

## ABSTRACT

In most parts of Kenya, tomato production is characterized by low quality and huge losses due to pest and diseases. Most common tomato diseases are caused by bacteria, bacterial wilt being the most prevalent. Bacterial wilt of tomato is caused by *Ralstonia solanacearum* and it accounts for up to 70 - 80% losses in tomatoes. Despite its importance, information on prevalence of bacterial wilt in different agro ecological zones in Meru south sub county is limited while the awareness of the disease existence is prerequisite to effective management. Chemicals are used to control the disease but their repeated use cause harmful effects on environment and pose health risks to the users. Therefore, there is a need for an alternative non-chemical methods of bacterial disease control. Studies have shown that *Trichoderma harzianum* can significantly reduce *R. solanacearum*. However, information on its inhibitory effects on *R. solanacearum* in under different ecological conditions is scanty. The aim of this study is to determine the prevalence of *R. solanacearum* in tomato farms in Meru South sub vi county, carry out morphological characterization of the pathogen and evaluate the efficacy of *T. harzianum* as biocontrol under *in vitro* conditions. Studies on prevalence of the bacterial wilt were carried out by conducting a survey across agro ecological zones (LM1, UM1, UM2, UM3 and LM1) in Meru south. Study farms were randomly selected. Data on the frequency of occurrence, severity and impacts of the disease were collected by observation and administration of questionnaires to the farmers. Severity of the disease was scored using a scale of 0 – 5. Tomato plants showing symptoms of bacterial wilt were sampled. Laboratory isolation and characterization of *R. solanacearum* of pathogen at Chuka University was arranged in Completely Randomized Design (CRD) based on site of sample origin, with five replicates. Selected biochemical tests were used for characterization of isolates of *R. solanacearum* pathogen. Analysis of variance was used to test whether there is variation in prevalence of bacteria wilt isolates obtained from different agro ecological zones. *T. harziunum* inhibitory effects against *R. solanacearum* was investigated using double culture on potato dextrose agar set in five replicates. Data obtained from efficacy of *T. harzianum* against *R. solanacearum* was subjected to analysis of variance using SAS version 9.4 software. Significant means were separated using Least Significance Difference at  $\alpha = 0.05$ . The prevalence of bacterial wilt by the tested pathogen was found to be higher in the farms where tomatoes were grown in the study area. However, there was notable variation of the level of infection of the pathogen within the surveyed farms in the agro-ecological zones. The disease prevalence ranged from a mean of 15.53% to 62.66%. All group of isolates of *R. solanacearum* were gram negative. *Trichoderma* had significant ( $p < 0.05$ ) effect on the growth of pathogenic bacteria causing wilting in tomatoes. The Results showed that there was a strong activity of control fungal depending on the concentration. This study broadens the understanding of *R. solancaerum* prevalence in Meru South sub-county. Finally, there is need to perform the ex vitro experiment on the field to test the efficacy *Trichoderma harzianum* for better yields and improved food security in the region.