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**The effect of coir particle size on yield of greenhouse
tomatoes (*Lycopersicon esculentum* Mill.)**

A thesis presented in partial fulfilment of the requirements for
the degree of Master of Science (Horticultural Science) at
Massey University, Turitea, New Zealand.

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ABSTRACT

Coir is a relatively new growing media, and little information is known of the relationship between particle size and particle size distribution on crop productivity. Particle size significantly affects the physical properties of coir, particularly the air-water relationships. The objectives are (1) to investigate the relationship water holding capacity has on total yield, fruit number and mean fruit weight of tomato (2) determine whether growth analysis could be used to test treatments prior to full scale growth trials in terms of predicting yields based on small sample sets of limited duration. Two yield trials, summer and winter trials, was designed to compare the yield of a tomato (*Lycopersicum esculentum*) crop grown in coir using a range of particle sizes, while a plant growth analysis was used to compare RGR, LAR, and NAR. Two coir sources were used throughout the trials. One source consisted of seven treatments based on combinations of small (S), medium (M) and large (L) size grade particles. The second source consisted of two ungraded coir products, P1 and P3. Two irrigation (low and high) frequencies were used. The seven treatments were based on particle size with differences in WHC (water holding capacity). A bioassay was used to compare tomato yield and RGR. The physical properties, governed by particle size, have an effect on tomato yield. The average yield for the winter yield trial was 2.14 and 2.38 kg per plant for SG and HK data while the average yield for the summer yield trial was 7.92 and 7.69 kg per plant. An increasing linear relationship exists between WHC and fruit yield per plant, as treatments increase in WHC so do their fruit yield per plant. A relationship was also found between the bioassay and tomato yield trial. Similar to the tomato yield trial, as WHC increased so did the RGR. The relationship between WHC and RGR may have commercial implications for both soilless media manufacturers and growers who require specific physical properties in terms of water and air availability for particular crop types.

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