

## Probiotics Dedicated to Honeybees

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Probiotics – live microbial food supplements – are believed to be beneficial for their consumers by improving intestinal microbial balance, protecting against gastrointestinal disorders, and digesting some food components. Probiotic strains dedicated to some group of organisms should originate from healthy specimens belonging to this group (Sararela et al. 2000). Nowadays, probiotics are omnipresent as functional food and medicaments. Unfortunately, strains isolated from one group of organisms might not turn out to be beneficial for another, thus probiotics dedicated to vertebrates are harmful to or have no beneficial effects on insects (Whitten and Coates 2017, Ptasińska et al. 2016, Johanson et al. 2014, Mirjanic et al. 2013). Digestive system of honeybees is mainly inhabited by *Lactobacillus kunkeei*, *L.apinorum*, *L. mellifer*, *L. apis*, *L. mellis* and *Fructobacillus fructosus* (Hroncova et al. 2015).

*Lactobacillus kunkeei* and *Fructobacillus fructosus* bacteria make up the bulk of the natural, beneficial bacterial flora of honeybees in the summer. Owing to their properties, they occur in any environment with considerable amount of fructose, e.g. pollen, fruit, grape must, etc. Consequently, they also occur in the hive environment. Furthermore, these bacteria are also able to thrive in the honeybee gut, which produces numerous beneficial effects: they help digest and absorb necessary compounds and microelements, protect against mild poisonings with xenobiotics, acidify their environment, which protects the gut from any developments of microorganisms that can be pathogenic for bees, e.g. *Paenibacillus larvae* that cause foulbrood, or *Nosemacerenae* fungi that cause *nosemosis*. They also have immunomodulation effects improving bees' immunity, strengthening the condition of whole bee families and prolonging bees' lives.

In winter, bees are devoid of contacts with their outdoor environment, also with naturally occurring probiotic bacteria. Hence a whole bee family, especially young winter bees, ought to be in touch with a probiotic.

### Biography:

Dr hab. Aneta A. Ptasińska, a lecturer at the Institute of Biology and Biochemistry, Faculty of Biology and Biotechnology, Maria Curie-Skłodowska University, Poland has been researching honeybees and their diseases. She has been doing experimental studies into synthetic and natural substances that could make up the basis for remedies improving bees' condition, fighting bee diseases, mainly fungal diseases, such as *nosemosis*. Dr hab. Ptasińska has been cooperating with numerous scientific centres in Poland and abroad and her studies have been the basis for three patent applications, two industrial implementations, and numerous scientific publications.