

DEVELOPMENT OF SUSTAINABLE HYDROPONIC TECHNIQUES OF CAPSICUM UNDER CHANGING CLIMATE IN BANGLADESH

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Abstract

Hydroponic culture provides an instant and long-term solution to the problem of inability to produce vegetables and it allows for uninterrupted year-round vegetable production. But the disadvantages of hydroponics are high costs of capital and energy inputs, and high degree of management skills required for successful production in Bangladesh. Therefore, it is necessary to develop a low-cost and simple hydroponic system of crops like sweet pepper that can be increasingly popular in Bangladesh. Three experiments were conducted from July 2018 to March 2021 to develop a low-cost and simple hydroponic cultivation system of sweet pepper funded by Social Science Research Council (SSRC), Planning Division, Ministry of Planning, and Government of Bangladesh.

Firstly, different concentrations of nutrient solution were tested for sweet pepper in semi-greenhouse. A suitable concentration of Rahman and Inden (2012) solution was identified for sweet pepper. Sweet pepper was performed better in respect of quality and higher yield when applied $3/4^{\text{th}}$ strength of Rahman and Inden (2012) solution. This study indicated that sweet pepper can be grown successfully by applying Rahman and Inden (2012) as mentioned above strength in soilless system in the tropical areas like Bangladesh.

Secondly, cow dung slurry as an alternative liquid fertilizer source was used with Rahman and Inden (2012) nutrient solution in soilless culture of sweet pepper. It is a less expensive alternative liquid fertilizer source as an addition in the standard solution. It can reduce crop production cost. But without testing its effect on growth, quality, and yield, it may not be suitable for use an alternative fertilizer in a sustainable production system. In this study, cow dung slurry 400 ml + $3/4$ strength standard nutrient solution was suitable for sweet pepper hydroponic culture with higher yield of high-quality produces. Therefore, it suggests that cow dung slurry, an alternative liquid fertilizer source, can be used in soilless culture.

Finally, a low-cost and simple (LCS) hydroponics structure was developed for growing sweet pepper in Bangladesh. It was easy to make and low-cost that can be used in commercial production of sweet pepper in Bangladesh.

Keywords: soilless culture, low-cost hydroponics, nutrient solution and capsicum