

## Abstract

Chicken feathers which are considered as poultry waste contain 90% keratin which is a structural protein commonly found in feathers, hair, and wool. They are used in biomedicine, agriculture, and sustainable materials due to its strength, biodegradability, and biocompatibility. However, its rigid structure makes extraction difficult, especially with traditional methods that rely on harsh chemicals and may generate pollution. This research explores a greener approach using keratinolytic *Bacillus subtilis* for microbial degradation of chicken feathers via submerged fermentation (SmF). This study aims to investigate the effect of adding peptone and various concentrations of sucrose on bacterial ability to degrade keratin. The results showed that the addition of sucrose and peptone significantly improved *Bacillus subtilis* growth and protein yield from feather degradation. The highest protein concentration (969 µg/mL) was obtained with 5 g/L sucrose and 15 g/L peptone. SDS-PAGE showed strong keratin band breakdown into low molecular weight peptides, while FTIR confirmed structural changes consistent with keratin hydrolysis. However, feather degradation was not directly proportional to protein yield, possibly due to sampling error or microbial reuptake.

Keywords: *Bacillus* spp., microbial degradation, keratin extraction, submerged fermentation, sustainable bioprocess