SCAN POSTER

Fatty acid as sustainable biorationals for weed control

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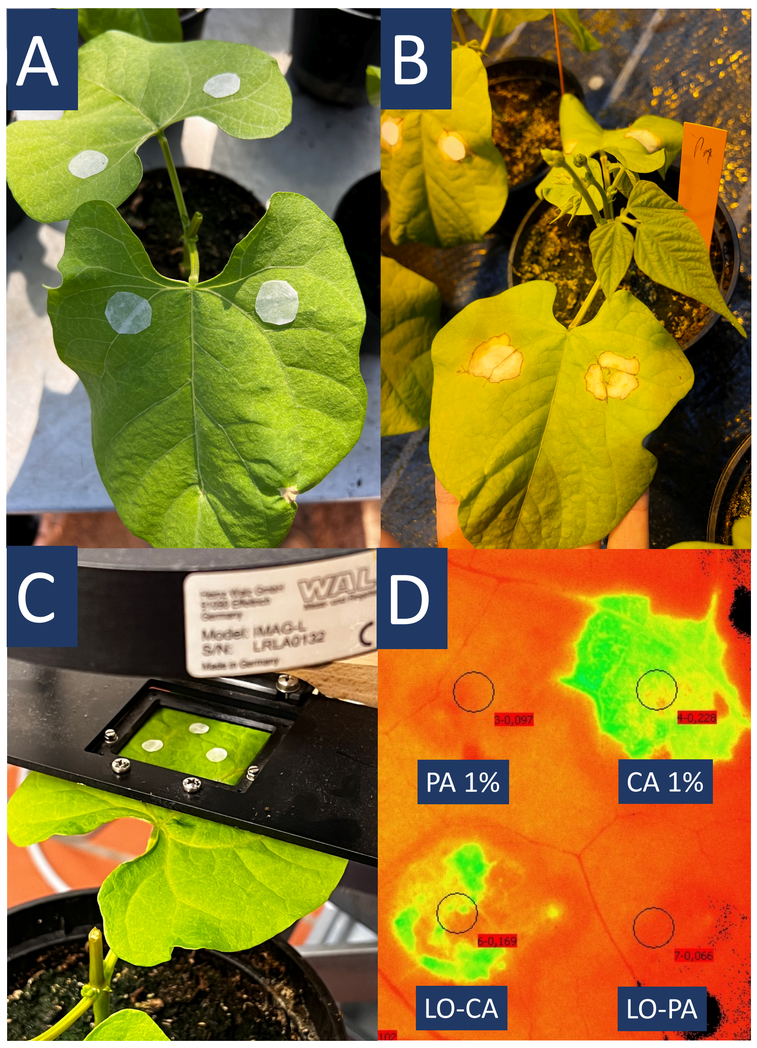
Hypothesis

The application of short length fatty acids pelargonic acids **(PA)** and caprylic acids **(CA)** will cause herbicidal effects on a model plant (*Phaseolus vulgaris* L. cv. 'Saxa'). These effects of fatty acids could be modified by drying plant oil linseed oil **(LO)** and linseed oil plus enhancer **(LEO).**

Objectives

1. Varying levels of efficacy and damage in green beans when exposed to different concentrations of fatty acids
2. Correlation between the number of carbons and the bond configurations in the fatty acid compounds and their phytotoxic potential
3. Herbicidal effectiveness of fatty acids in combination with linseed oil and an experimental enhancer

