

Improving the nutritional value and growth of *Eschscholzia californica* Cham. through iodine biofortification

*Maciej Gustab¹, **Sylwester Smoleń¹, Iwona Ledwożyw-Smoleń¹, Marta Liszka-Skoczylas², Łukasz Skoczylas³

¹ Department of Plant Biology and Biotechnology; Faculty of Biotechnology and Horticulture; University of Agriculture in Krakow, Al. Mickiewicza 21, 31-120 Kraków, Poland

² Department of Engineering and Machinery in Food Industry, Faculty of Food Technology; University of Agriculture in Krakow, Al. Mickiewicza 21, 31-120 Kraków, Poland

³ Department of Plant Product Technology and Nutrition Hygiene, Faculty of Food Technology; University of Agriculture in Krakow, Al. Mickiewicza 21, 31-120 Kraków, Poland

Corresponding authors e-mail: *maciej.gustab@urk.edu.pl **sylwester.smolen@urk.edu.pl

Introduction

Eschscholzia californica Cham. (California poppy, *Papaveraceae*) is a plant native to North America. Extracts of *E. californica* are used for its sedative and sleep-inducing properties. Biofortification is a method of increasing the nutritional and health-promoting properties of plants through enriched fertilization.



Fig. 1 *E. californica* during cultivation in a greenhouse.

Methods

The plants were grown hydroponically in a greenhouse (Fig. 1). The control group was watered with a standard nutrient solution that did not contain iodine compounds. The other groups were watered with a nutrient solution enriched with iodine compounds, as shown in Fig. 2.

