# Isolation and morphological identification of fungi from "*Solanum elaeagnifolium*" green compost

# Isolamento e identificação morfológica de fungos do composto verde "Solanum elaeagnifolium"

# Aislamiento e identificación morfológica de hongos del compost verde «Solanum elaeagnifolium»

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**Aicha Bouras**
Laboratory of Plant and Microbial Productions and Valuations, Department of Biotechnology, Faculty of Nature and Life Sciences, University of Science and Technology of Oran Mohamed Boudiaf (USTO-MB)
Algeria
bouras.a@outlook.com

**Ryme Terbeche**
Laborotory of Toxicology Environment and Health, Department of living and environment, Faculty of Nature and Life Sciences, University of Science and Technology of Oran Mohamed Boudiaf
(USTO-MB)
Algeria
rymeterbeche@yahoo.fr

## ABSTRACT
The present study is a research of the quantitative and qualitative composition of mycoflora of a green compost, aged of 06 months and mesophilically produced from plant debris of an undesirable plant "*Solanum elaeagnifolium*". Fungi were isolated on PDA medium and incubated at different temperatures "22°C, 30°C and 45°C". The results has showed that the fungi concentration varies between 2,2 x$10^5$ and 6,24 x$10^5$ CFU/g of dried green compost according to the incubation's temperature. Thirty species of fungi belonging to 10 genera were isolated and identified. The 03 principal genuses are: *Aspergillus*, *Penicillium* and *Trichoderma*, signifying that are the major representative of fungi community of "*Solanum elaeagnifolium"* green compost. The presences of a high concentration of antagonist species and the absence of pathogenic species witnessed the maturity of the green compost and make it as a good organic amendment for plant culture for stimulate their growth and to protect them from soil pathogens. The inventory of the mycoflora of this compost was necessary to determine its quality and the most appropriate application of them as a biological control agent against several plants' pathogens fungi.

**Keywords:** *Solanum elaeagnifolium,* green compost, mycoflora.

**RESUMO**
El presente estudio es una investigación de la composición cuantitativa y cualitativa de la micoflora de un compost verde, envejecido de 06 meses y producido mesófilamente a partir de restos vegetales de una planta indeseable «*Solanum elaeagnifolium*». Los hongos se aislaron en medio PDA y se incubaron a diferentes temperaturas «22°C, 30°C y 45°C». Los resultados han mostrado que la concentración de hongos varía entre 2,2 x105 y 6,24 x105 UFC/g de compost verde seco en función de la temperatura de incubación. Se aislaron e identificaron 30 especies de hongos pertenecientes a 10 géneros. Los 03 géneros principales son: *Aspergillus*, *Penicillium* y *Trichoderma*, significando que son los mayores representantes de la comunidad de hongos del compost verde «*Solanum elaeagnifolium*». La presencia de una alta concentración de especies antagonistas y la ausencia de especies patógenas atestiguan la madurez del compost verde y lo convierten en una buena enmienda orgánica para el cultivo de plantas, ya que estimula su crecimiento y las protege de los patógenos del suelo. El inventario de la micoflora de este compost era necesario para determinar su calidad y la aplicación más adecuada de los mismos como agente de control biológico contra diversos hongos patógenos de las plantas.

**Palavras-chave:** *Solanum elaeagnifolium,* composto verde, micoflora.

**RESUMEN**
El presente estudio es una investigación de la composición cuantitativa y cualitativa de la micoflora de un compost verde, envejecido de 06 meses y producido mesófilamente a partir de restos vegetales de una planta indeseable «*Solanum elaeagnifolium*». Los hongos se aislaron en medio PDA y se incubaron a diferentes temperaturas «22°C, 30°C y 45°C». Los resultados han mostrado que la concentración de hongos varía entre 2,2 x105 y 6,24 x105 UFC/g de compost verde seco en función de la temperatura de incubación. Se aislaron e identificaron 30 especies de hongos pertenecientes a 10 géneros. Los 03 géneros principales son: *Aspergillus*, *Penicillium* y *Trichoderma*, significando que son los mayores representantes de la comunidad de hongos del compost verde «*Solanum elaeagnifolium*». La presencia de una alta concentración de especies antagonistas y la ausencia de especies patógenas atestiguan la madurez del compost verde y lo convierten en una buena enmienda orgánica para el cultivo de plantas, ya que estimula su crecimiento y las protege de los patógenos del suelo. El inventario de la micoflora de este compost era necesario para determinar su calidad y la aplicación más adecuada de los mismos como agente de control biológico contra diversos hongos patógenos de las plantas.