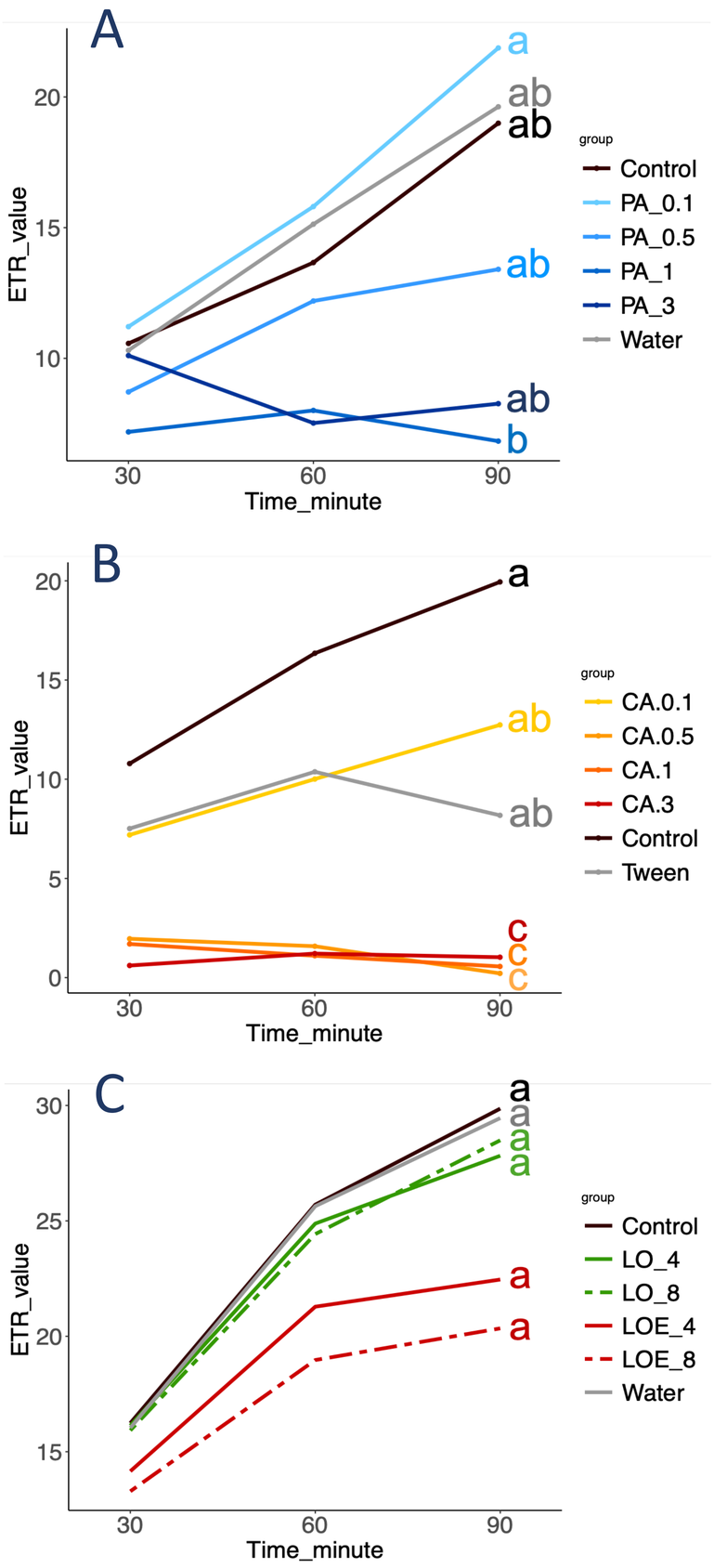


Materials & Methods

Primary leaves of bean plants were treated with five concentrations (0.1%, 0.5%, 1%, 2%, and 3%) of PA and CA, and 2 concentrations (4%, and 8%) of LO and LOE. Phytotoxic effects in the form of leaf damage were assessed by PAM fluorometry. Analysis of variance (ANOVA) was used to compare means of treatments and a Tukey-HSD test to determine homogeneous subgroups at a p value of $p \leq 0.05$.

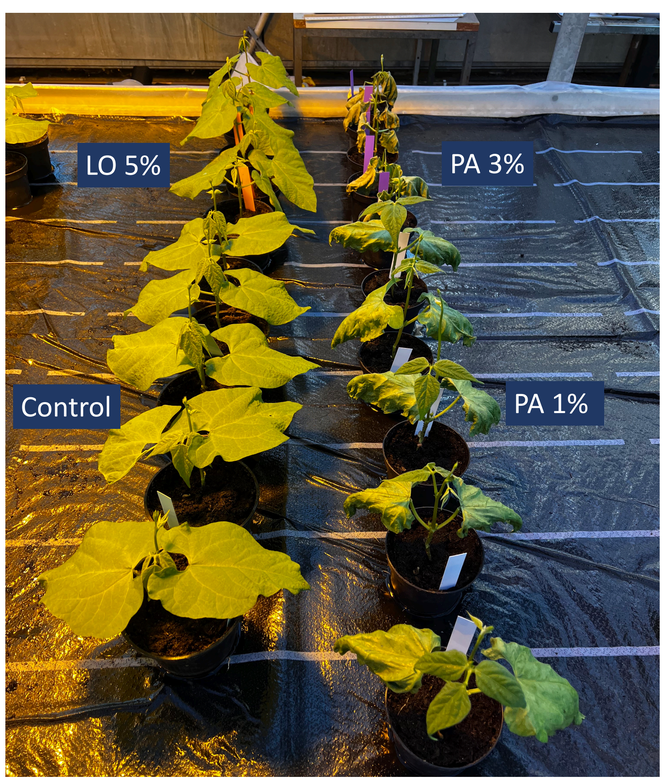
Figure 1. Application and chlorophyll fluorescence measurements. **(A)** Application with filter paper, **(B)** Effects after 1 day, **(C)** Device, **(D)** Chlorophyll fluorescence signal after exposure to light.

