

Can antioxidant machinery improve oxidative stress resilience?

Excessive ROS levels are often driven by adverse changes in environmental conditions, ultimately causing oxidative stress. The associated negative impact on cellular constituents have been a major focus of decade-long research efforts to improve the oxidative stress resilience by boosting the antioxidant machinery in model and crop species.

Do Plants produce ROS scavenging antioxidant defense machinery?

Recently, it has become apparent that plants actively produce ROS which may control many different physiological processes such as biotic and abiotic stress-response, pathogen defense and systemic signaling. Here we have covered the chemistry of ROS and their production sites and ROS scavenging antioxidant defense machinery. Fig. 1.

How does antioxidant defense protect against oxidative stress?

This enhanced stress resistance was attributed to an upregulated antioxidant defense mechanism, with elevated activities of SOD and POD, and increased Pro levels, collectively contributing to more efficient ROS scavenging and protection against oxidative stress.

Which antioxidants are more effective against stress-induced ROS and oxidative damage?

Additionally, these plants exhibited higher activities of antioxidants like SOD, APX, CAT, and GR, especially SOD's increased activity, highlighting a more robust antioxidant defense against stress-induced ROS and oxidative damage.

Does antioxidant machinery scavenge or process ROS?

Consequently, a diversified and efficient antioxidant machinery has evolved to scavenge or process ROS for the prevention of oxidative stress-associated molecular and cellular damages (Halliwell, 2006).

Is a biotechnological platform suitable for plant antioxidant production?

In these conditions, a biomass productivity of $18.7 \text{ g L}^{-1} \text{ d}^{-1}$ with a maximum RA production of 3.1 g L^{-1} was achieved, demonstrating the suitability of this biotechnological platform for the production of this plant antioxidant [54].

The compartmentalized ROS production and the limited passive diffusion capacities away from the production sites not only limit the ROS toxicity through its efficient removal by the right antioxidant combination and ...

Interestingly, *Ailanthus altissima* plants growing under 150 mM NaCl had upregulated antioxidant enzymatic activities and no significant difference in H_2O_2 content compared with control plants, suggesting a link ...

The need for oxygen for the efficient production of energy (ATP) in mitochondria is in balance with the necessity of controlling the level of reactive oxygen species (ROS), such ...

In recent years, great interest has been focused on using natural antioxidants in food products, due to studies indicating possible adverse effects that may be related to the ...

The storage roots of the storage-tolerant cultivars maintained higher activities and expression levels of antioxidative enzymes, including ascorbate peroxidase (APX), ...

Whether flavonoids play significant antioxidant roles in plants challenged by photooxidative stress of different origin has been largely debated over the last few decades. A critical review of the pertinent literature and our ...

Abstract Significance: For a plant to grow and develop, energy and appropriate building blocks are a fundamental requirement. Mitochondrial respiration is a vital source for ...

A green ultrasound-assisted extraction process for the recovery of antioxidant polyphenols and pigments from onion solid wastes using Box-Behnken experimental design ...

Natural antioxidants are widely distributed in food and medicinal plants. These natural antioxidants, especially polyphenols and carotenoids, exhibit a wide range of biological ...

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Out of four isomers of tocopherols present in plants, α -tocopherol has the highest antioxidant activity and represents the major vitamin E compound; it is the only ...

This review focuses on the well-known phenolic antioxidant rosmarinic acid (RA), an ester of caffeic acid and (R)-(+)-3-(3,4-dihydroxyphenyl) lactic acid, describing its wide distribution in thirty-nine plant families and the ...

Various abiotic stresses lead to the overproduction of reactive oxygen species (ROS) in plants which are highly reactive and toxic and cause damage to proteins, lipids, ...

We culminate the review with a short discussion on kinetic modeling to predict vitamin E production in plant cell cultures and suggestions on sustainable green extraction methods of vitamin E for reduced environmental impact.

A considerable increase ($p < 0.01$) of liver antioxidant enzymes CAT, SOD, GSH, and a decrease of MDA

level in LSML-treated groups were found at higher doses. The ...

The loss of cellular energy is related to membrane damage and increase in lipid peroxidation. ... sugars molecules perform various stress reducing functions during stress and ...

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