

Prebiotic Approach Research with *Taraxacum officinale* and *Cichorium intybus* for the Welfare of Honey Bees and Protection of Microbiota Dynamics and also against Nosemosis

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Microbiota dynamics play an important role that supports the immune system of honey bees against pathogens and pests. For this reason, many studies have been conducted on the effect of probiotic microorganisms on honey bee health. Although the use of probiotic microorganisms is the subject of scientific research, it is still a matter of debate which type of probiotic microorganism, in which combination and in what dose honey bees need. The beneficial microorganism diversity of honey bees shows almost individual differences according to race, region, climate and vegetation. The nutrients that induce the proliferation of individual microorganisms of each honey bee, are structural oligosaccharides defined as prebiotics. The most important prebiotic source is the exine outer layer of pollen, which has a cellulose and chitin structure. However, as one of the negative effects of climate change, the food source of beneficial microorganisms is also decreasing due to the decrease in pollen resources. This situation both weakens the immune system and induces intestinal diseases such as Nosemosis. Inulin was extracted from the roots of *Taraxacum officinale* and *Cichorium intybus* plants, which have high prebiotic properties, and made into a solution in 2 different concentrations in order to provide prebiotic support to the nutrition of honey bees, to encourage the reproduction of their own probiotic microorganisms and to strengthen the immune system. It was added to 1:1 w:v syrup and used to feed the bees in cages with 70 bees each. 4 cages were infected with *Nosema* spores at a rate of 0.9×10^6 spores/mL. It was found statistically significant that life expectancy increased in prebiotic supplemented feeding compared to the control groups. It was determined that the number of spores in bees infected with *Nosema* decreased by 38%. When both plant species were compared, it was determined that *T. officinale* increased the total biomass of microbiota by 33.6%. It is extremely important to support bee nutrition not only in terms of protein but also in terms of prebiotics, especially during periods of pollen shortage. Prebiotics would be a good alternative in tolerating food shortages and protecting bee health against climate change.