

# Chilling Resistance of *Phaseolus vulgaris* and *Brassica oleracea* under a High-Intensity Electric Field

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An electric field may have different effects on plant metabolism depending upon its application style and density, and environmental conditions. The effects of an electric field, low temperature, and their combinations on tissue vitality and some physiological variables regarding antioxidant responses of “bean” (*Phaseolus vulgaris* L. cv. Gina) and “cole” (*Brassica oleracea* L. cv. Acephale) leaves were studied. Fifteen-day-old seedlings were exposed to an electric field ( $100 \text{ kV m}^{-1}$ ) for 10 or 40 min prior to cold treatment. In both plant leaves, cold application caused statistically significant increments in total soluble protein levels and selected antioxidant enzyme activities such as catalase, peroxidase and superoxide dismutase activities. However, tissue vitality and  $\text{H}_2\text{O}_2$  levels did not change in “cole”, while tissue vitality decreased and  $\text{H}_2\text{O}_2$  levels increased in “bean”. Electric field application itself did not cause any significant changes in “bean” and “cole” leaves. On the other hand, 40 min electric field application increased the deteriorative effect of cold in both plant species, while 10 min electric field augmented the chilling resistance by increasing the tissue vitality and antioxidant enzyme activities resulting in decreased  $\text{H}_2\text{O}_2$  levels.

*Key words:* *Brassica oleracea*, Chilling Resistance, Electric Field, *Phaseolus vulgaris*