

Introduction:

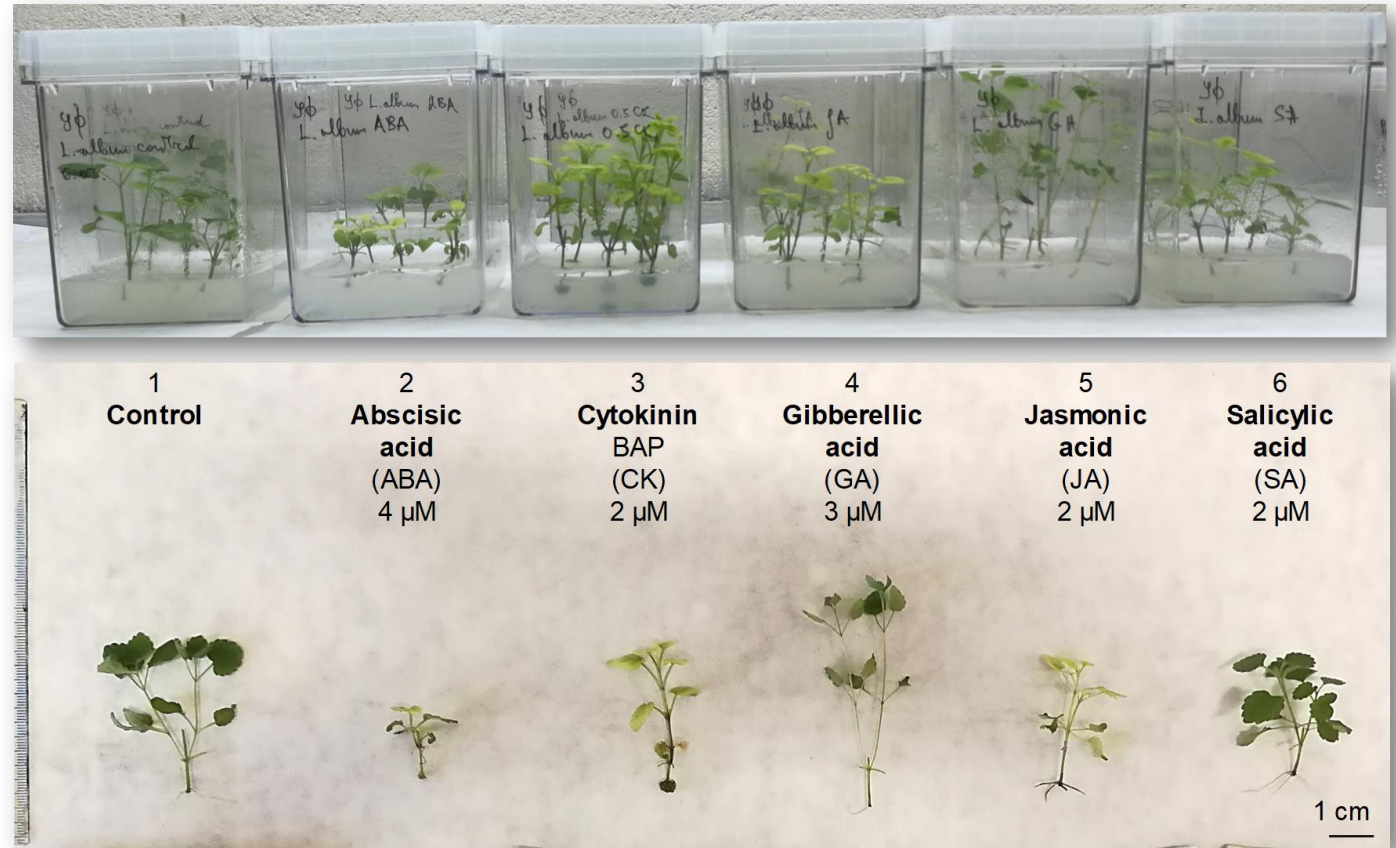
During their lifetime plants experience different types of stress factors. The environmental signals are mediated inside the plant organism via phytohormones that cause cellular changes and subsequent adequate response. Although there are some general tendencies, each plant species has specific adaptation strategy towards the environmental changes.

The aim of the present study is to investigate the white dead nettle *Lamium album* which is a medicinal plant enriched in secondary metabolites that take part into the phytoimmunity system.

The effects of phytohormones (abscisic acid, ABA; cytokinin, CK; gibberellic acid, GA; jasmonic acid, JA; salicylic acid, SA) participating as abiotic and biotic stress mediators are studied in controlled *in vitro* conditions by estimation of their growth and antioxidant state.

Plant material and treatments:

In vitro *L. album* was cultivated on standard nutrition medium MS. Single internodes were taken and cultivated for five weeks on control medium and on medium containing different hormones: 4 μM ABA, 2 μM cytokinin (BAP, benzylaminopurine), 3 μM GA, 2 μM JA, 2 μM SA. The plants are cultivated for 5 weeks under controlled conditions (photoperiod 16 h light/ 8 h dark, 100 $\mu\text{mol m}^{-2}\text{s}^{-1}$ PPD, cool white light, 24 \pm 1 $^{\circ}\text{C}$, 60-70% air humidity).



