

Effect of Temperature and Time on Survival of *Ralstonia solanacearum* in soil (Poster)

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Introduction

Bacterial wilt, caused by *Ralstonia solanacearum*, is responsible for severe losses to many important crops, mainly Solanaceous plants and bananas, in tropical and subtropical regions. This microorganism is the causal agent of potato brown rot and bacterial wilt in many crops and it is responsible for losses of up to 75% of the potato crop in several countries.

Objective

To test the efficacy of either continuous, 2-h cycle or short exposures to a variety of high temperatures and a range of time periods in reducing the viability of *Ralstonia* in wet or dry soils

Methods

Ralstonia solanacearum was prepared for inoculum in soil. In the study of 2-h temperature cycle, it had been found that it took at least 2 h for soil to attain the high temperatures of the incubators. The experimental units consisting of *Ralstonia* in soil were, therefore, incubated for 5 h which included 3 h for the gradual rise in soil temperature from ambient to that of the incubator plus 2 h at the requisite experimental temperature. After exposure to high temperatures (in the range 30 to 60 °C) the units were transferred to 30 °C for 19 h where the decline in temperature to ambient temperature took at least 6 h. In the study of short temperature exposure, to determine the minimum time required to inactivate *Ralstonia*, the units consisting of *Ralstonia* in soil were exposed to temperatures in the range of 45 to 60 °C for 15, 30, 60, 120, 180 or 240 min.

Results

The viability of *Ralstonia solanacearum* was tested in both wet and dry soil under simulated elevated temperatures in either constant, cyclic or short temperature regimes. In wet soil viability was reduced to zero by a constant temperature of 45 °C for 2 day or a minimum temperature of 60 °C for 2 h. Viability of *Ralstonia* were destroyed by either a 4-day constant temperature of 40 °C or a 2-h temperature cycle for 2 days at 50 °C or 3 days at 45 °C. Below 40 °C, *Ralstonia* were not affected. In dry soil at 55 °C, a 2 h constant temperature or 45 °C for 2 days 2-h temperature cycle eliminated *Ralstonia* viability.

Conclusion

Data on time and temperature relationships on loss in viability of *Ralstonia* in soil could thus be used to predict efficacy of soil solarization.

Selected references

1. Denny TP. (2000). *Ralstonia solanacearum* - a plant pathogen in touch with its host. *Trends in Microbiology*, 8, 486-489.

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