Cite this as: Qian-nan DIAO, Yong-jun SONG, Dong-mei SHI, Hong-yan QI, 2016. Nitric oxide induced by polyamines involves antioxidant systems against chilling stress in tomato (*Lycopersicon esculentum* Mill.) seedling. *Journal of Zhejiang University-Science B (Biomedicine & Biotechnology)*, 17(12):916-930. http://dx.doi.org/10.1631/jzus.B1600102

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_2O_2 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_2O_2 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.**

