

Salinity effects on growth, physiology, and yield in lowland tomato grown in soilless culture

ABSTRACT

Salinity is one of the environmental stresses which give detrimental effects to crop growth, physiological changes and lowering yield production. Crops grown under soilless culture system also have no exception on salinity problem. In fact, salinity occurs very quickly in small root volumes like in soilless culture due to the accumulation of salts. Thus, this study was carried out to study the influence of salt stress on physiological changes and quality attributes of lowland tomato grown hydroponically in Malaysia. Two cultivars of lowland tomato (Pearl and MT1) were treated with sodium chloride (NaCl) at 70 and 140 mM. A significant interaction between cultivar Pearl and MT1 with salinity level were shown on stomatal conductance, relative water content and electrolyte leakage. Photosynthetic rate of MT1 was higher by 18% than those in Pearl. However, no significant interaction was observed on total chlorophyll content. Overall, NaCl level at both 70 and 140 mM had significantly reduced the physiological parameters in both Pearl and MT1. Likewise, no significant interaction between cultivar and salinity was shown on yield, but Pearl with a higher yield production was observed to be more salinity-tolerant than MT1. In addition, total soluble solids were positively affected by salinity level, as the content significantly increased with increasing salinity. A blossom end rot was recorded the highest at salinity level of 140 mM with 30% of incidence. In conclusion, different cultivars of tomato showed different responses and degrees of tolerance towards salinity.

Keyword: Salinity, lowland tomato; Hydroponic; Photosynthetic rate; Yield; Blossom-end rot