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SCHEDULING OF NUTRITION SUPPLY IN DRIP IRRIGATION SYSTEM IN GREENHOUSE BASED ON PLC

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ABSTRACT

Irrigation and fertilization are critical factors influencing plant growth in greenhouse environments. Manual management of watering and nutrient delivery in greenhouses often results in timing and volume inaccuracies, which can negatively impact plant development. This study designed a nutrient scheduling system based on a Siemens S7-1200 PLC, integrated with WinCC HMI PC and a Real-Time Clock (RTC) feature, to automate the fertigation process with high precision. The system is equipped with a TDS sensor to measure nutrient concentration and a flow meter to monitor water volume. The research applied a Research and Development (R&D) approach, covering system design, implementation, and testing. Test results showed that the system was able to activate irrigation and fertigation precisely on schedule, with zero-second deviation from the set time. Chili plants treated using the automated system showed an increase in height from 8 cm to 9 cm within three days, with fresh green leaves and upright posture, while manually treated plants showed no growth. The system proved to enhance time efficiency, nutrient delivery accuracy, and overall plant growth performance in an automated greenhouse setting.

Keywords*: Drip Irrigation, Fertigation, Automation, PLC, RTC*