

# **TÍTULO:** DEGRADATION OF CHICKEN FEATHERS BY FILAMENTOUS FUNGI IN SUBMERGED FERMENTATION

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## **ABSTRACT:**

Inadequate disposal of feathers from the poultry industry contaminates soil and water bodies. The incorporation of enzymatically degraded feathers into animal feed or plant manure is indicated as an environmentally safe destination for these residues. We aimed in this work to evaluate the degradation of chicken feathers by filamentous fungi during submerged fermentation. Fifteen previously selected isolates were used as good feather degraders. The fungal isolates were identified morphologically and by molecular phylogeny by sequencing the beta-tubulin region for the isolates of the genus *Penicillium*, *Purpureocillium*, *Aspergillus* and *Metarhizium*; the TEF (translation and elongation factor of the RNA polymerase) region for the genera *Trichoderma* and *Cladosporium*; the LSU (Large Subunit of the nuclear ribosomal RNA) region for the genus *Acremonium*; and the region ITS1 and ITS2 (Internal Transcribed Space) for the genus *Clonostachys* and *Fusarium*. The degradation of chicken feathers was evaluated by means of submerged fermentation with three replicates in a randomized block design in time. The isolates were initially transferred to 250 ml erlenmeyers containing 0.6 g of feathers and 60 ml of saline solution composed of (g / liter): NaCl (0,5), K<sub>2</sub>HPO<sub>4</sub> (0,3), KH<sub>2</sub>PO<sub>4</sub> (0,4). The feathers and the saline medium were autoclaved separately. The degradation was evaluated on the 7th day of submerged fermentation. With the morphological and molecular analyzes the following species were identified: *Purpureocillium lilacinus* IS35, IS27, IS28 and IS11, *Fusarium oxysporum* IS98, *Penicillium daleae* IS25.2, *Metarhizium anisopliae* IS15, *Penicillium citrinum* IS4, *Fusarium solani* IS10, *Acremonium borodinense* IS21.1, *Aspergillus terreus* IS37, *Trichoderma harzianum* IS57, and it was not possible to identify at the species level *Cladosporium sp.* ISSD.8 *Trichoderma sp.* IS3 and *Clonostachys sp.* IS5.2. In the evaluation of the degradation of feathers the isolates of the species *Purpureocillium lilacinus* and the species *Acremonium borodinense* and *Clonostachys sp.* showed percentages of degradation above 30%: *Purpureocillium lilacinus* IS35 (37,86), *Purpureocillium lilacinus* IS27 (32,96), *Purpureocillium lilacinus* IS28 (31,65), *Purpureocillium lilacinus* IS11 (30,69), *Acremonium borodinense* IS21.1 (31,09) and *Clonostachys sp.* IS5.2 (30,67) evidencing the biotechnological potential of these isolates may be further exploited.

**Keywords:** enzymes; biotechnology, feathers, filamental fungi

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