Abstract

Chicken feathers, a major byproduct of the poultry industry, pose serious environmental challenges due to their resistance to natural degradation. This is primarily caused by β-keratin, a strong, insoluble protein that forms the structural basis of feathers. Conventional keratin extraction methods typically involve harsh chemicals that are environmentally damaging and may compromise the quality of the resulting protein. In this study, the keratinolytic potential of several *Bacillus* strains was screened to identify the most effective candidate for keratin degradation under submerged fermentation (SmF) conditions. Among them, *Bacillus subtilis* N10ND demonstrated the highest degradation efficiency and was selected for further optimization of fermentation duration. Fermentation was carried out over five days, and samples were analyzed for bacterial growth (CFU count), substrate degradation, and soluble protein concentration (via BCA assay). Structural changes in the feather material were evaluated using Fourier Transform Infrared Spectroscopy (FTIR), while protein band profiles were assessed through SDS-PAGE. Although a gradual increase in feather degradation and protein yield was observed over time, statistical analysis revealed no significant difference between fermentation durations. These results suggest that *Bacillus subtilis* N10ND can degrade feather keratin under SmF conditions, though extending fermentation beyond three days offers limited improvement in yield.

Keywords: *Bacillus subtilis*, keratin degradation, chicken feathers, submerged fermentation, FTIR, SDS-PAGE, BCA assay