

## **EPF (ExpressPoly Fuel): Pemanfaatan Serat Plastik PET pada Limbah Pakaian Berbahan Polyester Menjadi Bahan Bakar Minyak**

Raysa Aliya Antoni & Zakeisha Dhiannazwa Qomari  
SMA Semesta Bilingual Boarding School

### **Abstrak**

*Fast fashion* adalah sebuah konsep yang diterapkan oleh *retailer* pakaian untuk membuat pakaian trendi dengan cepat dan murah. Dengan pertumbuhan industri tekstil dan konsumsi pakaian yang cepat, limbah tekstil menjadi tantangan lingkungan yang signifikan. Untuk mengatasi masalah ini, penelitian fokus pada identifikasi mengelola limbah *fast fashion* berbahan poliester, khususnya serat PET (Polyethylene Terephthalate) mengkonversi menjadi EPF (Express Poly Fuel) melalui metode pirolisis. Percobaan dilakukan dengan menggunakan 500 gr pakaian berbahan poliester dengan melakukan proses pirolisis sebanyak 3 pengulangan, dengan variasi suhu 450°C, 500°C, dan 550°C. Parameter yang diuji termasuk densitas, viskositas, titik nyala, titik tuang, dan nilai kalor bahan bakar minyak yang dihasilkan. Penelitian ini dilakukan di AL Production Yogyakarta dan Laboratorium Teknik Kimia Universitas Gadjah Mada. Berdasarkan hasil penelitian, rata-rata densitas minyak hasil pirolisis sampah PET sebesar 0,836  $g/cm^3$ , rata-rata viskositas minyak hasil pirolisis sampah PET sebesar 19,22 cP, rata-rata titik nyala minyak hasil pirolisis sampah PET sebesar 153°C, dan rata-rata titik tuang minyak hasil pirolisis sampah PET sebesar 11°C, dan rata-rata nilai kalor minyak hasil pirolisis sampah PET sebesar 8309.2482 kal/gr. Hasil analisis kuantitas dan kualitas menunjukkan bahwa minyak dari EPF berpotensi untuk mencakupi kualitas bahan bakar minyak tanah dan biodiesel dengan proses yang lebih lanjut.

*Keywords* : poliester, limbah tekstil, pirolisis, fast fashion, bahan bakar, densitas, viskositas, titik nyala, titik tuang, nilai kalor

## **EPF (ExpressPoly Fuel): Utilization of PET Plastic Fibers from Polyester Clothing Waste into Fuel Oil**

Raysa Aliya Antoni & Zakeisha Dhiannazwa Qomari  
Semesta Bilingual Boarding School

### **Abstract**

Fast fashion is a concept implemented by clothing retailers to create trendy clothes quickly and cheaply. With the growth of the textile industry and rapid clothing consumption, textile waste is becoming a significant environmental challenge. To overcome this problem, research focuses on identifying how to manage fast fashion waste made from polyester, especially PET (Polyethylene Terephthalate) fiber which converts it into EPF (ExpressPoly Fuel) through the pyrolysis method. The experiment was carried out using 500 grams of polyester clothing by carrying out 3 repetitions of the pyrolysis process, with varying temperatures of 450°C, 500°C and 550°C. The parameters tested include density, viscosity, flash point, pour point, and heating value of the fuel oil produced. This research was conducted at AL Production Yogyakarta and the Gadjah Mada University Chemical Engineering Laboratory. Based on the research results, the average density of oil resulting from pyrolysis of PET waste is 0.836  $g/cm^3$ , the average viscosity of oil resulting from pyrolysis of PET waste is 19.22 cP, the average flash point of oil resulting from pyrolysis of PET waste is 153°C, and The average pour point of oil resulting from pyrolysis of PET waste is 11°C, and the average calorific value of oil resulting from pyrolysis of PET waste is 8309.2482 cal/gr. The results of the quantity and quality analysis show that oil from EPF has the potential to cover the quality of kerosene and biodiesel fuels with further processes.

*Keywords*: polyester, textile waste, pyrolysis, fast fashion, fuel, density, viscosity, flash point, pour point, calorific value