Hydrogen peroxide pretreatment induces stress tolerance memory in mung bean

Irina Moskova, Dessislava A. Todorova, Alexieva Vera Stefanova, Hung Shu Hsien, Yu Chih Wen

E-mail: shhung@mail.dyu.edu.tw

ABSTRACT
Evidence showed that hydrogen peroxide (H₂O₂) or cold shock pretreatment changed the calcium signature to subsequent cold stress. This suggested that the modification of calcium signaling provide a cold memory. In an attempt to demonstrate the occurrence of cold memory in plants, mung bean seedlings (Vigna radiate L. cv. Tainan No. 5) was pretreated with 200 mM H₂O₂ and then measured the chilling (4°C, 36 h) injuries of the seedlings by electrolyte leakage. Tolerance induced by repetitive H₂O₂ pretreatment at an interval of 3 h gave better chilling tolerance i.e. lower electrolyte leakage than both single H₂O₂ treatment and 10°C, 48-h acclimated plant. The H₂O₂ induced chilling tolerance depended on accumulation of glutathione (GSH), which could be inhibited by buthionine sulfoximine (BSO), an inhibitor of glutathione synthesis. The chilling tolerance of both acclimated and H₂O₂-treated seedlings was decreased by ethylene-glycol-bis(aminoethylether)-N,N'-tetraacetic acid (EGTA) but not by ruthenium red. Our evidences suggest that H₂O₂ triggered the influx of Ca²⁺ from extracellular pools leading to the induction of chilling tolerance and stress memory of mung bean seedlings.

Keywords: hydrogen peroxide; stress tolerance; mung bean

REFERENCES