

APPLICATION OF EVAPORATIVE COOLING SYSTEM IN PRODUCTION SCALE OF OYSTER MUSHROOM CULTURE

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ABSTRACT

Oyster mushrooms can only grow at temperatures below 30°C with an optimal value of 16-22°C and an optimal humidity of 80-95%. One method that can be done to achieve these conditions is to use an evaporative cooling system and a water misting system.

The results of the system design made using Autodesk Fusion 360 software are then applied to the system construction. Testing of the system is carried out by measuring the temperature and humidity and calculating the efficiency of the system. The test data are then compared with the results of previous studies to determine the effect of the water misting system on the evaporative cooling system. Testing the system in this study when measured in a span of 24 hours without involving the misting system resulted in a decrease in overall average air temperature of 0.16°C and an increase in average relative humidity of 1.01% with a cooling efficiency of 11.45 %. In an evaporative cooling system that involves a misting system, the overall average air temperature decrease is 0.23°C and an average relative humidity increase of 2.54% with a cooling efficiency of 18.06%, in other words, an additional efficiency of 18.06% is obtained. 6.6%. Further research found that the activation of the evaporative cooling system was detrimental if it was activated at a certain time. If the cooling is analyzed in the optimal time span to be activated on the system without involving the fogging system, the cooling efficiency is 14.46%. In the evaporative cooling system which involves the misting system, the cooling efficiency is 28.53%.

These results indicate that the addition of water misting in the evaporative cooling system can reduce temperature, increase humidity, and increase cooling efficiency more optimally. Especially if the cooling system is activated only at the effective time to be activated.

Keywords : oyster mushroom, evaporative cooling, misting.

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