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- Alya Naili Rozhan, Rochim Bakti Cahyono, Takahiro Nomura, Mohd Hanafi Ani, Hamzah Mohd. Salleh, Tomohiro Akiyama, Hadi Purwanto. "Enhancement of oil palm empty fruit bunch char by impregnation of pyrolytic carbon from tar vapor decomposition", Journal of Renewable and Sustainable Energy, 2016, Crossref, 1%
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Design of Pyrolysis Reactor For Production Of Bio-Oil and Bio-Char Simultaneously

Andi Aladin[1,a)], Ratna Surya Alwi[2,b)] and Takdir Syarif[1]

[1]*Department of Chemical Engineering, Muslim University of Indonesia, Indonesia*
[2]*Department of Chemical Engineering, Fajar University, Indonesia*

[a)] addin1966@yahoo.co.id
[b)]Corresponding author: ratnasya@gmail.com

Abstract. The residues from the wood industry are the main contributors to biomass waste in Indonesia. The conventional pyrolysis process, which needs a large energy as well as to produce various toxic chemical to the environment. Therefore, a pyrolysis unit on the laboratory scale was designed that can be a good alternative to achieve zero-waste and low energy cost. In this paper attempts to discuss design and system of pyrolysis reactor to produce bio-oil and bio-char simultaneously.

INTRODUCTION

The residues of agriculture are the main contributors to biomass waste in Indonesia. Recently, renewable energy have been gaining increasing interest since the consumption of fossil energy resources leads to concerns the global climate change, pollution, reduction of availability and security of the energy supply. Biomass is all organic matter produced by plants or any conversion process involving life. The classification of biomass include forest residues, agricultural residues, industrial waste, and energy crops. Biomass is also known as biofuels or bioenergy, is obtained from or- ganic matter either directly from plants or indirectly from industrial, commercial, domestic or agricultural products. Biomass is one of the renewable energy that is expected to play important role in the future, and other renewable energy incorporate solar power, hydropower, wind turbines. To develop biomass as a renewable energy, the biomass thermochemical conversion ways should be known well. A number of ways of thermo-chemical processes convert biomass into higher-value depending on its source and the technology used, these processes include: combustion, py- rolysis, gasification, liquefaction, anaerobic digestion or fermentation [1]. In the present study, we used pyrolysis as the sustainable solution that economically profitable in large scales and minimise environmental concerns especially in terms of waste minimization and energy or heat supply. Many researchers have been reported some biomass waste were converted to bio-oil [2, 3, 1, 4]. The pyrolysis process is the thermochemical that is commonly used to convert biomass into bio-char and bio oil at temperature ranges of 300-600°C [5, 6].

In common, a lower warming amount is more suitable for the manufacture of more char, while a higher warming amount is valuable to the manufacture of more bio-oil [7, 8, 9]. Conventional pyrolysis may also be known as slowly pyrolysis. Antal et al. improved the bio-char generate from biomass considerably by increasing the gaseous pressure within the reactor pyrolysis [10, 11, 12]. Conventional slow pyrolysis has been used for centuries and has been mainly used for the production of charcoal. For slow wood pyrolysis, biomass is heated up to 500 °C, and the vapor residence time varies of 5 min to 30 min[13, 14, 15]. Thus, a reduced optimum heat range should be selected for generating bio-char at a higher generate [3, 16]. For fast pyrolysis is a high-temperature process in which biomass is quickly warmed without fresh air to produce more bio-oil [17, 15, 14].

The classification of pyrolysis reactor for production bio-oil and bio-char that can be used include fixed bed reactor, free fall reactor, fluidized bed reactor, Induction heating reactor, and fixed bed catalytic reactor [18]. Among of these reactors, fixed bed reactor is easier to set up, inexpensive, and need less maintenance. In addition, material of reactor used, diameter of reactor, heigh of reactor, feed material and particle size used, and insulation material should be considered to design pyrolysis reactor. Bridgewater et al. released an outstanding evaluation that categorized the reactors within some categories [19]: (1) fluidized-bed reactors [7] ;(2) transported and circulating fluidized-bed

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reactors; (3) ablative (vortex and rotating blade) reactors; (4) rotating cone reactors and vacuum reactors. The aim of this study is to design and discuss system of pyrolysis reactor to produce bio-oil and bio-char simultaneously.

Bio oils are dark, viscous liquid that is made up of highly oxygenated organic compound. Many synonyms of bio oil include liquid smoke, wood distillates, pyrolysis oils, pyroligneous acid, pyrolysis liquids, bio-crude oil (BCO), wood liquids, wood oil, and liquid wood [1, 4]. Throughout this study, we will be used bio-oil. It can be used as a electricity generation or is purified to more efficient fuels and chemicals industry. Bio-char is another product of the biomass waste pyrolysis, and can be obtained by modifying the pyrolysis system. Bio-char is suitable for use as sorbent, a precursor of activated carbon, soil amendment, reductant in the metallurgical industry, and renewable fuel [2, 20, 21].

DESIGN AND CONSTRUCTION OF PYROLYSIS REACTOR

System Components

The Conceptual illustration of the pyrolysis system is shown in figure 1. Figure 2 illustrates the crucial components of pyrolysis system have been recognised.

