

**MANAGEMENT OF NITROGEN NUTRITION AND ELECTRICAL
CONDUCTIVITY IN HYDROPONICS FOR LEAFY LETTUCE (*Lactuca sativa*)
CULTIVATION IN THE DRY ZONE**

BY

UTTARA CHANDANI SAMARAKOON

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ABSTRACT

In Sri Lanka various nutrient solutions are used in hydroponics without identifying the appropriate requirements of nutrients for specific crops and the availability or uptake patterns of individual nutrients. This study attempts to determine the optimum nitrogen and electrical conductivity/nutrient concentration to improve the quality and productivity of lettuce in hydroponics under dry zone conditions. Stationary culture system consisting 4 plants/ trough was adapted to supply nutrients and water under indoor culture in the dry zone. After an initial study to compare the performance of lettuce under field conditions and using hydroponics a second study was practised using Albert's solution as the main fertilizer supplier and five different levels of Nitrogen namely 0.75, 1.0, 1.125, 1.25 and 1.375g/l of $\text{Ca}(\text{NO}_3)_2$ (145.8, 194.4, 218.7, 243.0 and 267.3 mgN /l) to provide N requirement in the Maha season

Increasing nitrogen content above the standard dosage of Albert's solution (1.0 g/l) appeared to be not desirable as it does not increase the yield parameters such as fresh weight, dry weight or the nutrient contents as indicated by total nitrogen and phosphorous content of leaves. Further increasing nitrogen levels increases tissue nitrate levels. There is a risk of nitrate toxicity with respect to the safety levels of nitrate in food when levels are increased above the standard.

Third experiment was conducted to assess 0.5 g/l, 1g/l and 2g/l concentrations of Albert's solution [EC of 1.35, 2.00 and 3.00 mS/cm] as two week replacements. Although uptake rate of nutrients increase with increasing nutrient solution concentration, it did not contributed to yield increase. According to results the standard 2g/l concentration is not appropriate for lettuce under dry zone because uptake and yield could vary with climatic conditions. Thus T1 [0.5g/l] or EC of 1.38 mS/cm) treatment with replacement at 2 week intervals gave much better yields under high temperature prevailed. Estimation of individual nutrient requirements in different growth stages is needed for the replacement of the nutrient solutions during the growth period.

Production of leafy lettuce under dry zone conditions is successful under hydroponics using Stationary (Trough) culture system. But temperature inside polytunnal is much higher under dry zone conditions, therefore germination of lettuce must be done out side (under room temperature). Hydroponics lettuce production has a high potential in the dry zone for making a marketable production, compared to open field (soil grown) crops, although yields vary with seasonal climatic conditions.