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### NON-PROTEIN AMINO ACIDS OF FLORAL NECTAR AFFECTS SURVIVAL AND LOCOMOTION OF POLLINATORS

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#### ABSTRACT

A large variety of animals exploit floral nectar as a food source and are engaged in pollination of numerous angiosperm species. Recently several secondary compounds have been detected in nectar and some of them affect the foraging behaviour of animals and potentially increase the benefits to the plant. One class of such compounds is the non-protein amino acids (NPAAs), i.e., amino acids that are not used for protein synthesis.

GABA ( $\gamma$ -aminobutyric acid) and  $\beta$ -alanine are among the most abundant and they were frequently found in floral nectar. Interestingly they are known to be important neurotransmitters in the insect nervous system. We performed experiments about the effects of these compounds on bumble bees (*Bombus terrestris*). Laboratory-reared insects fed artificial diets enriched with the two non-protein amino acids at low and high concentration and their survival and behavioral parameters have been assessed. GABA had a positive effect on insect's survival whereas  $\beta$ -alanine had a negative consequence on the same parameter. Bumble bees decrease the flying activity after feeding the low concentration GABA diet. They also increased their walking activity when fed the  $\beta$ -alanine diet at high concentration, while they increased their flying activity with the same solution at low concentration.

We tested also the possible effect of nectar-dwelling yeasts (*Metschnikowia gruesii*, *M. reukaufii* and *M. chrysoerperlae*) on GABA concentration in nectar. Only *M. gruesii* and *M. reukaufii* were able to drastically and quickly reduce GABA concentration. This result suggests that yeasts can interfere with the possible effect exerted by NPAAs on insect survival and behaviour.