

Temperature based control of ventilation system for optimum climate in tomato greenhouse

ABSTRACT

Tomato has been grown successfully in highlands of Malaysia. However, the production does not meet the demand in the large market due to problem related to climate change and lack of smart control mechanism for the tomato crop to grow healthily in the micro climate. Tomato requires optimum temperature to ensure a good quality fruit production especially under greenhouse system environment. This paper presents an optimum control mechanism for ventilation system in a greenhouse to minimize the energy consumption and meet the temperature requirement for lowland tomato. The control mechanism is tested on a tomato greenhouse system located in Universiti Putra Malaysia (UPM), Serdang. The ventilation system in the greenhouse comprises of six exhaust fans and two axial fans. Results show that the proposed control mechanism on the ventilation system is able to maintain the desired temperature for lowland tomato at lower energy consumption. With the automatic control of the ventilation system, an average of 65.8% of energy consumption was saved from the greenhouse as compared to baseline energy without the control system.

Keyword: Greenhouse system; Energy savings; Control algorithm