



Tropentag, September 16-18, 2015, Berlin, Germany

“Management of land use systems for enhanced food security:  
conflicts, controversies and resolutions”

## Impact of Organic versus Inorganic Approaches on Sustainable Intensification and Advance Food Security in Tomato (cv. Solan lalima) under Mid-Hill Conditions of Himachal Pradesh

NITIKA THAKUR<sup>1</sup>, AMAR SINGH KASHYAP<sup>2</sup>, ASTHA TRIPATHI<sup>1</sup>

<sup>1</sup>Shoolini University Solan, Dept. of Microbiology, India

<sup>2</sup>ICCOA, Bengaluru, Organic Agriculture, India

### Abstract

The present studies conducted during the years (2011–13) give an overview of the impact of organic and inorganic agriculture systems on soil health, productivity and food nutritional values. The organic treatments [T<sub>1</sub>-T<sub>6</sub> (organic treatments) - T<sub>7</sub> (control)] integrated the use of organic manures (FYM (200 q ha<sup>-1</sup>) and VC (50 q ha<sup>-1</sup>), biofertilisers (*Azotobacter*, *Azospirillum* and PSB 4 kg ha<sup>-1</sup> each), Biocontrol agents (*Trichoderma viridae* (4 kg ha<sup>-1</sup>), *Trichoderma herzianum* and *Pseudomonas flourescens* 10 g l<sup>-1</sup> water each), barrier and cover crops, pheromone and yellow sticky traps, green manuring and crop rotation etc, whereas the conventional treatment (control) implemented the use of chemical fertilisers (FYM 250 q ha<sup>-1</sup> + chemical fertilisers (CAN 650 kg ha<sup>-1</sup>, urea) 650 kg ha<sup>-1</sup> + pesticides (40–50 no. of sprays). The results confirmed the presence of higher soil NPK status (413.1 kg ha<sup>-1</sup>, 26.33 kg ha<sup>-1</sup> and 285.4 kg ha<sup>-1</sup>) and OC (0.99%). The GCMS results showed lesser pesticide residues (8.3%) in tomatoes produced under organic treatments as compared to conventional system (43.3%). The study recorded higher TSS (5.37 Brix), fruit firmness (10.11psi) and pericarp thickness (3.29 mm) with higher levels of Vit C (37.3 mg/100g), phenolics (42.1%) and antioxidant activity (12.6%) as compared to control (conventional system). The lycopene and beta-carotene extracted by SPE (Solid Phase Extraction) column and further purified by HPLC reported higher fractions in organically grown tomatoes (28.8% lycopene and 13.41% beta carotene respectively) than the conventional ones (14% lycopene and 4.8% beta carotene respectively). It was interesting to note that organically grown tomatoes have longer crop durations as compared to conventionally grown tomatoes. The overall productivity (665 kg ha<sup>-1</sup>) was also recorded higher than the conventionally grown ones (649.5 kg ha<sup>-1</sup>). It can be concluded from the present studies that by adopting appropriate organic production technologies productivity levels comparable to those under conventional practices can be achieved in tomato with better quality produce, improved soil health and nutrient status.

**Keywords:** Cultivation systems, food nutrition, GCMS, HPLC, quality produce, soil health, tomato