

Study of soft rot in carrots and possible control measures

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Soft rot in carrot (*Daucus carota*) caused by *Erwinia carotovora* is one of the most serious postharvest diseases in Sri Lanka, which can cause severe loss especially during storage and transit. In this study, effect of temperature, pH and two Generally Recognized As Safe chemicals, namely sodium bicarbonate and ammonium bicarbonate in different concentrations were evaluated on the total plate count of the *Erwinia carotovora in-vitro*. Best temperature and pH required for the growth of the bacteria were identified based on the results of preliminary studies. The most effective GRAS chemical was selected based on the reduction of total plate count and the effectiveness of the selected compound was investigated on inoculated and naturally infected carrots at 30 °C. Untreated, un-inoculated tubers were considered as controls. Consumer acceptability and changes of the weight loss, total soluble solids, firmness, titratable acidity and colour of the treated carrots were evaluated using standard methods during the storage up to 10 days at 28 °C±2 and 65-70% RH. The highest bacterial growth was observed between 20-30 °C temperature range and 6-11pH range. Ammonium bicarbonate was more effective to inhibit the bacterial growth than sodium bicarbonate; hence it was used in the *in vivo* experiments. Ammonium bicarbonate in 2% (wt/v) was more effective in reducing soft rot caused by *E. carotovora*. Disease incidence of the inoculated tubers treated with 2% ammonium bicarbonate was 50% whereas it was only 25% in treated tubers without inoculation, after nine days of storage at 28 °C±2 and 65-70% RH. Disease incidence of the control tubers was 65% at the nine days of storage. Sensory attributes and the physicochemical properties of the treated tubers did not change significantly ($p < 0.05$) during storage indicating the marketability of the treated tubers.