

STUDY ON NUTRIENT CONTENT OF CABBAGE AND LETTUCE USING HYDROPONIC TECHNIQUE

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ABSTRACT

This study is aimed to determine the effect of aqua cultural sludge (ACS) and cow urine as an organic nutrient solution (ONS) on the growth and yield to evaluate the impact of water usage on the development and nutrient uptake of *Brassica pekinensis* L.(Chinese cabbage) and *Lactuca sativa* L. (Lettuce) cultivated in a hydroponic system. The treatment used contains a combination of ACS, nutrient solution (AB mix) and cow urine. The highest plant growth, yield and the highest foliage fresh weight was observed in treatment with cow urine, with values of 1kg (Chinese cabbage), 300 g (lettuce). It was concluded that a mixture of ACS and cow urine has the potential to reduce the inorganic fertilizers use as a nutrient solution in a hydroponic system.

KEYWORDS: Aqua cultural, cow urine, hydroponic, nutrient solution.

1. INTRODUCTION

Hydroponics referred to the growing plants in nutrient solutions using an inert medium such as vermiculite, rock wool, peat moss, sawdust, coir dust, coconut fiber, etc. with or without the use of mechanical support. Hydroponics word is the combination of two types of Greek word i.e. 'Hydro' means water and 'ponos' means labor. Hydroponics can be used to cultivate a wide range of commercial and specialized crops, such as leafy vegetables, cole crops, cucumbers, onion, strawberries, etc. According to Butler and Oebker, (2006) hydroponic/soil-less growing is regarded as a promising method that goes in accordance to both the environmental preservation and the nutritional content of the product/s. Cow urine also contains macro nutrients viz., (K, Ca, Mg) and micro nutrients viz., (Fe, Zn) required for plant development (Muhammad *et al.* 2022). The present study also dealt with the concept of hydroponics to study the nutrient content of Chinese cabbage and lettuce.

2. MATERIAL AND METHODOLOGY

The study was carried out in the horticultural laboratory of the Faculty of Agriculture and Life Sciences at Desh Bhagat University, Mandi Gobindgarh, District Fatehgarh Sahib, Punjab, in the months of April to May, 2024. A total of thirty (30) seeds of Chinese cabbage and lettuce used for experimental purpose which were grown at a temperature of 18-20°C,

relative humidity 95% and temperature of 10°C, relative humidity 90% respectively. Seedlings of cabbage and lettuce were prepared in nursery. A Styrofoam sheet having thickness one inch thick and had holes for net pots was put on top of the tray (Miller and Nemali 2019). After cleaning the roots thoroughly with water, germinated seedlings were placed inside the net pots, which were placed at a distance of 8" row to row x 6" plant to plant apart in each tray. The combination of two nutrients use for this purpose i.e solution A Calcium and iron chelate whereas solution B contains Magnesium sulfate, potassium, copper sulfide, zinc sulfide and manganese sulfide respectively. Further, aqua cultural sludge (ACS) and cow urine added into water to create the hydroponic solution. Regular observation of the plants were taken to ensure that all the plants are free from any kind of pest and other plant diseases.

3. RESULT AND DISCUSSION

The present study inferred that a mixture of cow urine and aqua cultural sludge (ACS) has the potential to minimize the use of nutrient solutions from inorganic fertilizers, namely AB mix to grow lettuce plants through a hydroponic system. These results revealed that the Chinese cabbage and lettuce yield can be increased by 6%-10% when treated with cow urine. Muhammad *et al.* (2022) also observed that 50% volume of inorganic variant can be reduced through the application of cow urine and extract in a 25% proportion of the total volume. According to Sharma *et al.* (2019) concluded that extract of cow urine and Acacia stem bark powder showed maximum zone of inhibition while the organic and aqueous extracts does not show such high antibacterial activity.

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