

Abstract

# Hemolymph Nutrient Homeostasis in the *Tenebrio molitor* Larvae Affected by *Solanaceae* glycoalkaloids <sup>†</sup>

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Glycoalkaloids (GAs) are produced by many plant species and have high biological activity. In plants, they act as natural protectants against pathogens and herbivores. The studies of GAs in insects are focused mainly on the lethal and sublethal effects. There are only a few studies concerning the mechanisms of GAs action in these organisms and, thus, their activity remains largely unknown. The aim of our studies was to determine whether these compounds have impact on insect metabolism. The metabolism is tightly connected with nutrition, and as that GAs may be ingested together with nutrients, it seems that they also should affect metabolism. To check if tested compounds change metabolic activity of insect cells thus, have an impact on availability of nutrients for other tissues, we analyzed the levels of free amino acids, carbohydrates, and glycerol in insect haemolymph. In the research, three GAs in concentrations  $10^{-8}$  and  $10^{-5}$  M were tested: solanine, chaconine and tomatine. The content of nutrients was determined in the haemolymph of *T. molitor* larvae injected with the tested compounds. The assays were performed by RP-HPLC technique. The preliminary analysis revealed the effect of the tested compounds on carbohydrates, amino acids and lipid content in haemolymph. These results suggest that GAs have impact on insect physiology and influence on nutrient balance in haemolymph. Taken together, this research provides important insights into GAs action in insect tissues.

**Keywords:** carbohydrates; hemolymph; *Tenebrio molitor*; glycoalkaloids; *Solanaceae* plants