

## ABSTRACT

Each year the number of motorized vehicles always increases significantly, this is followed by the use of oil in motorized vehicles. There are currently few studies on oil processing, so the used oil that is wasted every year is very large, this wasted oil can be harmful to living things and the environment. Therefore, efforts are needed to reduce used oil waste, when one way is to use it as an alternative fuel. Used oil can be processed into fuel using a refining process with the aim of separating base oil and additives and residues [6] both physically and chemically. Based on previous research, used oil is processed using clay, zeolite, acids and alkalis. This research will use a purification method using a process of deposition, filtering, and chemical and physical treatment. The deposition process is carried out in a container filled with clay, on filtering using zeolite as the filtration medium, then the oil is treated with hydrochloric acid (HCl) then sodium hydroxide (NaOH) with variations of 2%, 3%, and 5% of the volume of used oil. The treated oil is heated in a distillation device until the oil's boiling temperature is above 250°C. The distilled refined oil is then precipitated and filtered again. The specifications of the refined oil include the specific gravity value, the kinematic viscosity value, and the calorific value. Then the refined oil specifications are compared with the specifications according to the law. At the specific gravity value, the best value is obtained from a variation of 3% HCl and NaOH of 0,852, at the kinematic viscosity the best value is obtained from a variation of 2% HCl and NaOH with a value of 1,935 mm<sup>2</sup> / s, the best value is obtained from a variation of 5% HCl and NaOH. with a value of 46,356 MJ / kg.

**Keywords:** Base Oil, Hydrochloric Acid, Sodium Hydroxide, Specific Gravity, Kinematic Viscosity, Calorific Value