# 7. Biological control of bacterial wilt in tomato using *Warburgia ugandensis* Extracts

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## Abstract

*Ralstonia solanacearum* is a soil-borne bacterial pathogen that poses significant threat to the Solanaceae family and other crops. Tomato plants are affected by *R. solanacearum* which causes bacterial wilt, that has no treatment. Bacterial wilt is a devastating disease that affects the plant's water transport system, leading to wilting and death. Numerous chemical agents and treatment methods have been employed in attempts to control *R. solanacearum*, but were ineffective. *Warburgia ugandensis* crude extract have exhibited biocontrol properties against pathogenic fungi and bacteria in animals but in plant the information is limited. The study aimed to determine the in vitro and vivo efficacy of *W. ugandensis* stem bark and leaf crude extracts against *R. solanacearum. W. ugandensis* stem bark and leaf crude extracts were obtained using organic solvents viz. methanol, ethanol, dichloromethane, and hexane. In vitro, antagonistic activities against *R. solanacearum* of all organic crude extracts of *W. ugandensis* were determined by standard agar well diffusion assay on Kelman's 2, 3, 5- triphenyl tetrazolium chloride medium in triplicates. Two-way analysis of variance (ANOVA) was used in the statistical analysis of the mean diameter inhibition zones. All the organic solvents crude extracts of *W. ugandensis* were inhibitive against *R. solanacearum*. However, the stem bark crude extracts exhibited significantly higher efficacy against *R. solanacearum* compared to the leaf crude extracts. The crude extracts were subjected to a serial dilution to determine the minimum inhibitory concentration (MIC). W. ugandensis stem bark dichloromethane crude extracts had the lowest MIC of 1 mg/ml. *W. ugandensis* stem bark dichloromethane crude extracts were most effective against R. solanacearum. The obtained crude extracts were tested against *R. solanacearum* in the greenhouse. The treatments were done in triplicate. Statistical analysis of the data was carried out using analysis of variance. Tomato plants established in soil inoculated with *R. solanacearum* but treated with *W. ugandensis* stem bark dichloromethane crude extract showed bacterial wilt disease incidence and severity of 0% which was like positive control. Tomato plants established in soil inoculated with *R. solanacearum* but treated with W. ugandensis leaf ethanol crude extract had the highest average height of 62.50 cm which was like positive control. The study proposed that W. ugandensis crude extract can be used as antibacterial biocontrol against R. solanacearum. Further research is important to determine the bioactive compounds against *R. solanacearum*. light conditions. Additionally, the study will demonstrate the potential of wild strawberries as a model plant for studying chloroplast movement and other important biological processes

**Keywords**: *Bacterial wilt, Ralstonia solanacearum, Tomato fruit, Warburgia ugandensis, Plant disease control*