

ABSTRACT

The accumulation of plastic waste from drinking water bottles and bottled drinking water (AMDK) made from Polyethylene Terephthalate (PET) is a serious problem. This type of waste is the biggest contributor to waste accumulation. To overcome this problem, the Ministry of Environment and Forestry applies the 3R concept (Reuse, Reduce and Recycle). To support the 3R concept proposed by the government, this research recycles PET plastic bottle waste as a 3D printing filament.

This research is designing a machine to recycle waste PET plastic bottles into 3D printing filaments with a focus on using "Aqua" brand plastic bottles with a size of 1.5L. This machine uses the Arduino Uno microcontroller as a speed control system, while the ESP8266 microcontroller is used as a temperature control system and a link between the application and the Arduino Uno microcontroller.

Testing is done by trying various variations of temperature and speed. The temperature experiment was tested from 180°C to 210°C, while the speed experiment was tested from 1 Round Per Minute (RPM) to 4 RPM. The best filaments from variations in temperature and speed will be tested to print 3D Vase and 3D Benchy. The best filaments with temperature and speed variations for 3D Vase and 3D Benchy printing are a combination of 2RPM speed and 200°C, and 3RPM speed and 210°C temperature.

Keywords: plastic waste, drinking water bottles, Polyethylene Terephthalate (PET), recycling, 3D printing filament.