

Determination of Trace Elements levels in Plasma from Larvae in the Course of Baculoviral and Bacterial Infections by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)

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ABSTRACT

While a number of studies have examined the effect of infections on the trace elements status of mammals, not any similar study in insects are found. In this study, we used inductively coupled plasma-mass spectrometry (ICP-MS) to quantify trace elements of Mg, Mn, Fe, Cu, Zn and Mo levels in the plasma from the tobacco budworm, *Heliothis virescens*, following infection of the insect with a baculovirus (Helicoverpazea single nucleopolyhedrovirus (HzSNPV)) and bacteria (*Micrococcus lysodeikticus*) at different times post infection.

There are no changes in any metal due to bacterial infection and no differences between any 12 hours post infection mocks versus 12 hours post infection bacterial infected samples.

For the larvae with a virus (HzSNPV) treatment, in both fourth and fifth instars, all the trace elements of interest (Mg, Mn, Fe, Cu, Zn, Mo) change over the course of the 72 hours of infection in both instars, which is due to the development of larvae. Iron level in insect plasma with the HzSNPV infection was elevated in the late 4th instar (60 hours post infection) when compared to iron level in the same aged controls. This could be explained by the ability of iron storage protein ferritin to buffer iron, or free iron of damaged tissues leaking intracellular iron into the plasma. Copper level in insect plasma with the HzSNPV infection was lower in the late 4th instar (60 hours post infection) when compared to copper level in the same aged controls, which is probably due to the decline of copper-binding protein prophenoloxidasases (PPOs) levels during the course of infection.

Keywords: trace elements, insect plasma, viral infection, ICP-MS