

ABSTRACT

MOISTURE CONTROL SYSTEM AND TEMPERATURE MONITORING OF BLACK PEPPER DRYER BASED ON MULTI SENSOR NETWORK

By

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In the post-harvest plantation agribusiness industry, water content is important in determining the quality of black pepper seeds. This development research presents a water content control sistem and monitors the temperature of a multi-sensor-based black pepper dryer. The PT100RTD sensor is a temperature sensor, the THD-DD2-C sensor is a temperature and humidity sensor and the CP1H-XA40DR-A PLC as a central processing unit is related to the SCADA sistem as a user interface. The design aims to sense the temperature and humidity of the water content of black pepper. Furthermore, the humidity and temperature levels are conditioned so that the water content of black pepper is 11% to 12%. The design was successfully installed to monitor the water content of black pepper. By implementing this sistem, the average difference in water content of 10.59% during the pretest and 11.57% during the posttest has an efficiency of the difference in weight loss of black pepper during the process reduced by 0.98%. The control sistem built has a fairly high level of accuracy with an error of 2.76%. SCADA operations as a user interface that is built allows users to monitor in real time.

Keywords: Temperature, Humidity, PT100RTD, THD-DD2-C, CP1H-XA40DR-A.

ABSTRAK

SISTEM KENDALI KADAR AIR DAN MEMONITOR SUHU PENGERING LADA HITAM BERBASIS JARINGAN MULTI SENSOR

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Industri Agribisnis hasil perkebunan pasca panen, kadar air penting dalam menentukan kualitas biji lada hitam. Penelitian pengembangan ini menyajikan tentang sistem kendali kadar air dan memonitor suhu pengering lada hitam berbasis multi sensor. Sensor PT100RTD pengindra suhu, sensor THD-DD2-C pengindra suhu dan kelembaban dan PLC CP1H-XA40DR-A sebagai *central processing unit* terkait dengan sistem SCADA sebagai *user interface*. Perancangan bertujuan mengindra suhu dan kelembapan kadar air lada hitam. Selanjutnya tingkat kelembaban dan suhu dikondisikan kadar air lada hitam berada 11 % sd. 12%. Perancangan berhasil diinstal untuk memantau kadar air lada hitam. Dengan menerapkan sistem ini, perbedaan rata-rata kadar air 10.59% saat *pretest* dan 11,57% saat *posttest* mempunyai efisiensi selisih kehilangan berat lada hitam selama proses berkurang 0,98%. Sistem kendali yang dibangun memiliki tingkat keakuratan cukup tinggi dengan error 2,76 %. Operasi SCADA sebagai *user interface* yang dibangun memungkinkan pengguna untuk memonitoring secara *real time*.

Kata Kunci: Suhu, Kelembapan, PT100RTD, THD-DD2-C, CP1H-XA40DR-A.