Biotic and abiotic factors influence the expression of effectors in Leptosphaeria maculans during axenic growth

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Plant pathogens secrete effector proteins into host tissues to promote infection through the manipulation of host processes. Sequencing and analyses of the genomes of fungal phytopathogens have shown that they contains tens to hundreds of genes predicted to encode putative effectors. Moreover, global analyses of gene expression revealed that several waves of concerted expression of effector genes take place during host invasion. In sharp contrast with the situation described in-planta, the expression of the effectors is difficult to detect and quantify in axenic cultures because their genes are expressed at a very low level. In the present study, we investigate biotic and abiotic factors that may relieve suppression of expression of effectors during axenic growth. Biotic factors (such as carbon source, nitrate source, antibiotics) as well as abiotic factors (pH, temperature) can influence their expression. Of major interest, incubation of the fungal mycelium with 1ug/ml of an antibiotic of the aminoglycoside family allowed an increase of effector gene expression 20-fold to 60-fold compared to regular axenic growth. An RNAseq analysis aiming at identifying the set of effectors up- and down-regulated in a culture medium supplemented or not with the antibiotic has been performed and results obtained will be presented. This simple system could be a good starting point to characterize the plant signals that trigger fungal effector gene expression.