Biochemical and molecular analysis of polygalacturonases *Moniliophthora perniciosa*.

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The pectinase enzymes are present in the plant cell wall and are involved in the degradation of pectin, the main cell wall polysaccharide, and have an important role in plant physiology. Pectinases are also produced by pathogenic microorganisms and act as virulence factor during the infection of the plant. Pectinases also have a great interest in food and textile industry. In the genomic database of *Moniliophthora perniciosa*, causal agent of the witches’ broom disease of cocoa (*Theobroma cacao* L.), homologous pectinases genes were identified, in particular polygalacturonases (PG, EC 3.2.1). The objective of this study was: i) the *in silico* characterization of *M. perniciosa* PG genes; ii) gene expression analysis of PGs in *M. perniciosa* grown in artificial system (cookies) and in culture media containing different carbon sources; and iii) detection of the PG enzymatic activity. Three genes were identified from *M. perniciosa* genome and characterized as PGs. These three genes showed significant and specific expression by RT-qPCR in the different stages of fungus growth (cookies), which was corroborated by enzymatic tests of PGs. During the growth of phytopathogen in cookies, four stages of development were collected in accordance with the color developed by the mycelium (white, yellow, light pink and dark pink). The study of gene expression between different phases, showed higher expression in the yellow phase, followed by dark pink and light pink respectively, for the three genes for PGs. We expect that with these studies we can develop different strategies for disease control and production of pectinases in large scale for the use of biotechnology.

Keywords: pectinases, polygalacturonases, witches’ broom disease

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