The role of methyl jasmonate on genomic and metabolomic profile of *Catharanthus roseus* infected with "aster yellow" phytoplasmas with different virulence degrees

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**Introduction**

Phytoplasmas are phloem-bound anaerobic microorganisms, evolved from Gram-positive bacteria, which cannot be maintained in axenic culture. They are usually transmitted through insect vectors or vegetative propagation material. Periwinkle (*Catharanthus roseus*) is a susceptible host and maybe used as a model plant to study phytoplasma/host interactions. The main symptoms of infection include leaf etiolation, plant dwarfism, and a greater number of axillary shoots and small leaves. Methyl jasmonate (MeJA) is an elicitor with potential to increase plant defense. The goal of this work was to understand the impact of the infection of "aster yellow" phytoplasmas with different virulence degrees in in vitro-grown periwinkles, specifically on the modulation of the expression of pathogen-resistance genes and on the induction of the synthesis of secondary metabolites.

**Materials and Methods**

- **Plant material**: healthy (HV) and infected *C. roseus* with "aster yellow" of different virulence degrees (AY107, intermediate virulence, and Hyd8, high virulence)
- **Treatments**: untreated (Ctrl), treated with 0 (2.5% ethanol, solvent), 12.5 and 25 mM MeJA
- **Time points**: before application (T0), 1 and 4 days (T1 and T2, respectively) after application
- **Measurements**:
  - Metabolomic profile ([L-ESI-UHR-QqTOF-MS/MS])
  - Gene expression (PAL, CHS, AS, STR, PRX)

**Results**

**Metabolomic profile**

![Image](image1.png)

**Genomic profile**

![Image](image2.png)

**Conclusions**

- Infected plants showed higher alkaloid content comparing with healthy ones.
- Treatment with 25 mM MeJA increased deoxy elenoic acid, hydroxytryrosol and catharine synthesis.
- MeJA upregulated PAL, CHS, AS and STR genes and downregulated PRX gene.
- AY107 periwinkle strain was more responsive to 12.5 mM MeJA, while Hyd8 strain was more responsive to 25 mM MeJA.

**Acknowledgements**

This work was supported by FCT – Portuguese Foundation for Science and Technology through projects EXPL/AGR-PRO/1155/2013 and UID/Multi/50016/2013. M.J.R.A. Oliveira was supported through FCT doctoral scholarship SFRH/BD/103896/2014.