Results:

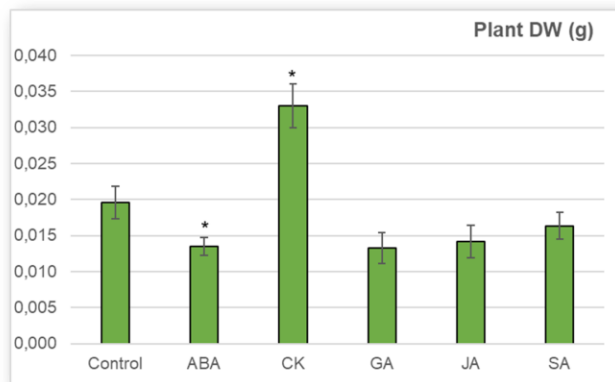


Fig. 1 *L. album* dry biomass upon treatment with phytohormones

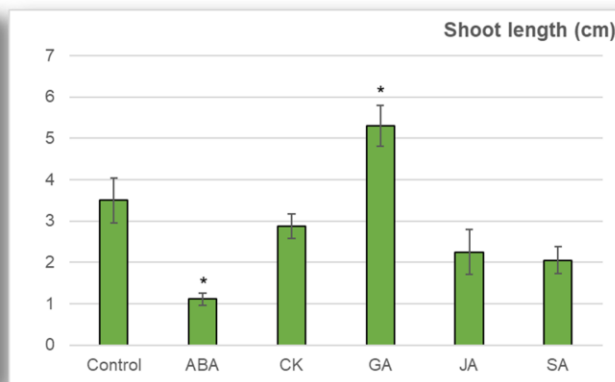


Fig. 2 *L. album* shoot length upon treatment with phytohormones

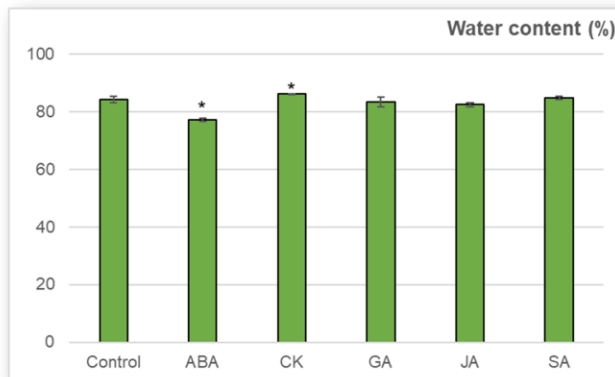


Fig. 3 *L. album* water content upon treatment with phytohormones

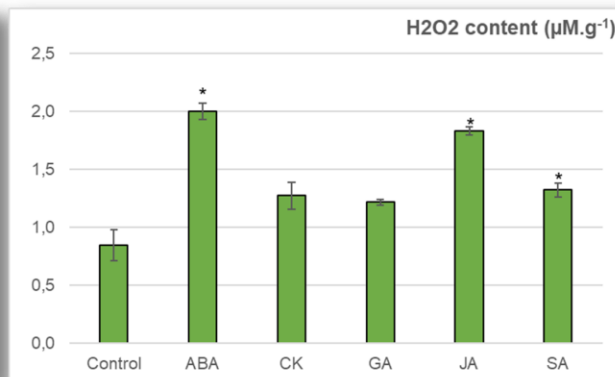


Fig. 4 *L. album* reactive oxygen species content upon treatment with phytohormones

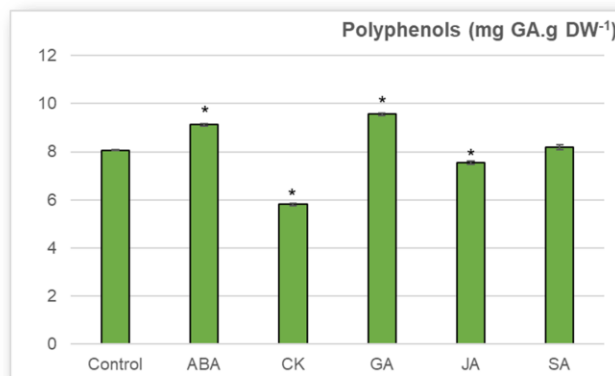


Fig. 5 *L. album* polyphenol content upon treatment with phytohormones

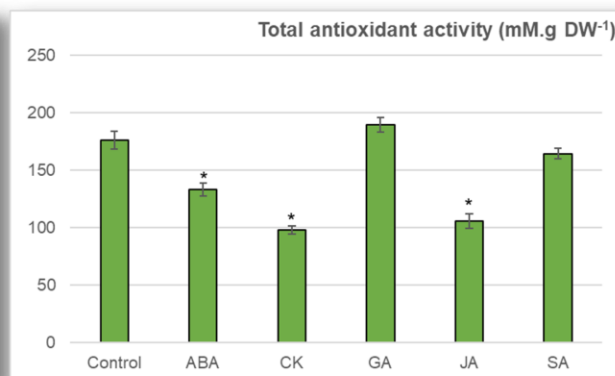


Fig. 6 *L. album* reducing potential upon treatment with phytohormones

Conclusions:

The applied phytohormonal variants on *in vitro* *L. album* plants showed:

- ✓ The growth is mostly reduced upon ABA treatment, while CK and GA had positive effect. ABA and CK caused opposite changes in water content and biomass, and ABA and GA acted antagonistically on shoot growth.
- ✓ Reactive oxygen species were present upon application of ABA, JA and SA. Polyphenols acting as non-enzymatic antioxidants were accumulated upon ABA and GA, and their level was reduced upon CK and JA.
- ✓ ABA, CK and JA decreased the total antioxidant activity associated with reducing molecules. This effect was proportional to the lower polyphenols content in the case of CK and JA.

In conclusion, among the used phytohormonal concentrations, the plant immunity of *L. album* was mostly affected by ABA, CK and JA, as well as GA, which altogether could serve as a base for further detailed studies.