**Palabras clave:** *Solanum elaeagnifolium,* compost verde, micoflora.

## 1 INTRODUCTION

Composting is known as a biological conversion of most biodegradable materials, usually mixture of solid organic waste, sewage sludge, green and industrial wastes, or animal manure into usable end products such as fertilizers. Mature compost contains an important community of a large diversity of mesophilic microorganisms. The amendment of soil with compost is also an amendment with living microorganisms (Lalande et al. 1998; Pascual et al. 1999; Albiach et al. 2000; Boulter et al. 2000; Masciandaro et al. 2000).

The use of compost made from green wastes, as organic amendments in soil, are considered agronomically advantageous and more safe compared with the other kind of composts, which have

high risk of toxicity due to the presence of pollutants, heavy metals, pathogen microbial, etc (Lalande et al. 1998; Witter et al. 1998; Pascual et al. 1999; Albiach et al. 2000; Masciandaro et al. 2000).The active element implicated in the biodegradation and conversion processes during composting is the resident microbial community, and more specially fungi, where the play a very important role. They use different sources of carbon, essentially lignocellulosic polymers and can survive in extreme conditions. They mainly are responsible for compost maturation (Miller et al. 1996).The biomass ratio of fungi to prokaryotes in compost is about 2:1 (Sparling et al. 1982; Wiegant et al. 1992).

Moreover, fungi affect soil fertility, promote mushroom growth and suppress plant diseases caused by a variety of soil-borne plant pathogens (Straatsma et al. 1993; Tuiter et al. 1998 ; Hoitink et al. 1999; Widmer et al. 1999).

In addition, their ability to degrade complex polymers such as plastics or polyaromatic compounds, allow their use to bioremediate soils contaminated with a wide range of pollutants (Kastner et al. 1996; Eggen et al. 1999 ; Minussi et al. 2001).

In fact and for a better understanding of fungal diversity in green compost, it is crucial to detect fungi hazardous to humans, animals and plants to optimize compost quality standards for its best application (Peters et al. 2000).

However, a lot of informations are founded about the succession of fungi, mainly thermotolerant and thermophilic fungi in industrial composting, using a variety of procedures and raw materials with different end products (Straatsma et al. 1993 ; Beffa et al. 1998).On the other hand, a very little is known about fungal communities in mesophilic natural processes.

The present study focuses on the species composition and load of the mycoflora of mature green composts, produced with debris of an undesirable plants "*Solanum elaeagnifolium*", to be applied in agriculture, as biological control against several plants' pathogens fungi in northern west Algeria.

## 2 MATERIALS AND METHODS

### 2.1 *SOLANUM ELAEAGNIFOLIUM* GREEN COMPOST

The compost used in this study, is a mature green compost (aged of 06 months), composed of 100% of plants of *Solanum elaeagnifolium* (mesophilically produced from plant debris). It pH (extracted in the water) is 7.4, the ration C/N is about 14.5 and there salinity is about 3,75 (mS/cm).

2.2 CULTIVATED MEDIUM

The medium used to cultivate the different fungi isolated from the green compost was PDA (Potato Dextrose Agar: 200 g of potato; 10 g of dextrose; 20g of agar-agar; distilled water 1000 ml). The medium was autoclaved at 121°C for 15 minutes. After autoclaving, an antibiotic (5 mg of chloramphénicol) was added to 100 ml of cooled molten media (PDA) to stop bacterial proliferation.

2.3 GREEN COMPOST MYCOFLORA ANALYSIS

**2.3.1 Preparation of compost dilution**

To evaluate fungi quantification in the green compost, the technic of soil dilution plating was adapted from method by Rapilly (1968). 10g of dried compost was homogined in 90ml of sterilised distilled water and shaken well for 30 min to disperse the organisms (mycelia and spores). The dilution factor for this solution is $10^{-}1$. Next, 1ml of the suspension was removed from the previous solution using a sterile pipette and then transferred to a new tube containing 9ml of sterilised distilled water. The tube was capped and vortexed. The dilution factor for this solution is $10^{-2}$. The dilution series was continued to obtain solutions with dilution factors of $10^{-3}$, $10^{-4}$ and $10^{-5}$.

