

Novel Lactic Acid Bacteria inhibiting *Paenibacillus larvae* in honey bee larvae

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Abstract

A novel bacterial flora of lactic acid bacteria (LAB) of the genera *Lactobacillus* and *Bifidobacterium* originating from the honey stomach of honeybees was recently described. LAB is known to be good producers of antimicrobial substances; however there is variation in beneficial qualities between species and genera. In this study, the antagonistic effects on the honey bee pathogen, *Paenibacillus larvae* from a novel bacterial flora of lactic acid bacteria (LAB) of the genera *Lactobacillus* and *Bifidobacterium* originating from the honey stomach were evaluated. We used inhibition assays on agar plates and honey bee larval bioassays to investigate the effects from honey bee LAB on *P. larvae* growth *in vitro* and on AFB infection *in vivo*. The individual LAB phylotypes showed different inhibition properties against *P. larvae* growth on agar plates whereas a combination of all eleven LAB phylotypes resulted in a total inhibition (no visible growth) of *P. larvae*. Adding the LAB mixture to the larval food significantly reduced the number of AFB infected larvae in exposure bioassays. The results demonstrate that honey bee specific LAB possess beneficial properties for honey bee health. Possible benefits from enhancing growth of LAB or from applying LAB to honey bee colonies to assure honey bee health will be discussed.