

## ABSTRACT

Hydroponics is one of the cultivation of plants with water as media (hydro) that has been dissolved nutrients inside it as one of agriculture solution in limited area. On hydroponics, controlling water conditions and the environment manually often spend a lot of time, energy, and miscalculation because of human error especially on fulfillment of nutritional needs and water quality. Those mistakes can make the plant is not in the good quality. Therefore, it is necessary to adjust for nutrition and water quality based on pH value.

This Final Project has been designed pakcoy nutrient levels regulations in the range of 1050-1400 ppm (parts per million) and the control of pH in the range 6.5 to 7 by the on-off method because the object does not require quick control response. This system uses two sensors that serve to read pH and nutrition (ppm) values that will processed next in the microcontroller. The values obtained from sensor will be a set point for peristaltic pumps to maintaining pH and nutrient levels (ppm) in hydroponic water tanks.

Based on the test results, accuracy of pH sensor is 98% and the TDS sensor is 96.53%. Then based on the transient system response characteristics, on the pH control system was obtained arise time of 10.98 seconds and a settling time of 19.56 seconds to reach a set point of 6.5. Meanwhile on the transient system response in controlling nutrient solution, the rise time is obtained in 527.2816 seconds and the settling time is obtained in 938.89 seconds to reach the set point of 1050 ppm.

**Keywords:** *Control, Nutrition, On-Off, Pakcoy, pH, ppm.*