Tomato yellow leaf curl virus (TYLCV) alters the phytochemical constituents in tomato fruits.

Abstract

An investigation was conducted in order to evaluate the responses of field grown tomato varieties (Marglove and Roma VF) to tomato yellow leaf curl virus (TYLCV). Fruit samples from the virus-infected and uninfected plants were collected at 20 (early stage), 40 (intermediate stage) and 60 days (ripening stage) after anthesis. Results showed higher virus RNA content in fruits of infected plants at early (42.48 to 38.24%) and intermediate stages (34.35 to 19.57%). There was a substantial decrease in DNA content (27.27 and 21.05%) at early and (23.08 and 43.75%) at intermediate stages of both Marglove and Roma VF, compared to the control, respectively. Similarly, indole acetic acid content was also decreased (27.08 and 24.29%) in fruits of virus-infected Marglove and Roma VF, respectively. The free ascorbic acid content was found lower (35.29 to 51.52%), while combined ascorbic acid was higher (13.91 to 33.33%) in both varieties. Neither the responses of individual organic acids nor their concentrations in fruits of infected and control plants were identical. Fumaric acid was not detected either in fruits of infected plants of Marglove or in healthy and infected Roma VF. Individual fruit weight and fruit numbers per plant were lower in the virus-infected plants. This study indicates that the yield of infected tomato plants could be reduced by the infection of TYLCV due to the changes in the concentrations of phytochemical constituents. This suggests that monitoring and management of TYLCV incidence is crucial for yield and quality optimization of field grown tomato.

Keyword: Anthesis; Ascorbic acid; Auxin; Nucleic acids; Organic acids phytochemicals; Virus infection; Tomato yield.