


# Chapter 7

## Is There a Relation Between the Probiotic Properties of Honey Isolates and Their Polysaccharides Applications?

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### **ABSTRACT**

*Honey has attracted the attention of scientists recently. The researchers have focused on the products of the honey isolates as an antimicrobial, an antioxidant, and an anticancer agent, besides its great role in the immune system improvement. This chapter will focus on honey bacterial and fungal isolates and the ability of them to produce different enzymes such as levansucrase, dextransucrase, and chitinase. A few years ago, the polysaccharides from bacterial honey isolates were recommended as a multifunction agent that could play a great role in the immune system improve-*

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ment. This article paid attention to the bacterial honey isolates that have probiotic features. Furthermore, it will focus on the applications of the polysaccharides yielded by honey isolates with unique properties as a cancer-protective, antiviral, antioxidant, fibrinolytic agent, anticoagulant, prebiotic, cures peptic ulcers, and anticancer. Finally, this chapter focused on the recommendation of bee honey as a new reservoir for probiotic bacteria producing applied polysaccharides.

## 1. INTRODUCTION

### 1.1. Probiotic Bacteria

Probiotics are a collection of bacteria that, when present in appropriate amounts, increase health advantages to the host (Hill et al. 2014). Probiotic bacteria are good bacteria that aid in preserving human health. They can aid in lowering the body's cholesterol levels, the strengthening of the immune system, and the improvement of digestion and nutritional absorption (Antushevich, 2020). Furthermore, there has been little investigation into probiotics as an alternate antimicrobial treatment or a novel source of antibiotics (Silva et al. 2020). Beneficial bacteria must possess a number of features, the absence of toxicity is the most crucial of these, such as resistance to antibiotics and haemolysis. Furthermore, probiotics must be able to tolerate the stomach's harsh circumstances, such as high concentration of bile salts and low pH. Earlier, *Achromobacter* sp. was discovered to be a bacterial probiotic that affects the functional characteristics of plants. It was also isolated from the microbiome of bees' stomachs (Wang et al. 2021). *Bacillus paralicheniform*, a probiotic bacterium, was isolated in the intestine of grass carps (Zhao et al. 2019). Probiotic microorganisms have a unique manner of demonstrating their potential to create polysaccharides with important health benefits (Angelin & Kavitha, 2020). *Bacillus paranthracis* ICIS-279 could be useful in the creation of probiotics and as a model for studying the interactions between the host and the microbiota (Bukharin et al., 2019). Sixteen probiotic lactic acid bacteria were used to make soy yoghurt, and their probiotic characteristics were investigated. Soymilk was prepared and infected with probiotic bacteria that had previously been isolated. The fermented soymilk's final pH ranged from 4.92 to 6.6, and its titratable acidity was between 0.5 and 0.99 percent. As the soy yoghurt was being prepared, changes in the levels of -glucosidase, isoflavone aglycone, total phenolics, and antioxidant activity were monitored. Both extracellular and cell-bound glucosidase tests were positive for every bacterial isolate. Their blood activity levels varied between 308.65 and 553 mU/mL. Extracellular  $\alpha$ - glucosidase was lower in *Lactobacillus* strains than cell-bound -glucosidase, whereas the other group exhibited the opposite. The content

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