RANCANG BANGUN SISTEM KONTROL KADAR AIR GABAH PADA ALAT PENGERING GABAH BERBASIS MIKROKONTROLER ATMEGA 8

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ABSTRAK

Penelitian ini bertujuan untuk membuat sistem kontrol kadar air gabah pada alat pengering gabah dengan *set point* 14%, untuk mengetahui cara kerja sistem kontrol kadar air gabah dan untuk menganalisis difusi massa air pada model gabah silinder.

Sistem kontrol kadar air gabah dibuat menggunakan mikrokontroler ATMega 8 yang keluarannya mempengaruhi kondisi kerja saklar transistor sehingga memicu relay untuk menyalakan atau mematikan pemanas. Sistem kontrol kadar air gabah dianalisis sesuai dengan aliran sinyal sistem. Kemudian masing-masing *input* dan *output* setiap blok dalam sistem didefinisikan sehingga diperoleh diagram blok keseluruhan sistem yang menggambarkan cara kerja sistem. Sedangkan difusi massa air pada model gabah silinder dianalisis menggunakan persamaan difusi massa dalam sistem koordinat silinder. Kemudian, solusi persamaan difusi massa diplot ke dalam grafik menggunakan *software* Matlab R2009a.

Hasil penelitian menunjukkan bahwa sistem kontrol kadar air gabah yang dibuat dapat bekerja dengan baik sesuai *set point* yang diinginkan. Sistem kontrol bekerja untuk menyalakan pemanas hingga kadar air gabah mencapai 14%. Apabila kadar air telah mencapai 14%, maka pemanas akan dimatikan. Pola distribusi *moisture ratio* yang mewakili difusi massa air pada gabah mengalami penurunan disertai fluktuasi dari pusat koordinat. Semakin bertambahnya waktu, fluktuasi makin berkurang dan membentuk pola *steady-state*.

Kata kunci: sistem kontrol, kadar air, gabah, difusi massa air.

DESIGN OF PADDY MOISTURE CONTENT CONTROL SYSTEM ON THE PADDY DRYER MACHINE BASED ON ATMEGA 8 MICROCONTROLER

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ABSTRACT

This research aimed to design a paddy moisture content control system on the paddy dryer machine with a set point of 14%, to determine the working principle of the paddy moisture content control system, and to analyze the mass of water diffusion on paddy cylindrical model.

Paddy moisture content control system was designed by using an ATMega 8 microcontroller so that the output could affect the working conditions of transistor that triggered the relay to turn on or turn off the heater. Paddy moisture content control system was analyzed according to the flow of signal system. Then, each input and output of each block in the system was defined to obtain the block diagram of the whole system that described the working principle of the system. Whereas the mass of water diffusion on paddy cylindrical model was analyzed by using equation of mass diffusion on cylindrical coordinate system. Then, the solution of mass diffusion equation was plotted into a graph by using the Matlab R2009a *software.*

The results showed that paddy moisture content control system worked well according to set point. The control system worked to turn the heater on until the paddy moisture content reached 14%. If the paddy moisture content reached 14%, the heater would be turned off. The distribution pattern of moisture ratio represented the mass of water diffusion on paddy. The moisture ratio decreased from the center position coordinate with fluctuation. When time increased, the fluctuation diminished and formed a pattern of steady-state.

Keywords*: control system, moisture content, paddy, the mass of water diffusion .*