**2.3.2 Fungi denombrement**

For fungi denombrement, 1 ml of each compost dilution was transferred into Petri dish containing molten PDA supplemented with 5mg/100ml of chloramphenicol. The medium and inoculums were homogenized before the agar solidifies. After all plates have solidified, they were incubated at three temperatures: 22°C, 30˚C and 45°C for 1 week, to isolate mesophilic and thermotolerant/thermophilic fungi. Each individual dilution was replicated thrice. The whole experiment was repeated twice.

Results expression: The detremination of green compost fungi charge was done by the comptage of fungi colonies and results were given using the expression of "CFU" (Colony Forming Unit) /g of green compost, and were calculated according to the following formula:

$$N = \frac{\sum \text{colonies}}{\text{Vml x } (n1 + 0{,}1n2) \text{x d1}}$$

Where N: Numer of CFU per gramme of green compost; ∑ colonies: all colonies in taken Petri dishes; V: Volume of disposed solution (1ml); n1: number of petri dishes taken in the first dilution; n2: number of petri dishes taken in the second dilution; d1: factor of the first dilution taken.

Only Petri dishes having between 15 and 150 colonies in two successive dilutions were taken for denombrement (Dutruc-Rosset, 2003). The number of Colony Forming Unit per g of dry green compost was calculated for the total mycoflora and for each species or morphotype.

### 2.3.3 Fungi isolation and identification

Every day and for 7 days, the presence of fungi isolates was observed. Based on color and surface morphology, the fungi were then separated to Potato Dextrose agar (PDA) plates with each type of fungi were transferred to 3 plates. Then, the plates were incubated for 1 week at room temperature. To obtain the pure culture, the fungi colony formed were inoculated on water agar for 5 to 7 days in order to isolate single spore or hyphal tip. For each isolate, a single spore or hyphal tip was then inoculated on new PDA as the pure culture. For long term storage, the pure culture fungi were inoculated on slanted PDA.

### 2.3.4 Cultural, morphological and microscopic identification of green compost fungi isolates

For fungi morphological identification, the isolated were cultivated aseptically on the PDA drop located on the surface of sterile glass microscope slides place in sterile Petri dish. To determine their genera, fungal isolates were then identified conventionally according to their macroscopic characters (color, texture, appearance, and diameter of colonies) and microscopic (hyphae and conidia). Using identification key from Pictorial Atlas of Soil and Seed Fungi (Watanabe, 2010), (Domsch et al. 1980; Kiffer et al. 1997; Lieckfeldt et al. 1999; Pitt, 2000) different genera and species are identified.

## 2.4 STATISTICAL ANALYSIS

For each dilution and each incubation temperature, three repetitions were done. Three repetitions were used for the total fungal load and for each species or morphotype denombrement. Results were analyzed with Microsoft Excel 2007 and completed with one way analysis of variance (ANOVA) associated to the mean comparison test of Student-Newman-Keuls (SNK) (at $P \leq 0.05$) using SPSS (Statistical Package for the Social Sciences) version 16.0. Each individual treatment was replicated thrice. The whole experiment was repeated twice.

# 3 RESULTS AND DISCUSSION

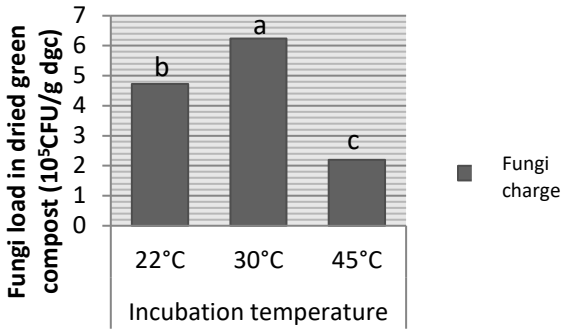
## 3.1 FUNGI QUANTIFICATION

Total fungal load in green compost was high at 30°C than at 22°C and 45°C. It was about 6,24x105; 4,72x105 and 2,2x105 CFU/g of dried green compost, respectively (Figure 1).

