Prospection of cellulolytic fungi from composted samples of saturated horse litter

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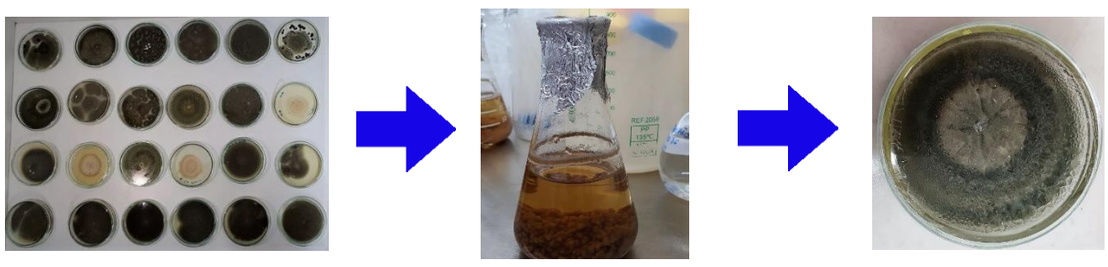
Introduction

- **The generation of waste during the production chain of horses causes negative impacts on environment.**
- **Due to the nature of the materials used in the horse beds, the composting process of this material can be long.**
- **Biotechnology is a promising tool capable of increasing the degrading activity of lignocellulolytic biomolecules.**
- **In the present study the cellulolyticactivity of fungi presents in horse's bed made with shavings and rice straw was evaluated**

Materials and methods

The pyramidal compost piles of horse manure combined with wood shavings or rice straw. While the composting reachedthe thermophilic phase, the material was sampled in five different points to form a composite sample.

For fungal isolation the sample were serially diluted in 0.9% NaCl and inoculated in cellulolytic selective medium, according to Parkinson et al. (1971). Molecular identification of the isolates was also performed by extraction of fungal DNA using the FavorPrepTM Soil DNA Isolation Mini Kit, followed by amplification of genetic material by the polymerase chain reaction (PCR) technique, using the primes ITS1 and ITS4 (White et al., 1990).



Results e Discussion

All isolates were identified as belonging to the *Aspergillus fumigatus* species (Figure1).

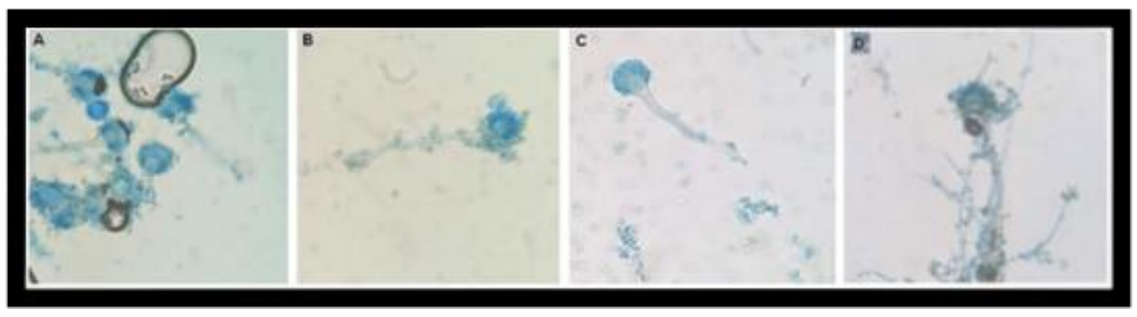


Figure 1 – Morphologic characteristics of selected fungi. A: isolated PA-7 field 7; B: isolated MA-7 field 9; C: isolated MA-6 field F2; D: isolated PA-7 field 5.

From the 7 isolates showing total cellulase activity, 4 were obtained from the wood shavings substrate and 3 from the rice straw substrate. Isolates PA-7 5 and PA-7 7, obtained from rice straw, showed the highest cellulolytic activities (0,376 e 0,358 UI mL-1, respectively, Figure 2).

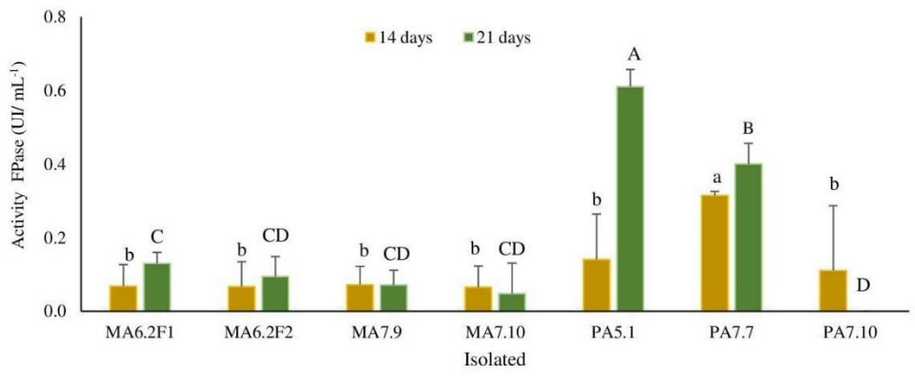


Figure 2. Graphic representation of the averages of enzymatic activities of total cellulase (FPase; UI mL^{-1}). Different letters indicate difference by t (Student) at 5% de probability.

Promising results were also observed in inoculation of a consortium of 3 species of fungi of Aspergillus genus (*A. fumigatus*, *A. flavus* and *A. terreus*) reduced the stabilization time of rice straw and poultry manure waste compost (Khyalia et al., 2022))

***A. fumigatus* can develop in the presence of complex biomasses, its transcriptional profile is completely distinct when subjected to carbon sources with distinct complexities, varying the profile of genes encoding hydrolytic enzymes (Bernardi, 2017)**

Conclusion

***A. fumigatus* stands out as a promising fungus to bereapplied in saturated equine bedding compost piles, with the potential to accelerate the maturation of the compost.**

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