***Cupressus sempervirens* essential oils and their major compounds successfully control postharvest grey mould disease of tomato**

**Rguez Safa1, Djebali Naceur2,Ben Slimene Imen2, Abid Ghassen3, Hammemi Majdi1, Chenenaoui Synda4, Bachkouel Sarra6, Daami-Remadi Mejda5, Hamrouni Sellami Ibtissem1, Ksouri Riadh1**

1Laboratory of Aromatic and Medicinal Plants, Center of Biotechnology of BorjCedria, BP 901, Hammam-Lif 2050, Tunisia.

2Laboratory of Bioactive Substances, Center of Biotechnology of BorjCedria, BP 901, Hammam-Lif 2050, Tunisia.

3Laboratory of Legumes, Center of Biotechnology of BorjCedria, BP 901, Hammam-Lif 2050, Tunisia

4Laboratory of Plant Molecular Physiology, Center of Biotechnology of BorjCedria, BP 901, Hammam-Lif 2050, Tunisia

5Regional Center of Research on Horticulture and Organic Agriculture, University of Sousse, Chott-Mariem 4042, Tunisia.

6Research Support and Technology Transfer, Center of Biotechnology of BorjCedria, BP 901, Hammam-Lif 2050, Tunisia.

**Background:** Medicinal plants generally produce many secondary metabolites which constitute an important source of many bioactive molecules. Among them *Cupressus sempervirens* is recognized by its richness in essential oil with antimicrobial properties. The aim of this study is to use *C. sempervirens* essential oil or its bioactive components as an alternative to synthetic fungicides currently used to control *Botrytis cinerea*.

**Materials/Methods** Essential oils of *Cupressus sempervirens* were extracted at vegetative, flowering and fructification stages and identified by chromatography-mass spectrometry. The antifungal activity of essential oils was determined using the dilution in agar method and the minimal inhibitory concentration using micro well plate dilutions. The *in vivo* antifungal activity was also tested on tomato fruits.

**Results**. Essential oils composition varied with the phenological stage and the main chemical classes were sesquiterpene hydrocarbons (59.59% to 64.5%) with the most representative compounds being germacrene D (18.38% to 24.82%) and those of the monoterpene hydrocarbons class (16.63% to 26.5%) with α-pinene as the most representative compound (14.75% to 22.92%). The *in vitro* antifungal tests against *B. cinerea* showed that the three studied essential oils inhibit mycelia growth with the highest activity observed at flowering stage. The antifungal activity of some pure compounds (α-pinene, α-cedrol and β-caryophyllene) alone or combined according to their proportions in the natural essential oil showed that α-pinene combined with β-caryophyllene provided the highest antifungal activity at a concentration as low as 0.12 mg/ml as compared to that of the chemical fungicide used as a positive control. Microscopic observation showed that essential oil at flowering stage induced swelling and crumbling of *B. cinerea* conidia. The pulverization of *C. sempervirens* essential oils on tomato fruits at 1mg/mL inhibited 54% of *B. cinerea* infection

**Conclusion:** *Cupressus sempervirens* essential oil constitutes a promising safe product for the biocontrol of the post-harvest disease *Botrytis cinerea* during storage and transport of tomato.