Research uncovers how Salmonella infects plants before harvest

Scientists in India have discovered how Salmonella enters plants to cause pre-harvest contamination of produce. Most Salmonella outbreaks are linked to contamination from post-harvest handling and transportation, but the bacterium can enter the plant earlier from contaminated soil. Salmonella can reach the soil from manure containing animal faeces or contaminated irrigation water.

The study from the Indian Institute of Science (IISc) and the University of Agricultural Sciences (UAS), Bengaluru looked at tomato plants and was published in the journal BMC Plant Biology.

Researchers found Salmonella enters through a gap created when a lateral root branches out from the plant's main root and that it can penetrate the deeper layer of the root. This is different to other disease-causing bacteria that enter the root, fruit or leaf by producing enzymes to break down the plant's cell wall. Salmonella is incapable of using cellulose or pectin so invasion by degrading the cell wall of the plant is not possible.

They studied how different types of bacteria including Salmonella colonize the roots of tomato plants. Researchers plan to look at Salmonella infiltration in other vegetables and strategies to detect and prevent soil contamination in future work.

The team found that when salt concentration in the soil increases, plants produce more lateral roots and there is an increase in the risk of Salmonella colonization on roots and transmission to the fruits.

This means outbreaks due to consumption of raw fruits and vegetables could be attributed to soil stress factors in addition to climatic, agronomic and plant factors, according to the study.

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