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ISOLATION AND CHARACTERIZATION OF OXIDIZED-OLIGOGALACTURONIDES: MECCANISM OF DAMPENING OF DAMPS

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Oligogalacturonides (OGs) released upon partial degradation of homogalacturonan, are a well-known class of Damage-Associated Molecular Patterns (DAMPs). Besides inducing immunity, OGs negatively affect plant growth by antagonizing auxin responses.

Because the recognition of DAMPs poses the intrinsic risk of activating an exaggerated response that may impair plant survival, dampening mechanisms of DAMPs should exist.

Transgenic Arabidopsis plants (OGM plants) expressing a chimeric protein called "OG-machine" accumulate oligogalacturonides (OGs) in their tissues and exhibit enhanced resistance to a variety of pathogens; however the growth of these plants is severely impaired. The prolonged release of OGs triggers defense responses that in the long term are deleterious for the plant.

We used the OGM plants as a tool to investigate a possible regulatory mechanism by searching for elicitor-inactive OGs that may derive from elicitor-active OGs through an enzymatic modification.

By analyzing the OGs produced in the transgenic plants, modified OGs were isolated. The nature of the modification was investigated by electrospray ionization mass spectrometry and resulted to be the oxidation to galactaric acid of the residue at the reducing end of OGs (oxOGs). OxOGs were tested for their ability to induce defense responses and antagonize auxin responses. In all experiments, they were inactive as compared to the corresponding typical OGs.

We succeeded to isolate and characterize one of the enzymes that causes the inactivation of OGs: it is a FAD binding oxidase, that we named OGOX1, capable of producing elicitor-inactive oxidized OGs and H_2O_2.