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## Nitric oxide induced by polyamines involves antioxidant systems against chilling stress in tomato (*Lycopersicon esculentum* Mill.) seedling

Key words: antioxidant enzymes, chilling tolerance, hydrogen peroxide, nitric oxide, spermidine, tomato

## **Research Summary**

This review mainly focused on the the effect of putrescine (Put) and spermidine (Spd) on NO generation and the function of Spd-induced NO in the tolerance of tomato seedling under chilling stress. And summarized the key points in the following aspects:

Spd could induce NO production under chilling stress.
H<sub>2</sub>O<sub>2</sub> may act upstream of NO to enhance its production.
NR and NOS-like enzyme are involved in Spd inducing NO production.

> NO may be involved in Spd inducing expression and activities of antioxidant enzymes in tomato.



## **Innovation Points**

- Introduction of the on the relationship between NO and PAs in response to cold stress in tomato.
- Summary of the Spd increased NO release via the nitric oxide synthase (NOS)-like and nitrate reductase (NR) enzymatic pathways in the seedlings.
- Emphasis of the NO induced by Spd plays an important role in tomato's response to chilling stress.



## **Innovation Points**

A series of comprehensive figures were generated to summarize the latest knowledge about the relationship between PAs and NO.

- Figure 1 NO accumulation induced by PAs.
- **Figure 2** Involvement of NOS-like and NR in PA-induced NO generation.
- **Figure 3** Involvement of H<sub>2</sub>O<sub>2</sub> in PA-induced NO generation.
- **Figure 4** | Fv/Fm of different treatments in tomato leaves during chilling stress.
- **Figure 5** | Electrolyte Leakage of different treatments in tomato leaves under chilling stress.
- **Figure 6** Involvement of NO in Spd-induced expressions of antioxidant genes in tomato leaves during chilling stress.
- **Figure 7** Involvement of NO in Spd-induced antioxidant enzyme activities in tomato leaves under chilling stress.

