Summary

This study represents the interaction between potato brown rot bacteria (*Ralstonia solanacearum*) and root exudates of host plants (potato) and non-host (sweet basil & Chinese chieve) and using of both biotic and a biotic inducer to control bacterial wilt in potato.

Typical colonies of all bacterial isolates released from different sources were detected and identified by classical and modernized tests. All isolates showed similarity in their typical morphological colonies on SMSA media and BOX-PCR detected no strain variation when compared visually. The highest percentage of infection and disease severity obtained with Spunta potato cultivar that was grown in infested soil; it was the most susceptible cultivar to the infection with *R. solanacearum* pathogen followed by Lady rosetta cultivar then Nicola. Also there are differences in the bacterial pathogenicity to these potato cultivars when planted in infested soil (previously sterilized) and infested field soil where the sensitivity of potato cultivars decreased in infested field soil than in the infested soil (previously sterilized), this would give an indication that the infested field soil has an effect on the *R. solanacearum* populations.

In contrast, Lady Rosetta exhibited moderate percentage of infection and disease severity, where Nicola cultivar achieved the lowest percentage of infection and disease severity. Therefore, potato cultivars may express secretion of some compounds considered as chemotatic signals between potato roots and the pathogen in soil . Such compounds include amino acids, sugars and other nutrients induced by microbes. Spunta thought to have the most of such nutrients secreted as root exudates around its root surface which attract the pathogen than in other potato cultivars.

Motility is an important attribute for *R. solanacearum* to colonized potato roots in soil.

Different concentration of salicylic acid demonstrating an important role as a signal in the mechanism of systemic acquired resistance the fluctuation of SA effect was balanced whether for the bacterial concentration at10^8 or at10^6Cfu/ml so such effect showed slightly difference between both concentrations. Different concentration of salicylic acid showed an effective role in the induction signals in the mechanism of systemic acquired resistance.

Different concentrations of β-ABA were effective in reducing *Ralstonia solanacearum* bacterial pathogenicity to tomato and potato plants as well as decreasing the population of bacteria invading their roots. The application of amino butyric acid (ABA) in soil induced accumulation of pathogenisis related protein in such plants. Also, other related compounds such as phenolic, salicylic acid, hydrogen peroxides, and the autofluorescing compounds showed accumulation in tomato and potato plants.

Soil amended with CaO and Urea influenced the presence of *R. solanacearum* population density in both tomato and potato plants soil rhizosphere.

Chinese chive and Sweet basil secrete an antimicrobial compounds as root exudates such as glycosides and A-terthienyl in Chinese chive root exudates as well as rosmarinic acid in the root exudates of hairy root cultures of Sweet basil which reduced the population of *R. solanacearum* in the soil and identified as allelochemical. Such compounds were inhibitory to the growth of the bacteria on the basal media and caused an inhibition zones around filter paper disks disks suspended with these root exudates.

Chemical composition of Spunta root exudates detected by GC mass detector screened that all of abiotic inducer (salicylic acid , β-ABA , CaO with urea) able to cause alteration in their chemical composition so the chemical signals between potato roots and *R.solanacearum* were cut. So the bacteria can not find its way to colonize potato roots. Screening for composition of both Chinese chive and sweet basil root exudates showed that they contain antimicrobial compounds in their root exudates which have ability to reduce the counting of bacteria in their rhizosphere of soil that cultivated with them.