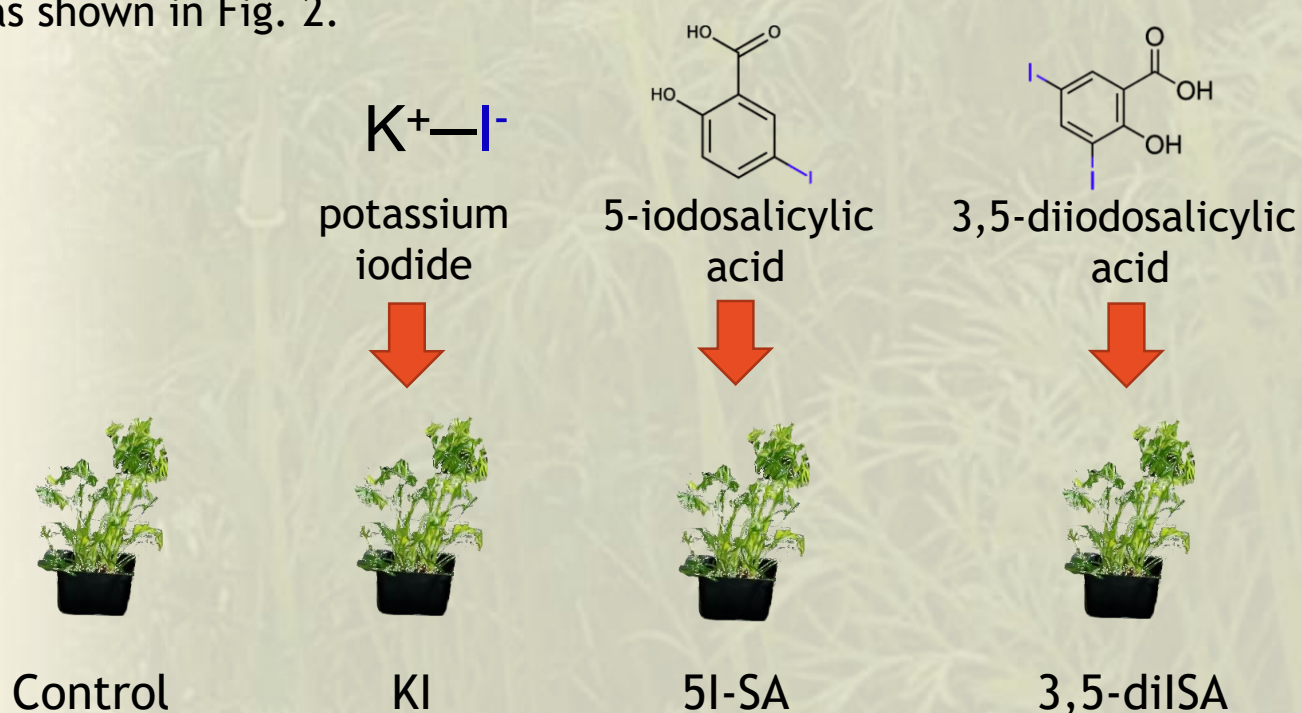


Fig. 2 Graphical representation of iodine supplementation in experimental groups

Results

The experimental groups were compared with the control. Supplementation enriched with KI and 5I-diSA resulted in an increase in the mean **fresh weight of plant shoots** (Fig. 3a). An increase in the mean **fresh weight of roots** was also observed in the KI group (Fig. 3b). Plants fertilized with KI and 3,5-diISA showed an increase in the mean **total sugar** concentration (Fig. 4a). What is more, increases in the mean concentrations of **vitamins B2 and B7** were noted in the KI group, whereas an increase in **vitamin B1** was observed in the 5I-SA and 3,5-diISA combinations (Fig. 4b). No differences in vitamin B3, B5 and C concentrations were observed between the control group and the treatment groups (data not shown).

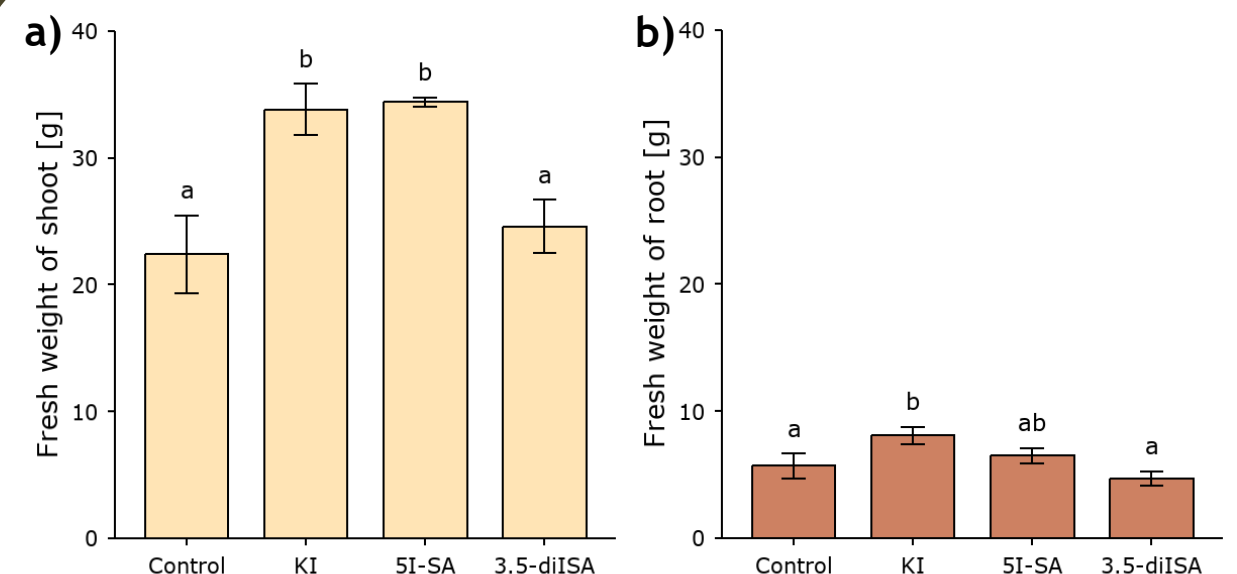


Fig. 3 Fresh weight of shoot (a) and root (b) of *E. californica*. Distinct letters indicate statistically significant differences among groups (HSD Tukey test, $n=4$, $1n$ =mean from 15 plants).

Conclusions

These studies show that iodine compounds may have a beneficial effect on the nutritional and health-promoting properties of *E. californica* plants, as well as accelerate their growth.

