Soil innate microbiome shows the potential to protect crops against human pathogens

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Foodborne diseases are increasingly associated with fresh fruits and vegetables. Serovars of *Salmonella* were the second most frequent cause in 2015. The biological diversity of soil plays a major role in the establishment of *Salmonella* in the plant production environment.

Antagonists and plant beneficial microbes negatively affect the establishment of *Salmonella* in the rhizosphere. Here we analyzed the tripartite interactions between the human pathogen *Salmonella enterica*, the soil microbiome and the crop plants tomato, lettuce and corn salad grown under greenhouse conditions.

We observed that *Salmonella* persisted in the rhizosphere of lettuce and tomato. In contrast, its numbers declined in the rhizosphere of corn salad. Very important was the observation that reduction of microbial diversity in soil increased the ability of *Salmonella* to persist in this environment. These results clearly show a dependency between the microbial diversity and the potential of *Salmonella* to colonize the rhizosphere as well as the high physiological plasticity of *Salmonella*. In the following, we focused on the impact of resistance induced in crop plants on the establishment in plant production environment and colonization of plants. In greenhouse experiments, crop plants were primed for induced resistance with the bacterium *Ensifer meliloti*. This bacterium produces *N*-acyl-homoserine-lactones, which are known to induce resistance.

Our results show that priming has a negative effect on the persistence of *Salmonella*. Primed plants express the defense-related genes earlier than unprimed plants and are able to close their stomata for longer period. These results indicate the potential of priming for enhanced resistance against *Salmonella*.