## 3.2 FUNGI IDENTIFICATION

From the green compost used, a total of 30 fungi isolates were obtained and were identified based on their cultural and morphological characteristics such as colony color, reverse color, texture, margin and colony diameter. 30 fungi species from 10 genus were isolated from "*Solanum elaeagnifolium*" green compost. The presence of the different species at different incubation temperatures: 22°C, 30°C and 45°C are shown on table.1. The 03 principal genuses are: *Aspergillus*, *Penicillium* and *Trichoderma*, signifying that are the major representative of fungi community of "*Solanum elaeagnifolium*" green compost. The results shown that all species can be developed at 30°C. Only, six species were developed at 45°C: *Aspergillus japonicas*, *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus terrus*, Emericella nidulans and Humicola pulvericola. Macroscopic and microscopic characters of the 30 fungi isolates genus and species are shown on following photos (Figure 1, Figure 2, Figure 3, Figure 4 and Figure 5).

Figure 1. Total fungi load in dried green compost, calculated on PDA medium at three incubations temperatures: 22°C, 30°C and 45°C for 1 week. Different letters indicate significant differences (at $P \leq 0.05$, mean comparison test of Student-Newman-Keuls (SNK)) among the load of the green compost obtained in different incubations temperatures.




Source: Prepared by the authors (2025)

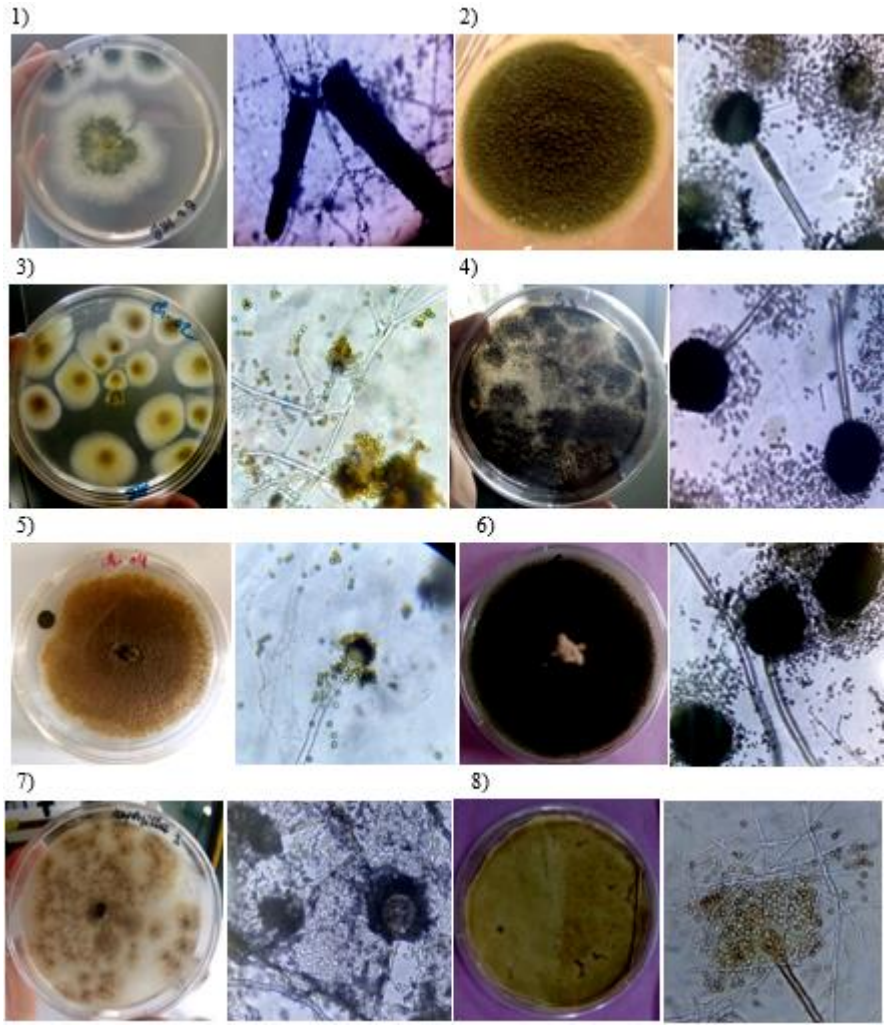
Table 1. Fungi species isolated from "*Solanum elaeagnifolium*" green compost, their temperature of isolation and their load (CFU/g dried green compost)

