# Introduction

Potato (*Solanum tuberosum*) is one of the most important vegetable crops in Egypt due to its high carbohydrate and starch contents. It is the fourth most important staple food after wheat, rice and maize. Egypt is the largest potato producer in Africa, producing annually about 1.5-2 million tons from 200.000 Fadden **(FAO,2002)**

Potato crop subjects to several diseases that seriously reduce the quality and quantity of its yield. Brown Rot (bacterial wilt) is the major disease that causes a tremendous loss of the yield of the potato.

Bacterial wilt caused by *Ralstonia solanacearum* was reported for the first time at the end of the 19th century. It was detected on potato, tobacco, tomato and groundnut in Asia, southern USA and South America **(OEPP/EPPO Bulletin, 2004)**.

The bacterium affect more than 50 plant families including *Solanaceae*, *Compositae* and *Leguminosae*. **(Hayward, 2000)**, the most susceptible crops being potato, tomato, eggplant, pepper, banana, and groundnut. Bacterial wilt is the most important disease of tomato **(Hayward, 2000)** and the second most important constrain to potato production in tropical and subtropical regions of the world**.** *R. solanacearum* has been divided into five races, based on host range, and five biovars based on biochemical tests **(Steven , 2003)**.

Spread of brown rot of potato caused by *R. solanacearum* race 3 (biovar 2) has been associated with dissemination in latently infected plant material **(Janse, 1996)**. International trade in seed potatoes assumes zero tolerance for brown rot infection and latent infected potato tubers has results in strong refuse of potato exports to Europe (**Farag *et al.*, 1999).**

The costs of disease surveillance and eradication in those countries affected by brown rot are significant **(Hayward ,2000).**

The interaction between *Ralstonia solanacearum* and host roots results in surface colonization of two specific recognition sites namely the elongation zone and axils of emerging secondary roots. The elongation zone is the major zone of plant root exudation and is commonly colonized by numerous microorganisms of the rizosphere **(Rovira, 1973)**. It seems that the colonization by *Ralstonia solanacearum* which occurs at exudation sites along the root system is the result of the phenomenon chemotaxis by the microorganism. (**Vasse *et al*., 1995).**

Although plants can not talk, listen or see, they communicate extensively, using secondary metabolites to express messages **(Degenhardt *et al*., 2003) and (Dicke and Hilker , 2003).**

Root exudates are compounds released into the surrounding medium by healthy and intact plant roots **(Kalburtj and Mosjidi, 1993)**. Such compounds secreted by plant roots serve important roles as chemical attractants and repellants in the rhizosphere. **(Estabrook and Yoder, 1998) and (Bais, 2001 )**.

Root exudates may act as messengers that communicate and initiate biological and physical interactions between roots and soil organisms.Root-microbe communication can either be a positive (symbiotic) to the plant, or negative to the plant, including interactions with parasitic plants, pathogenic bacteria, fungi, and insects **(Ryan and Delhaize, 2001).**

Molecules exuded by plant roots are thought to act as signals to influence the ability of microbial strains to survive in the rhizosphere and colonize the roots. The selection of specific rhizospher populations may mediated by responses to signals from different plant species.

In contrast, the defense mechanism of the unprotected root cells that is under continual attack by pathogenic microorganisms mediated by secretion of phytoalexins, defense proteins, and other as yet unknown chemicals **(Flores *et al* ., 1999).**

One of `the most remarkable metabolic features of plant roots is the ability to secrete a vast array of compounds into the rhizosphere, with nearly 5% to 21%

of all photosynthetically fixed carbon being transferred to the rhizosphere through root exudates **(Marschner, 1991).** Low-molecular weight compounds such as amino acids, organic acids, sugars, phenolics, and various other secondary metabolites are believed to represent the majority of root exudates.