

ABSTRACT

*The growth of the industry that more advanced, replaces the agricultural land, and more in urban areas. There is one method that suits the condition is Hydroponic, which one of the planting methods using water as a media. The needs of water and nutrition are the importing things for the hydroponic system. Using the measurement tools, Total Dissolved Solid (TDS) that measure the number of solid that dissolved in water. The measurement of hydroponic nutrition is an absolute thing dan very important. One that is often cultivated on a hydroponic system is lettuce (*Lactuca Sativa*) that using a hydroponic technique Nutrient Film Technique (NFT) and PID control that minimizes steady-state error and faster response to reach a steady-state. This research aims for knowing the control system on a hydroponic NFT on planting lettuce using Proportional Integral Derivative Ziegler Nichols. The input of PID value for a system using control is $K_p= 2.89$, $K_i= 0.06$ and $K_d= 0$ with setpoint is 840 PPM and obtain error value as 0,436%.*

In this research, there are two hydroponic systems, that are a system using PI control and without control. The result of monitoring in every day on lettuce without PI control is increasing the average of leaf width is 0.0915 cm, leaf length is 0.2025 cm, the number of leaves is 0.198 cm, and leaf color is 0.0362 cm, with the day of harvest during 40 days, produce an average of root length is 8,64 cm, average number of the leaves is 11,27 and average weight is 31,18 g. While the result of everyday monitoring using PI control on lettuce plant is, average of leaf width is 0.0961 cm, leaf length is 0.1957 cm, number of the leaves is 0.182 cm and leaf color is 0.0015, with the result of harvest during 37 days produce average root length is 6.83 cm, number of leaf is 11 and wet weight total is 22.71 g.

Keywords: Hydroponics, PID Control, Lettuce Plants.