

**Growth Substrates for  
Lettuce in Nutrient Film  
Technique Hydroponics**

**University of New England**



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hydroponics**

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## ABSTRACT

This study aimed to find the best growth substrate for lettuce in hydroponic systems by testing the influence of different growth substrates on the germination and growth of plants. Seven kinds growth substrates (vermiculite, gravel, peat, biochar, wood shavings, perlite and rockwool) by applying Nutrient Film Technique (NFT) with Huett's standard nutrient solution for lettuce in three experiments. The seeds were germinated for two weeks in the substrates in stationary nutrient solution. After germination, the seedlings in net pots were transferred to a re-circulating NFT system and grown for three weeks until harvest. Number and length of leaves and chlorophyll content were recorded during growth, and dry weight of roots and shoots at harvest. Substrate and variety significantly affected germination in all experiments. Biochar and vermiculite had the highest germination average, while peat had the lowest. Growth substrate significantly affected plant growth through its impact on number and length of leaves, chlorophyll content, and shoot and root dry weight. Vermiculite was the most favourable substrate for plant growth and in contrast, perlite was the least favourable in all experiments. When two varieties were compared, there were no interactions between variety and growth substrates in growth parameters. Rockwool showed a problem of marginal yellowing of lettuce plant leaves. ICP data showed that Al, B, Ca, Mg and Mn concentrations in leaves were significantly higher with rockwool than with vermiculite, suggesting Al toxicity as the cause of the yellowing. The sharp edges of gravel caused breakage of some plants. In conclusion, the good results of germination and growth, the reasonable cost and a possibility for some reuse of the vermiculite medium made it the best and the most suitable medium for hydroponic lettuce cultivation compared with other media that were used in these trials.