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How do plants overcome the excess sugars-driven repression of photosynthesis in suc2 mutant leaves?

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With the energy from the sunlight, plants assimilate atmospheric CO2 via photosynthesis and produce sugars. However, photosynthesis-associated genes are downregulated when sugars accumulate beyond the storage or transport capacity in leaves to reduce carbon assimilation. While various sugar signalling pathways have been proposed to control this downregulation, the molecular mechanism of how plants cope with excessive sugar accumulation in photosynthetically active leaves remains elusive.
Here, we employed Arabidopsis thaliana mutants of *sucrose-proton symporter 2* (*suc2*), accumulating sugars in photosynthetically active leaves. In a new suppressor screen, we isolated novel mutants with larger biomass in the *suc2* mutant background. The physiological characteristics of the *suc2* mutant and the revertant, such as the starch accumulation pattern and photosynthesis performance, will be presented, and the hypothetical scenario of how the plants found a way to recover from the saturation of sugars will be discussed.

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