| **Fungi Species** | **Temperature (°C )** | **Fungi load (CFU/g dgc)** |
|---|---|---|
| 1. *Aspergillus clavatus* Desm (1834) | 22,30 | $0,7x10^3$ |
| 2. *Aspergillus flavus* Link (1809) | 22,30,45 | $4,9x10^3$ |
| 3. *Aspergillus heldtiae* Romeo et Houbraken (2020) | 22,30 | $1,5x10^3$ |
| 4. *Aspergillus japonicus* Saito (1906) | 22,30,45 | $1,2x10^3$ |
| 5. *Aspergillus nidulans* G. Winter (1884) | 22,30,45 | $3,7x10^3$ |
| 6. *Aspergillus niger* Van Tieghem (1867) | 22,30,45 | $4,2x10^4$ |
| 7. *Aspergillus ochraceus* K. Wilh (1877) | 22,30 | $1,9x10^3$ |
| 8. *Aspergillus puniceus* Kwon-Chung et Fenelle (1965) | 22,30 | $0,5x10^3$ |
| 9. *Aspergillus terreus* Charles Thom (1918) | 30,45 | $3,7x10^4$ |
| 10.*Aspergillus tubingensis* R.Mosseray (1934) | 22,30 | $2,7x10^3$ |
| 11. *Aspergillus uvarum* G.Perrone (2008) | 22,30 | $1,9.10^2$ |
| 12. *Aspergillus versicolor* (Vuill.) Tirab., (1908) | 22,30 | $1,5x10^3$ |
| 13. *Aspergillus wentii* Wehmer (1896) | 22,30 | $0,6x10^3$ |
| 14. *Cladosporium cladosporioides* (Fresen.) G.A.de Vries (1952) | 22,30 | $0,4x10^2$ |
| 15. *Emericella nidulans* (Eidam) Vuill. (1927) tleomorphe d'*Aspergillus nidulans* (Eidam) G. Winter (1884) | 22,30,45 | $3,3x10^3$ |

| | | |
|---|---|---|
| 16. *Humicola pulvericola* (Fresen) G.A. de Vries (1952) | 30,45 | $0,5x10^2$ |
| 17. *Metarhizium anisopliae* (Metchnikoff) Sorokin (1883) | 30°C | $0,3x10^2$ |
| 18. *Mucor* sp. Fresen (1850) | 22,30 | $3,7x10^3$ |
| 19. *Neofusicoccum parvum* (Pennycook et Samuels) Crous,Chausson et AJLPhillips (2006) | 22,30 | $0,4x10^2$ |
| 20. *Penicillium chrysogenum* Westling (1911) | 30 | $2,3x10^3$ |
| 21. *Penicillium digitatum* Sacc (1881) | 30 | $1,6x10^3$ |
| 22. *Penicillium frequentans* Westling (1911) | 30 | $1,4x10^2$ |
| 23. *Penicillium jensenii* Zalesski KM (1927) | 30 | $1,5x10^2$ |
| 24. *Penicillium notatum* Westling (1911) | 30 | $1,8x10^3$ |
| 25. *Penicillium raistrickii* Smith G (1933) | 22,30 | $1,5x10^2$ |
| 26. *Penicillium* sp. | 30 | $1,3x10^3$ |
| 27. *Trichoderma harzianum* Rifai (1969) | 30 | $4,5x10^4$ |
| 28. *Trichoderma paucisporum* Samuels *et al*., (2006) | 30 | $2,9x10^2$ |
| 29. *Trichoderma viride* Pers (1794) | 30 | $4,2x10^4$ |
| 30. *Ulocladium artum* (Preuss) Sacc., (1886) | 22,30 | $1,7x10^2$ |

