

EFFECT OF SPERMIDINE SUPPLEMENTATION ON VITELLOGENIN GENE EXPRESSION IN HONEY BEES

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Introduction

Honey bee (*Apis mellifera* L.), one of the most important pollinators on the planet, provides a vital service to the ecosystem that is essential to maintaining natural biodiversity. However, the number of colonies is decreasing for the last few decades, and scientists revealed the main cause of this problem might be the reduced level of quality food during the wintertime, because of the disappearance of flowering plants. As a result of the mass colony disappearance, the health and survival of the honey bees have been attracting significant attention. There are many experimental tests of nutrition supplementation in many organisms, focusing on the improvements in health. Many studies have shown that spermidine, the naturally occurring ubiquitous polyamine, in different species has a positive effect on health and longevity, with anti-oxidative activity. Our aim was to see if spermidine influence vitellogenin synthesis, since it is a fosfolipoglycoprotein that has different functions in honey bees, including the regulation of a life span and social organization

Methods

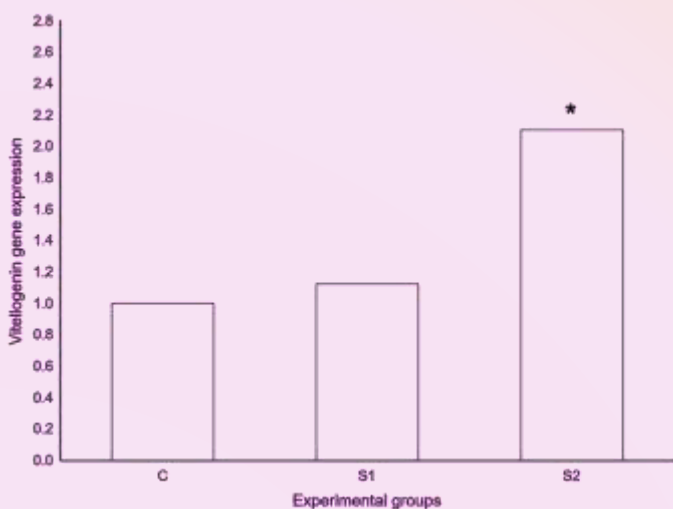
- Honey bee collection in plastic boxes, 30 bees per box
- Three experimental groups were formed, each with three biological replicates
- C- control- fed with 50% (w/v) sucrose solution
- S1 and S2- treatments- fed with 1 mM and 0.1 mM spermidine, respectively
- Spermidine was prepared fresh, every day, from 1 M stock
- Experiment lasted for 20 days period, after which the bees were immediately frozen and stored at -80 °C
- Three abdomens from every replicate was used for RNA isolation using RNA extracol
- cDNA was synthesized from RNA in reverse transcription reaction
- qPCR was performed using primers for vitellogenin gene
- REST was used to analyze results

Results

The results of the experiment showed that the expression of vitellogenin gene was significantly upregulated in experimental group S2, where bees were supplemented with 0.1 mM spermidine, compared to control C.

Conclusion

These results confirm the specific role vitellogenin might have in regulating honey bee longevity and stress resistance. These are the first results and further research is needed to confirm them and to investigate the mechanisms of spermidine action and exact role of vitellogenin in honey bees.



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