

## Abstract

This study explores the prebiotic potential of chitooligosaccharides (COS) derived from the Bombay locust (*Patanga succincta*), an underutilized insect source, as a novel functional ingredient for promoting gut health. The extracted COS exhibited a moisture content of  $52.00 \pm 3.21\%$ , and scanning electron microscopy analysis revealed a rough and porous surface morphology, which could influence its functional properties. To evaluate its prebiotic activity, COS was tested at concentrations of 5% and 10% to grow *Bifidobacterium*, *Streptococcus thermophilus*, and *Lactobacillus acidophilus*. Inulin was used as a positive control and BHI broth as a negative control. Results showed that inulin consistently enhanced the growth of all tested probiotics throughout the incubation period, confirming its robust prebiotic effect. COS at 5% concentration supported limited growth stimulation of *Bifidobacterium* reaching approximately  $1.4 \times 10^7$  CFU/mL and *L. acidophilus* reaching approximately  $2.1 \times 10^7$  CFU/mL, whereas at 10% concentration, COS appeared to inhibit the growth of these strains, suggesting a concentration-dependent effect. Interestingly, *S. thermophilus* showed no growth promotion with COS at either concentration. These findings indicate that while insect-derived COS possesses some prebiotic properties, its efficacy varies depending on concentration and bacterial strain. The limited prebiotic activity observed may be due to impurities or structural characteristics of COS extracted from the locusts. Further research involving purification, structural modification, and in vivo studies is needed to fully realize the potential of Bombay locust-derived COS as a functional prebiotic ingredient.

**Keywords:** *Bombay locust, chitooligosaccharides, inulin, probiotics, scanning electron microscopy*