

Benzothiadiazole treatment inhibits membrane lipid metabolism and straight-chain volatile compound release in *Penicillium expansum*-inoculated apple fruit

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Abstract

Benzo-(1, 2, 3)-thiadiazole-7-carbothioic acid S-methyl ester (BTH) is the first synthetic chemical elicitor that induces resistance against postharvest diseases in fruit and vegetables. However, little information is available on how BTH application affects membrane lipid metabolism and volatile compounds (VOCs) biosynthesis in infected fruit. The results of this study indicated that BTH treatment maintained cell membrane integrity, increased phospholipase A2 (PLA2) activity, and decreased phospholipase C (PLC) and D (PLD) activities in *Penicillium expansum*-inoculated apple fruit. BTH enhanced phosphatidic acid (PA) content, maintained phosphatidylcholine (PC) and phosphatidylinositol (PI) levels, and increased unsaturated fatty acids (USFA) content. Additionally, BTH decreased the activity of lipoxygenase (LOX), hydroperoxidelyase (HPL), alcohol dehydrogenase (ADH) and alcohol acyltransferase (AAT), and reduced the content of straight-chain VOCs in inoculated fruit. Therefore, BTH could maintain cell membrane integrity in the *P. expansum*-inoculated apple fruit by inhibiting PLD and PLC activities and PA content. A higher accumulation of USFAs is contributed by increasing PLA2 activity with BTH. In addition, BTH could inhibit the enzymes activities of HPL, LOX, ADH and AAT in LOX pathway, resulting in a less release of straight-chain VOCs in the inoculated fruit during incubation.