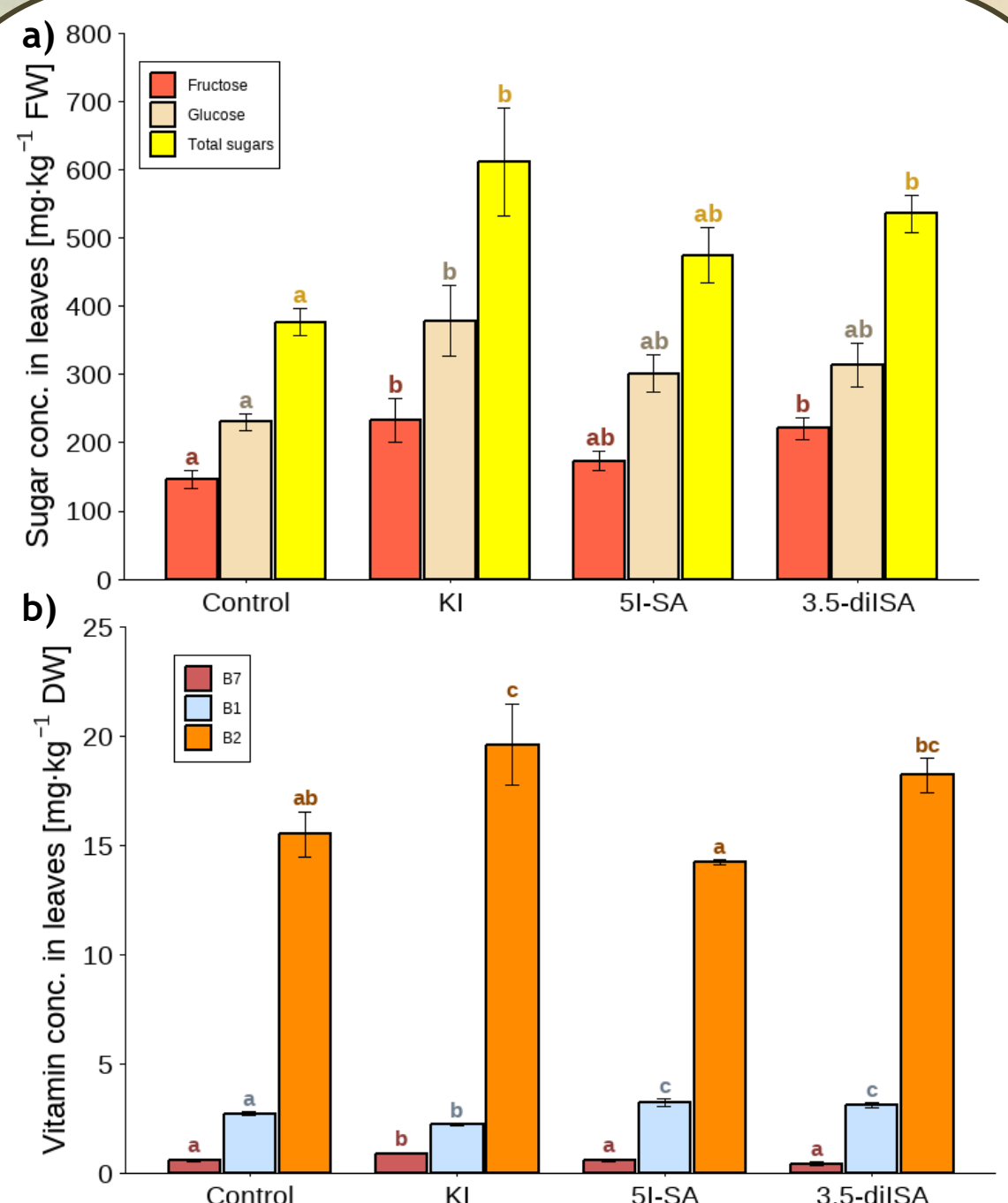


Fig. 4 Sugar (a) and vitamin (b) concentration in leaves of *E. californica*. Distinct letters of the same color identify statistically significant differences among groups (HSD Tukey test, $n=4$, $1n$ =15 plants mixed together). FW - fresh weight; DW - dry weight

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