

UNIVERSITI TEKNOLOGI MARA

**STUDY OF ARTIFICIAL NEURAL
NETWORK (ANN) FOR PYROLYSIS
OF SAWDUST**

MUHAMMAD ZAYEEM ARIF BIN SALEHAN

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ABSTRACT

The effects of emissions caused by the excessive usage of fossil fuel on global warming has become a global concern as the negative impacts continuously increase. One of the most recognized alternatives to the fossil derived energy was biofuel, which has been perceived as more environmentally friendly and used as product against climate change. Artificial neural network, ANN is a highly intelligent system that has been widely used to predict and analyze certain processes. With the aid of ANN, it is possible to model the pyrolysis of sawdust before being industrially applied and implemented. The predicted data from ANN fitting model in Matlab was determined with validation, R^2 achieved at 0.9811 and the MSE error was indicated at small difference of 4.9747 in validation result under 36 epochs at 25 hidden neurons. The modeling of ANN has shown great performance and potential for the application on real process modeling and control in biofuel production process.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

With the limiting ability of our human minds to compute and analyze, artificial neural network (ANN) have become the alternative to assist us in analyzing a multitude of problems. ANN are relatively new computational tools that have been extensively utilized to solve real-world problems. The attractiveness of ANN comes from their generalization capabilities to learn and adapt, alongside their remarkable information processing (Basheer, 2000). With the aid of the highly intelligent system, it is possible to analyze multiple processes that could highly benefit and change the future of the chemical engineering field, such as analyzing and modelling the pyrolysis of sawdust before being industrially applied and implemented.

The effects of emissions on global warming has become a global concern as the increment of negative impacts. The focus on waste minimisation to lower the dependence on fossil fuel derived energy has been researched (Phebe A. O. & Samuel A., 2016). One of the most recognised alternative to the fossil derived energy was biofuel, which has been perceived as a more environmental friendly substitute and used as a product against climate change (Khanna M., et al, 2011). The utilization of biomass has great potential in alleviating the burden of environmental degradation and reducing the dependence on fossil fuels (Abnissa F. & Wan D., 2014). From a financial point of view, the shift towards the usage of biofuels can be justified if it offers cost and performance benefits of equal or extra value to their fossil-derived counterparts (Sichone K., 2013).