Ca^{2+} applications affect the phenylpropanoid metabolism in potato tubers induced by T-2 toxin

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Postharvest Biology and Technology, Volume 180, October 2021, 111616

Abstract

The dry rot of potato caused by *Fusarium sulphureum* is the main postharvest disease that causes serious economic loss and leads to mycotoxin contamination. Therefore, it is necessary to find a strategy to increase the plant's resistance against disease. T-2 toxin at low concentration can act as an elicitor to induce resistance against disease. Calcium ion plays a vital role in induced resistance by responding the environmental stress in plant. In this study, the effect of Ca^{2+} on the development of dry rot, weight loss rate, the suberin polyphenolic (SPP) and suberin polyaliphatic (SPA) accumulation and their participation in phenylpropanoid metabolism were investigated in treated potato. The results showed that lesion diameter and weight loss rate significantly increased after ethylenebis (oxyethylenenitrilo) tetraacetic acid (EGTA) treatment, but the addition of exogenous Ca^{2+} noticeably inhibited the increase. The accumulations of SPP and SPA, enzymatic activities, gene expressions, as well as the contents of total phenols and lignin and their major substrates involved in phenylpropanoid metabolism were decreased after EGTA treatment, these indicators were recovered after the addition of exogenous Ca^{2+}. Therefore, the results suggested that Ca^{2+} treatment induced resistance against dry rot, inhibited weight loss rate and accelerated the accumulation of SPP and SPA by activating phenylpropanoid metabolism in treated potato.