Title: Gene expression analysis of secretion system during interaction of *Methylobacterium mesophilicum* SR 1.6/6 with the host plant.

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Abstract:

Methylobacterium genus is composed by pink-pigmented facultative methylotrophic bacteria. Some species of this genus are able to promote plant growth, increase photosynthetic activity of the host plant and reduce the incidence of pathogens. The SR1.6/6 strain of *M. mesophilicum* is a bacterium isolated from citrus and due to its interaction with the plant and possibly with *Xylella fastidiosa*, it has been the focus of several studies. The mechanisms of interaction of the bacterium with the host plant have not yet been elucidated, some transcriptomic and proteomic studies show the hyper-regulation of genes related to stress in the plant interaction. Therefore, this project evaluates seven types of protein secretion system that could be involved in *Methylobacterium*-corn (*Zea maiz*) interaction that it could be associated to the act of colonization by this bacteria and recognition by the host plant due to root exudates compounds. In this work, the analyzed treatments were bacterial cells adhered to the roots forming biofilm and bacterial cells in suspension (planktonic-called cells interacting only with root exudates) compared to control (bacterial cells without plant). For expression analysis, the selected genes were related to protein secretion system (type I, II, III, IV, V, VI and VII) and ABC transporter, by quantitative PCR technique. The results showed differences in the expression of genes in the different treatments. For this study, 32 genes related to the secretion system were evaluated and 22 evidenced different gene expression responses, showing that during interaction with the host plant, both in the initial phase (influenced by exudates) and the next phase (during the colonization of the root), secretion system genes are activated. Such results indicate that proteins secreted by symbionts like *M. mesophilicum* may have the ability to enter into host cells and probably modify host physiology to promote bacterial colonization (maybe by releasing toxins and/or effector proteins).

Key words: *M. mesophilicum* SR 1.6/6, qPCR, protein secretion system, gene expression.

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