

# Data Analysis on Biomass Pyrolysis

N. Seetayya<sup>1</sup>, S. Sai Sandeep<sup>2</sup>, P. Dharani<sup>3</sup>, R. Mahalakshmi<sup>4</sup>, N. Teja Abhiram<sup>5</sup>

Assistant Professor, Department of Computer Science and Engineering<sup>1</sup>

Students, Department of Computer Science and Engineering<sup>2,3,4,5</sup>

Raghu Institute of Technology, Visakhapatnam, AP, India

**Abstract:** Biomass is a promising sustainable and renewable energy source due to its high diversity of sources, and as it is profusely obtainable everywhere in the world. 50% of the global population uses biomass as a source to generate energy and heat. Recent advances in biomass availability and technology allow its use as a renewable energy source with low emissions and environmental impact. Biogas, bio-liquid, and bio-solid fuels replaces fossil fuels in power and transportation. The report examines pyrolysis products, their yields, and biomass product characteristics, as well as the current pyrolysis technique and potential concerns. This study found that the properties of pyrolysis products depend on the proximity and ultimate analysis parameters. We have predicted yield of bio-oil and H<sub>2</sub> content in yield from proximate and ultimate analysis parameters. We have used machine learning algorithms like Multiple Linear Regression, Multivariate Polynomial Regression and Random Forest regression to predict the yield and H<sub>2</sub> content in yield.

**Keywords:** Renewable energy; biofuel; environment; technology development.

## REFERENCES

- [1]. S. M. Metev and V. P. Veiko, Laser Assisted Microtechnology, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.
- [2]. Demirbaş, Ayhan. "Partly chemical analysis of liquid fraction of flash pyrolysis products from biomass in the presence of sodium carbonate."
- [3]. Energy Conversion and Management 43.14 (2002): 1801-1809
- [4]. McGrath, Thomas E., W. Geoffrey Chan, and Mohammad R. Hajaligol. "Low temperature mechanism for the formation of polycyclic aromatic hydrocarbons from the pyrolysis of cellulose." Journal of Analytical and Applied Pyrolysis 66.1-2 (2003): 51- 70
- [5]. Tilman, David, et al. "Beneficial biofuels—the food, energy, and environment trilemma." Science 325.5938 (2009): 270-271
- [6]. Diniz, Vivian, and Bohumil Volesky. "Biosorption of La, Eu and Yb using sargassum biomass." Water Research 39.1 (2005): 239- 247.
- [7]. Bridgwater, Anthony V. "Review of fast pyrolysis of biomass and product upgrading." Biomass and bioenergy 38 (2012): 68-94.
- [8]. Das, L. M., Rohit Gulati, and Pankaj Kumar Gupta. "A comparative evaluation of the performance characteristics of a spark ignition engine using hydrogen and compressed natural gas as alternative fuels." International journal of hydrogen energy 25.8 (2000): 783-793.
- [9]. Abnisa, Faisal, et al. "Characterization of bio-oil and bio-char from pyrolysis of palm oil wastes." BioEnergy Research 6.2 (2013): 830-840.
- [10]. Abnisa, Faisal, et al. "Utilization of oil palm tree residues to produce bio-oil and bio-char via pyrolysis." Energy conversion and management 76 (2013): 1073-1082.
- [11]. David, E., and J. Kopac. "Pyrolysis of rapeseed oil cake in a fixed bed reactor to produce biooil." Journal of Analytical and Applied Pyrolysis 134 (2018): 495-502.
- [12]. Chen, Dengyu, et al. "Bamboo pyrolysis using TG-FTIR and a lab-scale reactor: Analysis of pyrolysis behavior, product properties, and carbon and energy yields." Fuel 148 (2015): 79-86.

- [13]. Pütün, Ayşe Eren, et al. "Production of biocrudes from biomass in a fixed-bed tubular reactor: product yields and compositions." *Fuel* 80.10 (2001): 1371-1378.
- [14]. Bordoloi, Neonjyoti, et al. "Characterization of bio-oil and its sub-fractions from pyrolysis of *Scenedesmus dimorphus*." *Renewable Energy* 98 (2016): 245-253.
- [15]. Demiral, İlknur, and Emine Aslı Ayan. "Pyrolysis of grape bagasse: effect of pyrolysis conditions on the product yields and characterization of the liquid product." *Bioresource technology* 102.4 (2011): 3946-3951.