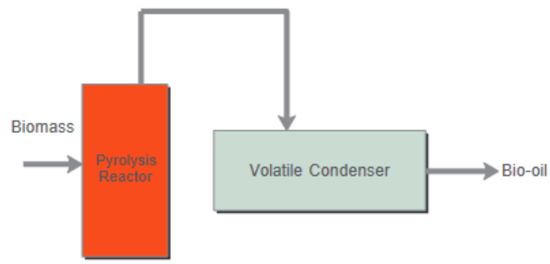


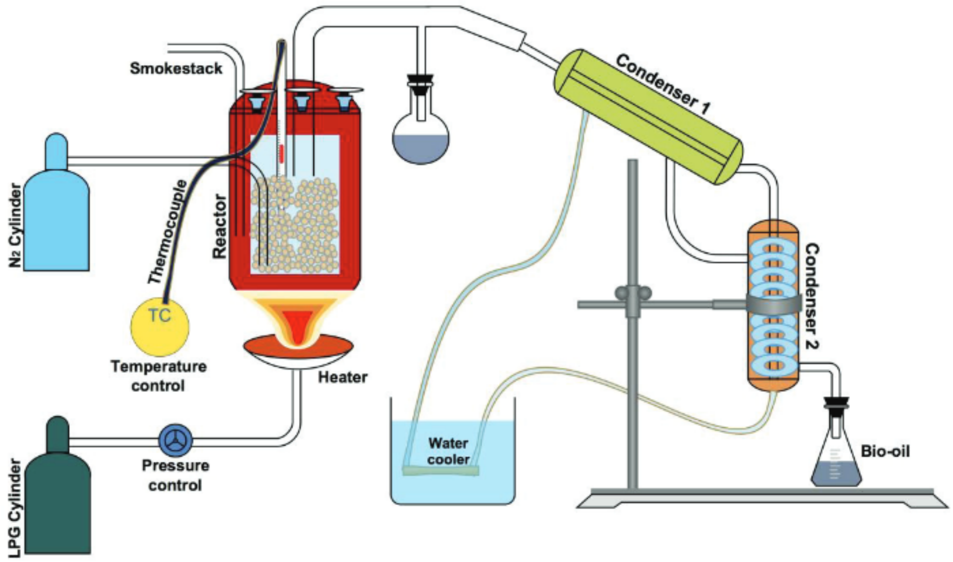
FIGURE 1. The Conceptual illustration of the pyrolysis system

A pyrolysis reactor was designed for production bio-oil and bio-char from biomass waste or agricultural wastes. The shape of the reactor is a cylindrical, batch type, and fixed bed reactor. on the top side of reactor can be open for feeding the raw material, at the end of the experimental run, bio-char can be removed easily. The temperature inside of the reactor is measured by using thermocouple. During experimental run, the top side is kept closed by a cover plate tightly secured to prevent atmospheric air into the reactor to achieve best pyrolysis conditions. The reactor weighs approximately 20-30 kg, and to prevent the heat loss to the surrounding, the reactor is provided with jacket insulation on the outside.

A pressurized gas stove that use liquefied petroleum gas as fuel is provided on the bottom of the reactor for thermal degradation of biomass waste. The thermal degradation is regulated by setting the pressurized gas stove.Two volatile condensors is provided for condensation of volatile gases which is then known as bio-oil or pyrolytic oil. Hot gases passed through the inside tube of condensor and condensed with the help circulation of cold water surrounding the tube.

EXPERIMENTS

The investigation will be performanced by keeping the pyrolysis reactor under various for slow pyrolysis conditions. Pyrolysis process will be conducted by changing the parameters such as temperature, heating rate, feedstock particle size, amount of feed material etc. Different temperature conditions and heating rate are required for different feed and types of pyrolysis. For slow pyrolysis temperature requirement is 250 to 500 °C and heating rate is about 10 - 20 °C/min. For fast pyrolysis temperature requirement is maximum and heating rate required is 100 °C/sec andabove.



15 FIGURE 2. The schematic diagram of the pyrolysis system

CONCLUSIONS

The pyrolysis reactor is easy to design and not need large maintenance. The reactor system does not require any com- plicated components. 4 Parameters such as temperature, heating rate, feedstock particle size, amount of feed material will be studied to find out the maximum condition yield will be obtained.

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REFERENCES

1. D. Mohan, C. U. Pittman, and P. H. Steele, Energy Fuels 20, 848–889 (2006).
2. B. B. Uzun, E. Apaydin-Varol, F. Ateş, N. Özbay, and A. E. Pütün, Fuel 89, 176 – 184 (2010). [3] A. Demirbas, J. Anal. Appl. Pyrolysis 72, 243–248 (2004).
3. S. Czernik and A. V. Bridgwater, Energy Fuels 18, 590–598 (2004). [5] A. Bridgwater, Chem. Eng. J 91, 87 – 102 (2003).
4. M. Balat and G. Ayar, Energ. Source 27, 931–940 (2005).
5. D. S. Scott, J. Piskorz, and D. Radlein, Ind. Eng. Chem. Prod. RD 24, 581–588 (1985).
6. L. Ma, T. Wang, Q. Liu, X. Zhang, W. Ma, and Q. Zhang, Biotechnol. Adv. 30, 859–873 (2012). [9] M. Dall'Ora, P. A. Jensen, and A. D. Jensen, Energy Fuels 22, 2955–2962 (2008).
7. M. J. Antal, W. S. L. Mok, G. Varhegyi, and T. Szekely, Energy Fuels 4, 221–225 (1990).
8. M. J. Antal, E. Croiset, X. Dai, C. DeAlmeida, W. S.-L. Mok, N. Norberg, J.-R. Richard, and M. Al Ma- jthoub, Energy Fuels 10, 652–658 (1996).
9. M. J. Antal, S. G. Allen, X. Dai, B. Shimizu, M. S. Tam, and M. Grønli, Ind. Eng. Chem. Res. 39, 4024–4031 (2000).