

Serbian Biochemical Society

President: Marija Gavrović-Jankulović

Vice-president: Suzana Jovanović-Šanta

General Secretary: Jelica Milošević

Treasurer: Milica Popović

Organization Committee

Vladimir Mihailović

Aleksandar Ostojić

Nevena Đukić

Jelena S. Katanić Stanković

Marko Živanović

Nikola Srećković

Stefan Marković

Sladana Đorđević

Nataša Simin

Milan Nikolić

Milica Popović

Jelica Milošević

Scientific Board

Marija Gavrović-Jankulović

Suzana Jovanović-Šanta

Marina Mitrović

Tatjana Jevtović Stoimenov

Ivan Spasojević

Snežana Marković

Melita Vidaković

Natalija Polović

Aleksandra Zeljković

Romana Masnikosa

Radivoje Prodanović

Proceedings

Editor: Ivan Spasojević

Technical support: Dragana Robajac

Cover design: Zoran Beloševac

Publisher: Faculty of Chemistry, Serbian Biochemical Society

Printed by: Colorgrafx, Belgrade

Serbian Biochemical Society

Tenth Conference

with international participation

24.09.2021. Kragujevac, Serbia

“Biochemical Insights into Molecular Mechanisms”

Expression of *cs*, *ast*, *alt* and *ldh* genes during diapause of the European corn borer *Ostrinia nubilalis* (Hbn.)

Teodora Knežić^{1,2*}, Miloš Avramov², Iva Uzelac², Snežana Gošić-Dondo³, Željko D. Popović²

¹ Biosense Institute, University of Novi Sad, Novi Sad; Serbia

² Department of Biology and Ecology, Faculty of Sciences, University of Novi Sad

³ Maize Research Institute “Zemun Polje”, Belgrade; Serbia

*e-mail: teodora.knezic@biosense.rs

Many insect species overcome unfavourable environmental conditions by entering diapause, a type of hypometabolic resting state which features accumulation of energy reserves, lowered oxidative metabolism rates, synthesis of protective metabolites and expression of specific genes. In order to better understand the changes occurring at the transcriptional level during diapause of the economically important European corn borer *Ostrinia nubilalis* (Hbn.), the expression of genes encoding selected metabolic enzymes was measured in this study. The selected enzymes are markers of aerobic (citrate synthase, aspartate aminotransferase, alanine aminotransferase) and anaerobic metabolism (lactate dehydrogenase). Total RNA was isolated from whole-body non-diapausing (ND) and diapausing (D) 5th instar larvae acclimated to different temperatures (15°C, 5°C, -3°C, -16°C) due to a close link between diapause and cold hardiness in this species. QPCR was performed and relative gene expression was determined using *rps3* as the reference gene and the ND group as control. Relative expression of *cs* gene did not differ between groups, suggesting that this enzyme is regulated posttranslationally. Relative expressions of *ast* and *alt* genes were significantly higher in the ND group compared to diapausing larvae, while the expression of *ldh* was higher in the diapausing groups. A temperature effect on relative gene expression of *cs*, *ldh* and *alt* was determined. Higher *cs* expression was recorded in diapausing larvae acclimated to 5°C compared to D(15°C), probably compensating for lowered CS enzyme activity. Cold acclimation leads to higher expression of *ldh* in diapausing larvae, especially in D(-3°C) group, as expected. Lastly, acclimating diapausing larvae to 5°C and -3°C resulted in higher expression of *alt* in these groups compared to D(15°C) larvae, leading to an increase of the cryoprotective alanine synthesis.

Acknowledgements

This study was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, Grant No. 451-03-9/2021-14/200125.