

**AUTOMATED GRANULAR FERTILIZER DISPENSING MACHINE FOR DRIP
FERTIGATION SYSTEM**

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ABSTRACT

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The increasing demand for efficient water and nutrient management in agriculture has prompted the adoption of innovative technologies such as drip fertigation. The study was conducted to design and evaluate an automated drip fertigation system equipped with a precision granular fertilizer dispensing machine. Due to their availability and cost-effectiveness, the machine was designed to utilize granular fertilizers in the fertigation system. It focused on automating the mixing and dispensing of fertilizers through an automated control system allowing the users to input specific parameters, such as fertilizer amount and fertilization date, enabling precise and timely nutrient applications. The machine's performance was evaluated by comparing the actual output of the dispensed fertilizer from the machine to the desired output specified by the user, the fertigation distribution uniformity, and the assessment of the fertilizer concentration delivered by the system. The automated system consists of a user interface, where users can input parameters such as fertilizer amount and a control system that automates the fertigation process. The system performance evaluation indicates that the system can effectively deliver the required amount of fertilizer with minimal marginal error of 2.59%. The machine has a 97.4% dispensing efficiency. However, a more uniform fertigation distribution and a higher nutrient concentration in the middle to farthest sections of the

plots were observed. In contrast, the upstream sections had the lowest distribution uniformity and nutrient concentration.

Keywords: Fertigation, fertilizer application; automation; drip irrigation; distribution uniformity

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