

Novel compounds that keep plant fresh: Controlling stomatal aperture

Background

Stomata are small pores present on the surface of leaves, which are opened or closed under the control of a pair of guard cells for gas exchange with the atmosphere. Through these pores, plants uptake the carbon dioxide necessary for photosynthesis and release water by transpiration, which enhances uptake of nutrients from the roots. Therefore, regulation of stomatal openings is essential for plant growth as well as survival in response to various environmental conditions.

Technology Overview

Through random screening of a chemical library of over 20,000 compounds, Nagoya University researchers have succeeded in finding new compounds that can control stomatal opening in plants. Analysis of stomatal closing compounds (SCLs) revealed that they inhibit the signaling components between the blue light receptor phototropin and the plasma membrane proton ATPase (PM H⁺-ATPase), thus inhibiting light-induced activation of PM H⁺-ATPase and leading to suppression of stomatal opening. Some of the compounds have shown to prevent leaves from drying up and suppress wilting when sprayed onto rose and oat leaves. The beauty of a chemistry-based approach instead of classical genetic techniques is that SCLs can be applied very easily to all plants. It also circumvents GMOs regulation.

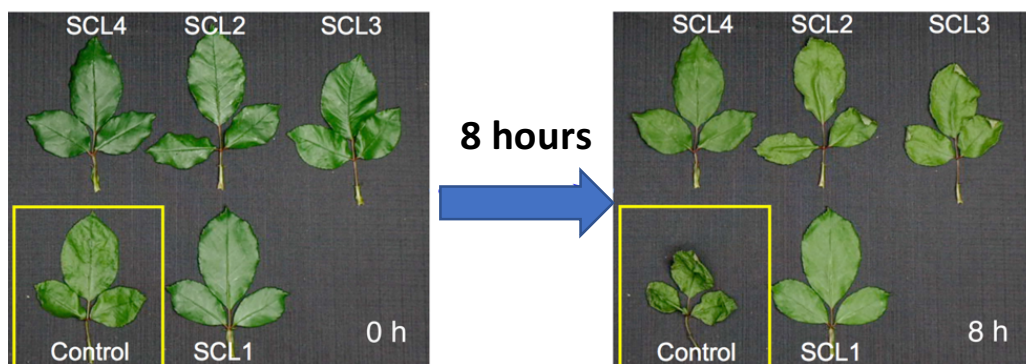


Fig. Photos of Rose leaves sprayed with stomatal closing compounds (SCLs) after 0 and 8 hours. **Plants sprayed with SCLs remained fresh longer** in comparison to control leaves.

Advantage:

- Does not rely on classical genetic method
- Easily increase drought tolerance

Applications:

- Extension of the freshness of cut flowers
- Reduction of transportation cost of plants

IP Status: PCT has been filed.

Further Details:

Shigeo Toh *et al.* Identification and Characterization of Compounds that Affect Stomatal Movements. Plant Cell Physiol. 2018 Apr 8. doi: 10.1093/pcp/pcy061.

Contact

Rena Shimizu, Ph.D., TEL: 919-535-8724 Email: rshimizu@tpnu.org
Technology Partnership of Nagoya University, Inc.
One Copley Parkway, Suite 305, Morrisville, NC 27560