

Novel regulators of root growth

Value Proposition

With growing populations and changing climate, agricultural technologies that enhance crop growth and increase stress tolerance are crucial. Stress tolerance, which includes low soil fertility and drought conditions, are relevant to both crop yield and where crops may be grown, which is relevant to farms at all scales. Heat and drought are the two most important stresses that affect crop production and food security worldwide. Current efforts to combat these abiotic stresses are genetic techniques, such as transgenics or breeding for stress tolerance. Other efforts include inducing stress resistance by the addition of certain chemicals, in order to prepare them for drought conditions. A further important approach is the exogenous application of growth promoters. Here, the inventors identified novel plant hormones that increase the growth and integrity of plants. Because these compounds are plant derivatives, this technique increases the growth of plants in a sustainable and efficient way.

Technology

Duke researchers have identified four novel beta-carotene derived apocarotenals (Apo-10-carotenal, apo-12-carotenal, apo-14-carotenal, and apo-16-carotenal) that promote root growth in *Arabidopsis thaliana* through a screen for compounds that rescue root growth. These compounds are metabolites of beta-carotenes, common pigments found in plants. The data shows that these hormones rescue the length of roots and subsequent plant growth after root growth has been inhibited. These results suggest that in conditions where growth is reduced (such as in a drought), growth could be rescued with the addition of these plant hormones. These beta-carotene metabolites (apocarotenals) thus could play a role in promoting root growth at a larger scale. See also the related technology T-004900.

Advantages

- This technology is safe and organic, apocarotenals are metabolites of naturally occurring products in plants.
- This technology could allow plants to be grown in more diverse climates as it can increase drought tolerance.

Duke

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Patents

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Title: COMPOSITIONS AND METHODS FOR MODULATING
ROOT GROWTH

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