Using Zaxinone to Postpone Leaf Senescence in Rice Plants

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Despite their role in regulating crucial plant phenomena like plant architecture and senescence, information about plant hormones, especially strigolactones, is relatively scarce. Strigolactones (SLs), which result from the cleavage of carotenoids, are fundamental to the maintenance of plant health as they dictate the rate at which the plant starts to degenerate. I believe that zaxinone, a novel regulatory compound that results from further cleavage of carotenoids, inhibits SLs biosynthesis. To prove the relationship between zaxinone, SLs, and senescence, uniform size (4cm) leaf segments from the 3rd leaf of 1 weak old rice plants (WT vs zs mutant) were cut and soaked in a solution composed of 2.5 mM MES buffer, containing 0.05% Tween 20, supplemented with 5 μM of either GR24, zaxinone, or a blank treatment. A set of 4 leaf segments of each treatment were taken out daily for observation and sample collection for 5 subsequent days. Chlorophyll levels of each set were examined to determine the progression of senescence in GR24 and zaxinone treated leaf segments. The transcript level of senescence associated genes, OsI20 and OsI295, was measured. Ion leakage was tracked by testing the conductivity of the solution the leaves were soaked in. The results showed that the application of synthetic strigolactone, GR24, accelerated leaf senescence and senescence associated parameters in both WT and zs mutant, while application of zaxinone reduced senescence. These results suggest that zaxinone might regulate strigolactone biosynthesis and ultimately affect leaf senescence, which will allow for longer lasting food crops.

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