Results



Conclusions

1. Significant effects at concentrations of 0.5% and higher for both PA and CA.
2. Greater damage in fatty acids with 8 carbon atoms (CA) in comparison to those with 9 carbon atoms (PA).
3. Exacerbated damage in combination of LOE with fatty acids, whereas LO has no additional observable effects, potentially mitigating damage



Results

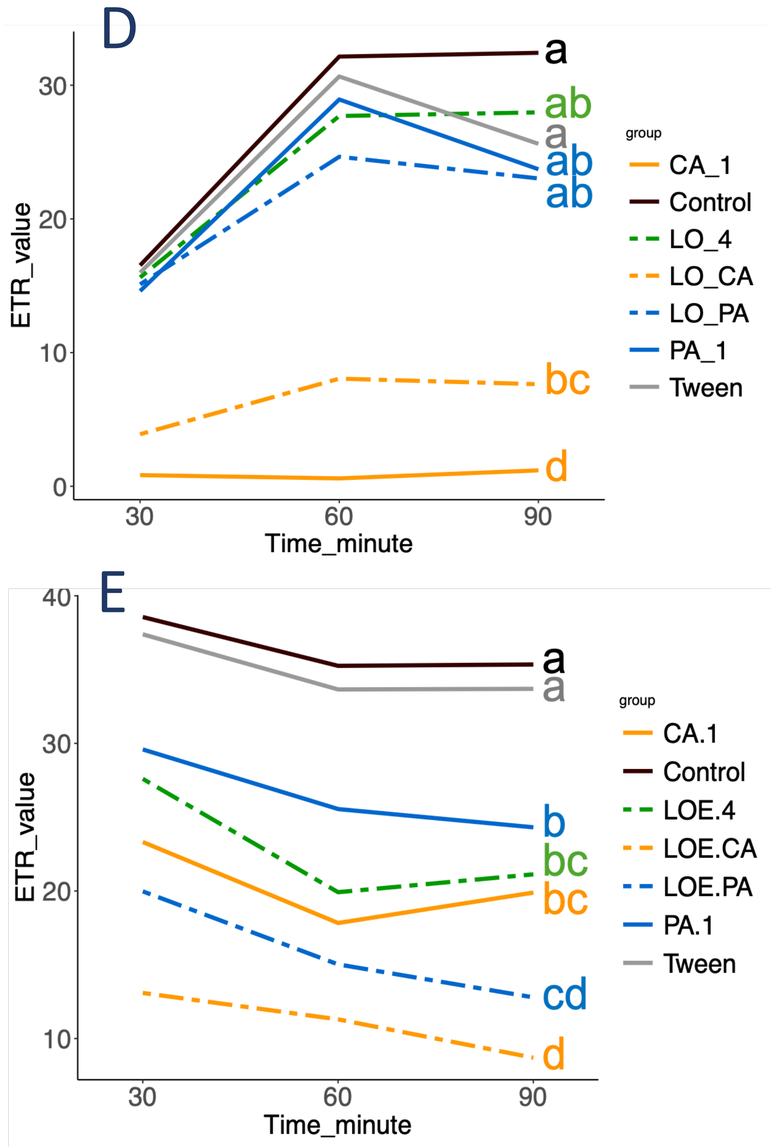


Figure 2. ETR value (Electron Transport Rate (µmol e-/m²/s)) depending on treatment and time after application. **(A)** Pelargonic acid, 0.1 to 3%. **(B)** Caprylic Acid, 0.1 to 3%. **(C)** Linseed oil and Linseed Oil plus enhancer, **(D)** Combinations of fatty acids and linseed oil, **(E)** Combinations of fatty acids and linseed oil plus enhancer

Figure 3. Effects of fatty acids 1 day after application.

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