

## Sustainable Bee Nutrition: Utilizing Brewer's Yeast as an Alternative to Natural Pollen

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### Abstract:

The decline in natural food sources for bees, exacerbated by climate change and habitat loss, poses significant challenges to beekeeping and agricultural sustainability. This study investigates the development of a food substitute for bees using brewer's yeast (*Saccharomyces cerevisiae*) as an alternative to natural pollen. Brewer's yeast, which is rich in proteins, vitamins, and essential nutrients, provides a viable nutritional solution during periods of food scarcity, thereby promoting colony health and productivity. This research focuses on *Apis mellifera* L., testing various formulations of artificial pollen to evaluate their effects on bee colony growth, immune resilience, and honey production efficiency. The study employs a controlled experimental design across 20 beehives, assessing overall health, brood development, and honey output under different yeast conditions. The results are expected to offer insights into sustainable beekeeping practices, reduce bee mortality, and enhance honey yields, thus supporting the agricultural industry's pollination needs. Total protein content was measured, revealing that the devoid diet contained  $25.171 \pm 0.071$  ug/ $\square$ L (n=10), while the diet with brewer's yeast contained  $107.391 \pm 0.745$  ug/ $\square$ L (n=10). Additionally, this research explores brewer's yeast as a cost-effective, accessible, and environmentally sustainable alternative, which may play a pivotal role in enhancing bee nutrition and productivity.

### Keywords:

Brewer's Yeast; Artificial Diet; Sustainable Beekeeping.