ABSTRACT

YAYU ROMDHONAH. Simulation of Temperature and Humidity Distribution for Development of Greenhouse Design in the Humid Tropics. Supervised by HERRY SUHARDIYANTO, ERIZAL and SATYANTO KRIDO SAPTOMO.

Greenhouse design for the humid tropical regions is still a challenge. Microclimate analysis of a standard peak type greenhouse has been conducted using Computational Fluid Dynamics (CFD). The objectives of this research were to simulate temperature, humidity, and airflow distribution by using CFD, and to investigate the greenhouse natural ventilation performance on zero and low windspeed conditions. Climate data and greenhouse characteristics were used as inputs for the simulation. The CFD model predicted temperature, relative humidity, and airflow distributions inside the greenhouse. Visual representations of the three parameters distributions in the greenhouse were created by isothermal line. The simulation produced realistic approximations of the dynamic behavior of greenhouse environments. Results of this study showed the importance of roof vents and sidewalls openings for efficient thermally driven ventilation.

Keywords: Computational Fluid Dynamics (CFD), humid tropical greenhouse, temperature, humidity, ventilation, simulation