3937677 ENAT/M : MAJOR: APPROPRIATE TECHNOLOGY FOR RESOURCE DEVELOPMENT ;
M.Sc. (APPROPRIATE TECHNOLOGY FOR RESOURCE DEVELOPMENT)
KEY WORDS : HEAT PUMP DRYER / JAVA WEED / HEAT PUMP

NARES SAWANGCHAN : HEAT TRANSFER SYSTEM DESIGN FOR AGRICULTURE PRODUCT LOW TEMPERATURE DRYING BY USING HEAT PUMP : CASE STUDY JAVA WEED DRYING. THESIS ADVISOR : SOMPONG THONGCHAI, M.Sc., PRASERT PHOLRAT. M.Sc., WALLOP CHANTRAKUL, M.S. Tech. Ed., 199 p. ISBN 974-664-349-5

The purpose of this research was to study, design and construct a low heat dryer and to find an effective drying system that used Java weed in an experiment to test its physical qualities such as color, shape, moisture content and tensile stress. The low heat pump dryer was 1.2 meters wide, 2 meters long, 1.1 meters high with a volume of 2.64 cubic meters. The 18 square trays containing Java weed were 0.9 meter long, 0.9 meter wide and 0.02 meter high. The compressor was 1.6 kW that used R-134a refrigerant. The internal condenser was 3.3 kW. The external condenser was 1.2 kW and the evaporator was 3.6 kW. The drying temperature was 40° , 50° , and 60 °C with a velocity of 0.3 , 0.6 and 0.9 m/s.

The result showed that the physical qualities of Java weed after drying had not been changed. The initial moisture content of drying was 970 % dry basis. The final moisture content of drying was 14 % dry basis. The tensile stress was 1.09-2.15 N/mm^2. The process showed that the optimum drying was achieved as follows : The temperature was 50 °C , velocity was 0.9 m/s, the final moisture content was 14 % dry basis, the tensile stress was 2.13 N/mm^2 and it takes 18 hours for drying.

The low heat pump dryer can dry the Java weed at the highest temperature of 60 °C and can be applied for drying other agricultural products depending on the factors of temperature , velocity , time available for vegetables , fruits , seeds and handicrafts. It can be used as a model to develop a low heat pump dryer to be used for family use agricultural industrial and other such uses.