Rhizosphere associated bacteria trigger accumulation of terpenes in leaves of *Vitis vinifera* L. cv. Malbec that protect cells against reactive oxygen species

It has been proposed that plant growth promoting rhizobacteria (PGPR) stimulate plant growth and development by inducing the biosynthesis of secondary metabolites, like terpenes, which reduce stress incidence. Three bacteria previously isolated from grapevine (*Microbacterium imperiale* Rz19M10, *Kocuria erythromyxa* Rt5M10 and *Terribacillus saccharophilus* Rt17M10) were tested as PGPR. After 30 d since root inoculation of *in vitro* grown *Vitis vinifera* cv. Malbec plants, the monoterpenes α-pinene, terpinolene and 4-carene, and the sesquiterpene nerolidol were detected in bacterized-leaves but not in controls. Also, the concentrations of the diterpenes α and γ-tocopherol, and the sterols sitosterol and lupeol were significantly enhanced compared to controls. The leaf extracts of bacterized plants showed photoprotective properties since they decreased the oxygen consumption (that is photooxidation) of the amino acid tryptophan in a sensitized solution, thus indicating an increment of the antioxidant capacity of the tissues. In experiments *in vitro* α-pinene and nerolidol intercepted reactive oxygen species. The results suggest that *M. imperiale, K. erythromyxa* and *T. saccharophilus* are able to induce a systemic response that trigger increases on monoterpenes, sesquiterpenes, tocopherols and membrane sterols. These compounds enhance the antioxidant capacity in leaf tissues that may help grapevine to cope with stresses.