# Importance of carbon source for the cellulase activity in *Trichoderma* strains isolated from kitchen waste compost

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## Introduction

- One of the major issues in urban areas is the production of kitchen waste residues.
- Solid waste is rich in lipids and lignocellulosic compounds that are hard to decompose due to the complexity of their molecules.
- Making use of microorganisms multifunctionality could enable a faster and more efficient composting process.

Our aim is to isolate and identify fungi strains able to degrade cellulose and to understand how different carbon sources could affect their cellulolytic potential.

## Materials and methods

The compost samples were diluted and plated in PDA medium until the formation of single colonies. Isolates were identified and grown in selective CMC medium to test for their cellulolytic potential as described by Carder (1986).

After the plate test, the Trichoderma strains were submitted to a submerged-state fermentation (SmF) experiment using basal medium with the addition of different carbon sources that are commonly used in composting piles: wood shaving, rice straw and dry Tifton 85 grass (Cynodon spp.).

Kitchen waste compost

Isolation and morphological identification of fungi strains

5x fungi grow in cellulolitic CMC medium

Cellulase test in 3 carbon sources

Tifton grass

Rice straw

Wood shavings

## Results

The two isolated strains were called F10A and F10C and they were identified as *Trichoderma spp*. Both strains were induced to produce CMCase enzymes after growing repeatedly in CMC substrate. Plates were stained with Congo red after a three-day incubation period.

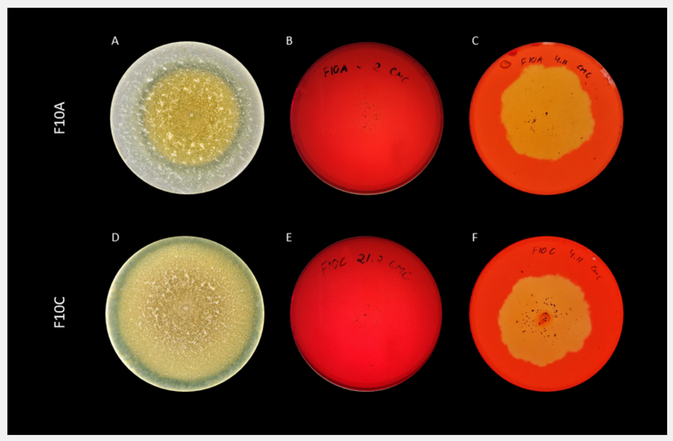


**Figure 1**. Morphology of the isolated strains growing in PDA plates (A and D) and cellulase production in CMC medium. Strains growing in CMC medium after isolation (B and E) and after growing repeatedly in the presence of CMC substrate (C and F).

Trichoderma strains were submitted to a submerged-state fermentation (SmF) that was conducted for 21 days at 28˚C. The filter paper activity (FPase) was determined according to Miller (1959).

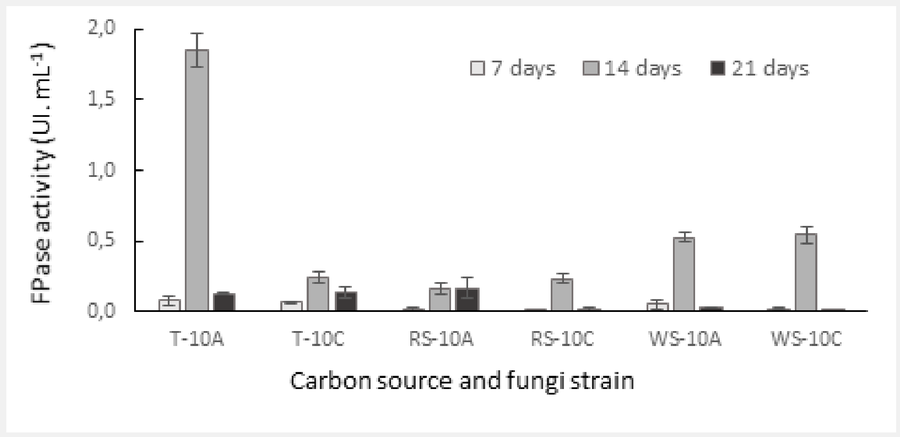


**Figure 3.** FPase activity of fungi F10A and F10C in submerged-state fermentation with different carbon sources. FPase activity for fungi incubated with Tifton 85 grass (T), rice straw (RS) and wood shavings (WS).

## Discussion

- Our results show that the carbon source has an influence on the enzyme production (Amadi at al. 2020).
- The combination of strain F10A growing with Tifton 85 for 14 days resulted in the higher FPase activity.
- Other culture conditions need to be optimized in order to achieve the full potential of enzyme production of our isolates (Su at al. 2017).
- Our results point to the potential use of Trichoderma strains to enrich composting piles and improve the composting process of kitchen waste.

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