

**A STUDY TO RECYCLE POLYTHENE BY PYROLYSIS AND
TO DETERMINE THE POSSIBLE USABLE PRODUCTS**

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ABSTRACT

Waste plastic disposal and excessive use of fossil is a big concern to the environment in the world over. Without an effective way to handle it, the littered and flowering plastic bags along the roads, the clogged drainage and sewer systems, direct ocean dumping remains an environmental time bomb. This does not only portray a bad image but also poses a major source of health related problems such as waterborne diseases and increased upper respiratory diseases from burning garbage to malaria episodes. The main purpose of this study was to develop a lab scale batch reactor for plastic pyrolysis and to establish the possible usable products. The study was conducted in the Mt. Kenya pharmaceutical chemistry laboratory using an experimental design. The post consumer chips were pyrolysed by the reactor and yellowish brown distillate formed, cooled and collected. According to the study, polythene (PE) melts at a temperature range of 450^oc - 500^oc. It was observed that non-condensable gaseous substances formed below the temperature of 400^oc whereas the residue formed above the temperature of 500^oc. The results showed that these products vary in quantity depending on the conditions applied. The yield percent of the condensable crude liquid collected was about 68%. This clearly indicates that the reactor developed was efficient for plastic pyrolysis. If this process is implemented it would lead to a major transformation of plastic waste handling and produce usable hydrocarbon products hence reducing environmental pollution due to plastic dumping. The researcher concluded that there was need to upgrade the pyrolysis apparatus so as to improve the condensable liquid yield and account for its exact composition. From these findings more effort is needed to redesigning of the pyrolysis apparatus into a continuous system before its implementation.