Survival of *Salmonella* in agricultural soil – attack from the underground

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In the last years, salmonellosis outbreaks were increasingly associated with contaminated fruits and vegetables. This indicates that plants are suitable vectors for *Salmonella enterica*. Contamination of produce can occur along the whole production chain also, for instance, during plant growth. The survival of *Salmonella* in soil is an essential precondition for the colonization of plants. However, so far the knowledge about factors influencing its persistence in soil and in plant environment is scarce, and the question whether *Salmonella* uses plants as opportunistic bacterium or if it behaves as a plant pathogen is still controversially discussed.

We analyzed the influence of soil fertilization and soil sterilization on the survival of *Salmonella*. We observed an adaption of *Salmonella* inoculated into soil with reduced diversity that leads to enhanced persistence and survival in the plant environment. While fertilization with pig manure had a positive effect on the survival of *Salmonella* in soil, chicken manure had no distinct influence on the survival. Usually, sterilization of soil by autoclaving does not lead to a sterile soil but to a drastic reduction of the abundance and diversity of soil bacteria. *Salmonella* was able to survive in this soil for a relatively long time (monitored up to 6 months) and seemed to adapt to this environment. This adaption led to a change in the persistence in the presence of plants. Despite an initial decline, our data indicated a long-term survival of *Salmonella* in agricultural soil. The presence of the indigenous soil microbial community reduced its survival, most likely due to competition for resources.

Together, our results indicate that *Salmonella* can persist in soil for extended times and that adaptation to the soil environment enhances the risk of contamination of produce in the agricultural environment. The fact that *Salmonella* uses plants as alternative hosts strongly suggests that plants represent a much larger reservoir for animal pathogens than estimated so far.