

## Fuzzy Climate Control System for Hydroponic Green Forage Production

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**Abstract :** In recent decades, population growth has exerted great pressure on natural resources. Two of the most scarce and difficult to obtain resources, arable land, and water, are closely interrelated, to the satisfaction of the demand for food production. In Mexico, the agricultural sector uses more than 70% of water consumption. Therefore, maximize the efficiency of current production systems is inescapable. It is essential to utilize techniques and tools that will enable us to the significant savings of water, labor and fertilizer. In this study, we present a production module of hydroponic green forage (HGF), which is a viable alternative in the production of livestock feed in the semi-arid and arid zones. The equipment in addition to having a forage production module, has a climate and irrigation control system that operated with photovoltaics. The climate control, irrigation and power management is based on fuzzy control techniques. The fuzzy control provides an accurate method in the design of controllers for nonlinear dynamic physical phenomena such as temperature and humidity, besides other as lighting level, aeration and irrigation control using heuristic information. In this working, firstly refers to the production of the hydroponic green forage, suitable weather conditions and fertigation subsequently presents the design of the production module and the design of the controller. A simulation of the behavior of the production module and the end results of actual operation of the equipment are presented, demonstrating its easy design, flexibility, robustness and low cost that represents this equipment in the primary sector.

**Keywords :** fuzzy, climate control system, hydroponic green forage, forage production module

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