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# EFFECTIVENESS OF BIOLOGICALLY ACTIVE SUBSTANCES WITH KAIROMONAL PROPERTIES ON THE PERFORMANCE OF THE EGG PARASITOID *Trichogramma pintoi* Voegelé, 1982

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The egg parasitoid *Trichogramma* spp. is one of the most important biological control agents used in integrated pest management programs for annual and perennial crops.

The Angoumois grain moth, *Sitotroga cerealella* (Olivier), is routinely reared as a host species under laboratory conditions. During oviposition, females deposit biologically active compounds on the egg surface, including lipids, proteins, kairomones, volatile substances, and other semiochemicals. These compounds play an important role in host location, recognition, and stimulation of parasitoid oviposition.

The present study aimed to improve the quality and biological performance of *Trichogramma* spp. through the application of biologically active substances (BAS) exhibiting kairomonal properties. An ethanol extract obtained from *S. cerealella* eggs was used as the source of kairomonal compounds. The effects of the extracted fractions on the host-searching ability and biological quality of *Trichogramma pintoi* were evaluated in order to enhance its effectiveness in suppressing pest populations. Experimental variants were prepared using BAS with optimal kairomonal activity, determined using the "Optimclas" software package and the Box experimental design methodology. The amount of water required to dilute ethanol to the desired concentration was calculated according to the following equation: $X = P \times (N/M - 1)$ where X is the amount of water required for dilution; P is the volume of ethanol used in the treatment; N is the initial ethanol concentration (96%); and M is the required ethanol concentration (30%).

To prepare the kairomonal extract, host eggs were immersed in 30% ethanol for 5 minutes. Experiments were conducted at temperatures of 23–25°C and 26–30°C.

The persistence and biological activity of the extracts were assessed after 0, 7, 14, 21, and 28 days of storage.The following biological parameters were evaluated: fecundity (eggs per female), adult emergence rate, female emergence rate, parasitism rate, host-searching capacity, and the quality index of the parasitoid population.

The results demonstrated that prolonged storage of the extract at 4°C resulted in a gradual decline in the biological performance of *T. pintoi*. After 28 days of storage, all evaluated parameters showed lower values compared with freshly prepared extracts. Fecundity ranged from 22.1 to 24.8 eggs per female, adult emergence from 80.5 to 92.2%, female emergence from 51.0 to 56.0%, host-searching capacity from 79 to 90%, and parasitism rate from 76 to 89%. The quality index varied between 9.0 and 12.8. The biological performance of *T. pintoi* was slightly higher at 23–25°C than at 26–30°C, confirming that the lower temperature range is more favorable for parasitoid development and activity.

The application of kairomonal biologically active substances may contribute to improving the efficiency of mass-reared *Trichogramma* used in biological control programs. The use of parasitoids offers numerous advantages, including reduced crop protection costs, conservation of beneficial organisms, increased field efficacy, improved agricultural productivity, enhanced food quality, reduced dependence on chemical pesticides, and lower environmental contamination.

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