Title A non-ACC pathway for ethylene biosynthesis in *Botrytis cinerea*

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Abstract

Premature softening and tissue senescence occur in kiwifruit infected with *Botrytis cinerea.* While ethylene production is enhanced in infected fruit and *B. cinerea* produces ethylene on defined media *in vitro* the source of ethylene in this pathosystem is unclear. Ethylene production by *B. cinerea* was enhanced when methionine or ∝-keto-methylthiobutyric acid (KMBA) was added to a defined (modified Pratts) medium. Although 1-aminocyclopropane-1-carboxylic acid (ACC) did not stimulate ethylene production, ∝-aminooxyacetic acid (AOA) was inhibitory suggesting a role for a pyridoxal phosphate mediated enzyme reaction down stream from the methionine/KMBA stimulated ethylene biosynthetic pathway. Cobalt chloride (Co^{2+}) was inhibitory, but after a 4-d lag period ethylene production from *B. cinerea* cultures containing methionine and Co^{2+} reached the same level as those without Co^{2+}. [U ^{14}C] methionine was converted to ^{14}C-ethylene with high efficiency indicating that it is a direct precursor, while [2,3^{14}C]-ACC did not yield radioactively labelled ethylene. These results suggest that the ethylene biosynthetic pathway in *B. cinerea* does not involve ACC as a precursor and that the enzyme responsible for synthesising ethylene is similar to, but different from, ACC oxidase from higher plants. The ethylene biosynthetic pathway in *B. cinerea* is yet to be determined.