

UNIVERSITI TEKNOLOGI MARA
FILTRATION OF PALM OIL MILLING EFFLUENT

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Abstract

The palm oil mill effluent is a waste produced by the palm oil milling activities. It consists of high amount of Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), turbidity, suspended particles, color, and heavy metal content. Currently, the POME cannot be released to the public as it will affect nature strongly. On the other hand, kenaf is a plant which is known for its mechanical properties, specifically in rope, pulp and paper. Its adsorption properties has people taken notice, and it is being further studied in various fields.

One of which is the adsorption properties towards POME. The POME is divided into two, which has different pH (the source of the POME was taken is the same, where one part of the POME is inserted with an acid, in order to change its pH), to also test whether the alteration in pH has an effect on the ability of kenaf filter. The filtration process (which involves the kenaf filter; that has already being shaped into a proper form of filter) takes place for about 25 minutes before the samples are sent to be tested for suspended solids, color, BOD, turbidity, particle size and heavy metal.

In the end of the research, it is found that the POME with the pH of 6 increases the adsorption ability of kenaf filter in all test but the heavy metal test.

Background Study

Kenaf is a plant that is probably native in southern Asia, though its exact natural origin is relatively unknown. The plant is known to be used as an allied fiber in jute worldwide. The name of the plant also applies to the fiber obtained from this plant. In United States, the research to use the kenaf bast (outer bark) fibers for rope began in the 1940's when jute imports from Asia were briefly interrupted by World War II. In the 1950's, the Agricultural Research Service (ARS) of the U.S. Department of Agriculture screened more than 500 plant species as potential fiber sources for pulp and paper manufacturing. As a result, kenaf was selected as the most promising non-wood fiber plant for this use.

Kenaf are also cost effective if it is used in filtration system, as kenaf does not need to be pre-treated before shaped and used directly in the filter as soon as it has been shaped. Filtration is by definition, any of various mechanical, physical or biological operations that separate solids from solids by applying a medium through where only fluid are to pass. The fluids that have flowed through the system are called filtrate. In physical filters oversize solids in the fluid are detained and in biological filters are trapped and removed. Filtration occurs in both naturally and engineered system, in form of biologic, geologic and industrial. For instance, renal filtration in humans (and animals) removes wastes from blood.

Comparatively, in water treatment and sewage treatment, unwanted components are separated by adsorption into a biological film grown on or in a filter medium. There are different methods in attain the separation of substances. The substance that is move through the filter must a liquid or gas. The wastewater that is included in this research is POME which is palm oil milling effluent. The wastewater is discharged from sterilization process, crude oil clarification and cracked mixture separation process. POME is dangerous if untreated, as anaerobic process will release methane gas and has 21 times Global Warming Potential (GWP) when compared to any other gasses. Biogas is promising, but the utilization in Malaysia is still in a very early stage, if it can be utilized as fuel for power generation and cogeneration. Clean water can be recovered from POME, if filtered by using kenaf.