater is continually being produced everyday especially in the industries site such as food industries, petrochemical, electronics, pharmaceutical, textile and many others. Production processes used in the industries give rise to wastewater containing inorganic and organic substances, suspended solids and some potentially toxic solvents.

Wastewater is continually being produced and the pollutants never completely disappear. Categories of industrial wastewater pollutants include heavy metals, organic industrial chemicals, agricultural chemicals, oils/greases and miscellaneous hazardous pollutants, such as medical wastes. The untreated wastewater that never comply the environmental regulations can harm human health, animals and can cause the environmental damage especially to the water resources and ecosystems.

In Malaysia, the rules for protection of the environment have been developed long time ago following the increasing of the industries sectors and the development of the country to achieve the Vision 2020 target. These rules and regulations are to