ABSTRACT

Sweet potato (Ipomoea Batatas L.) is a root crop that is included in the type of food crops that some Indonesian people, especially in Papua Province, make as a staple food substitute for rice or sago, and are used as animal feed. Sweet potatoes have many benefits for the health of the human body such as very high nutritional content. Although sweet potato plants are easy to manage and can grow in various types of soil, the production of sweet potato plants itself is still not optimal. Thus, an alternative development of sweet potato cultivation techniques using a hydroponic system is needed. Sweet potato plants and hydroponic systems have plant growth requirements in the form of ambient temperatures ranging from $21°C - 27°C$, air humidity ranging from $50\% - 80\%$, and water temperatures in the root area ranging from $18°C - 25°C$. This research was carried out in the area of Jayapura City which has a hot and humid climate, so it is very necessary to use a temperature monitoring and control system in the root area and environment to maintain temperature conditions in accordance with these conditions. Design of temperature monitoring and control systems in root areas and the environment in hydroponic cultivation systems for sweet potato plants using the fuzzy logic of the mamdani method. Where, in the application of fuzzy logic, four fuzzy rules were obtained for the environmental temperature and humidity control system with the results of environmental temperature and humidity tests that were still relatively high, reaching around $25.4°C - 36.8°C$ and $51.0\% - 99.9\%$. In addition, three fuzzy rules were obtained for the root area water temperature control system with the results of testing the blood temperature of roots which is still relatively high reaching around $15.1°C - 29.9°C$. The use of temperature monitoring and control systems can affect the growth rate of sweet potato plants with an average growth rate of 0.356 branches / day, the number of leaves of 2.27 strands / day, leaf length of 0.184 cm / day, leaf width of 0.163 cm / day and plant stem length of 4.144 cm / day.

Keywords:, *Hydroponics, Fuzzy Logic, Water Temperature, Temperature, Sweet Potato.*