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BIOSTIMULANTS AS A FACTOR OF OPTIMIZATION OF PARENT STOCK CULTURES OF *Hermetia illucens* L.

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Introduction

In recent years, interest in the industrial rearing of the black soldier fly (*Hermetia illucens* L.) has increased significantly due to its value as a sustainable source of protein-rich feed ingredients for livestock and its ability to efficiently convert organic agricultural waste into valuable biomass. One of the promising approaches to improving insect productivity is the use of dietary biostimulants.

The aim of this study was to evaluate the effectiveness of selected dietary biostimulants in improving the viability and productivity of breeding stock cultures of *Hermetia illucens* L.

Materials and Methods

Three biostimulants were evaluated. Premix is a dietary supplement containing macro- and microelements, glucose, vitamins, and essential amino acids. Aminosol is a complex liquid formulation containing water-soluble B-group vitamins, amino acids, glucose, and mineral salts. Ammonium perchlorate (NHClO) was evaluated as a biostimulant intended to stimulate the activity of digestive enzyme systems in insects. The experimental treatments were initiated on the tenth day of larval development. Each treatment consisted of three replicates of 200 larvae. The insects were maintained under standardized rearing conditions at 24 ± 1°C, 50% relative humidity, and a 16:8 h light: dark photoperiod.

Results

A significant increase in the survival of both larvae and adults was observed in all experimental treatments compared with the control. However, in the ammonium perchlorate treatment, pupal survival was 11.8% lower than that of the control group. Supplementation with Premix and Aminosol significantly increased the average larval body weight. In addition, all biostimulant treatments resulted in a higher proportion of females than in the control population, with the greatest increase observed in the Aminosol treatment.

The application of ammonium perchlorate produced the greatest increase in larval body weight (53%). However, these larvae subsequently exhibited impaired molting, resulting in a reduction in pupal survival of 11.8% compared with the control, 25.1% compared with the Aminosol treatment, and 23.0% compared with the Premix treatment.

Conclusions

The findings demonstrate that dietary biostimulants can be effectively used to optimize breeding stock cultures of *H. illucens* under technocenosis conditions. Supplementation with the vitamin-mineral complexes Premix and Aminosol significantly increased the survival of larvae, pupae, and adults, whereas ammonium perchlorate significantly improved the survival of larvae and adults but adversely affected pupal survival. All tested biostimulants also contributed to a significant increase in pupal body weight.

Furthermore, analysis of the population sex ratio demonstrated that the application of biostimulants increased the proportion of females within breeding populations of *H. illucens*.