

# The Monoterpenoid Produced by Entomopathogenic Bacterium, *Xenorhabdus nematophilus*, Inhibits Phospholipase A2 Activity

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An entomopathogenic bacterium, *Xenorhabdus nematophilus*, caused significant immunodepression of the target insects by inhibiting phospholipase A2 (PLA2) to block the release of arachidonic acid (AA) that is the primary substrate for synthesis of eicosanoids. We reported that monoterpenoid produced by *X. nematophilus* also inhibits PLA2 activity and has the insecticidal effect to test insects by injection in this study. The Monoterpenoid produced by *X. nematophilus* was isolated from organic fractions in bacterial growth medium by butanol solvent and analyzed chemical structure by NMR. PLA2 activity in test insects was analyzed with gas chromatography (GC) and liquid scintillation counter (LSC). In the GC results, fat body shown that monoterpenoid produced by *X. nematophilus* inhibits the release of AA from membrane of *Spodoptera exigua*. Compositions of the major fatty acids varied among different membranes derived from hemocytes, the fat body, and the gut. All tissues had significant level of AA, amounting 0.02% among all fatty acids. The AA was released into the medium by adding PLA2 extract from the membrane preparation. However, the monoterpenoid produced by *X. nematophilus* inhibited the AA release when the bacteria were incubated with the PLA2 extract in the membrane preparation. In the LSC results, PLA2 extracted from hemocytes, the fat body, and the gut from *Manduca sexta* also show hydrolyzed the 14C-labeled AA from phosphatidylcholine, but inhibited the hydrolysis of the 14C-labeled AA when the monoterpenoid produced by *X. nematophilus* were incubated with the PLA2 extract in the membrane preparation. These results clearly indicate that the monoterpenoid produced by *X. nematophilus* blocks the release of AA from the membrane preparation by inhibiting PLA2 activity in test insect.