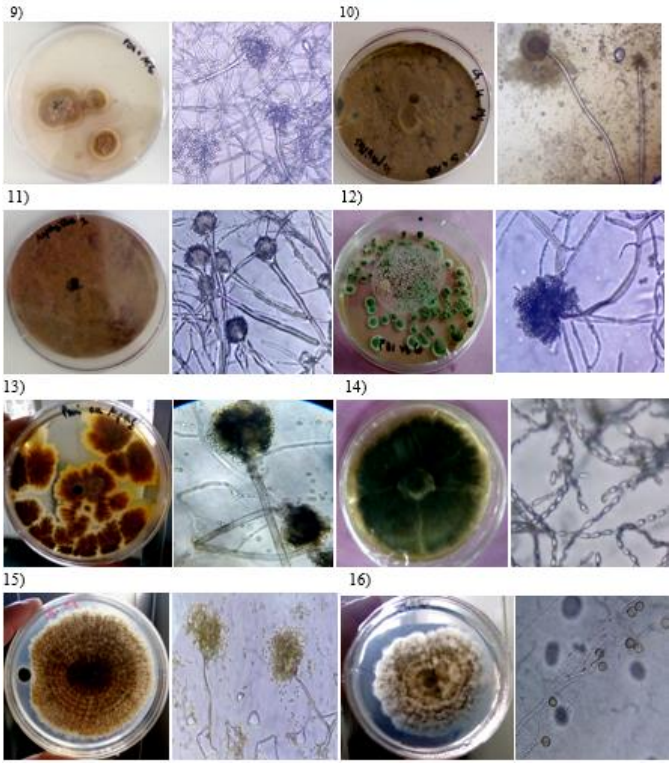
Source: Prepared by the authors (2025)

Figure 2. Macroscopic and microscopic observation of fungi species isolated from "*Solanum elaeagnifolium*" green compost. 1) *Aspergillus clavatus*,2) *Aspergillus flavus*,3) *Aspergillus heldtiae*,4) *Aspergillus japonicus* ,5*) Aspergillus nidulans* ,6*) Aspergillus niger*,7) *Aspergillus ochraceus*,8) *Aspergillus puniceus.*



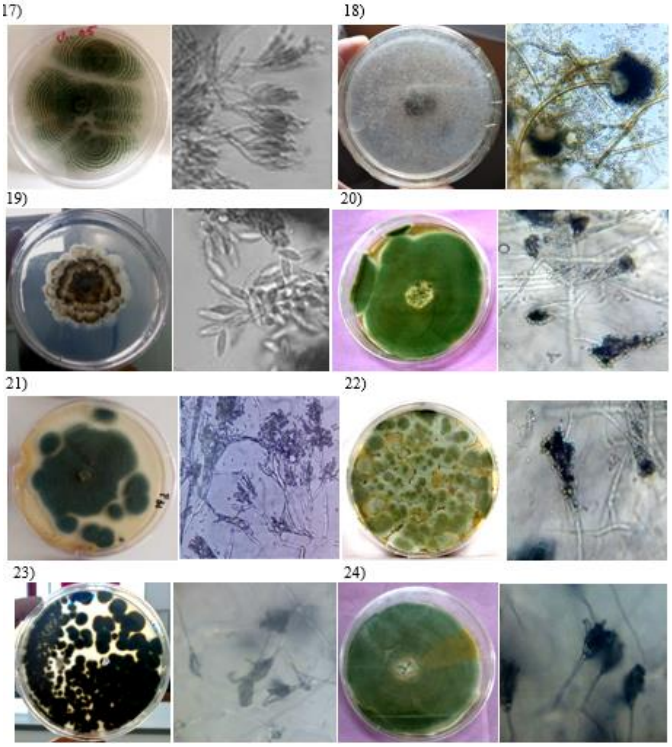

Source: Prepared by the authors (2025)

Figure 3. Macroscopic and microscopic observation of fungi species isolated from "*Solanum elaeagnifolium*" green compost. 9) *Aspergillus terreus*,10) *Aspergillus tubingensis*, 11) *Aspergillus uvarum* , 12) *Aspergillus versicolor*,13) *Aspergillus wentii*,14) *Cladosporium cladosporioides*,15) *Emericella nidulans*,16) *Humicola pulvericola*.



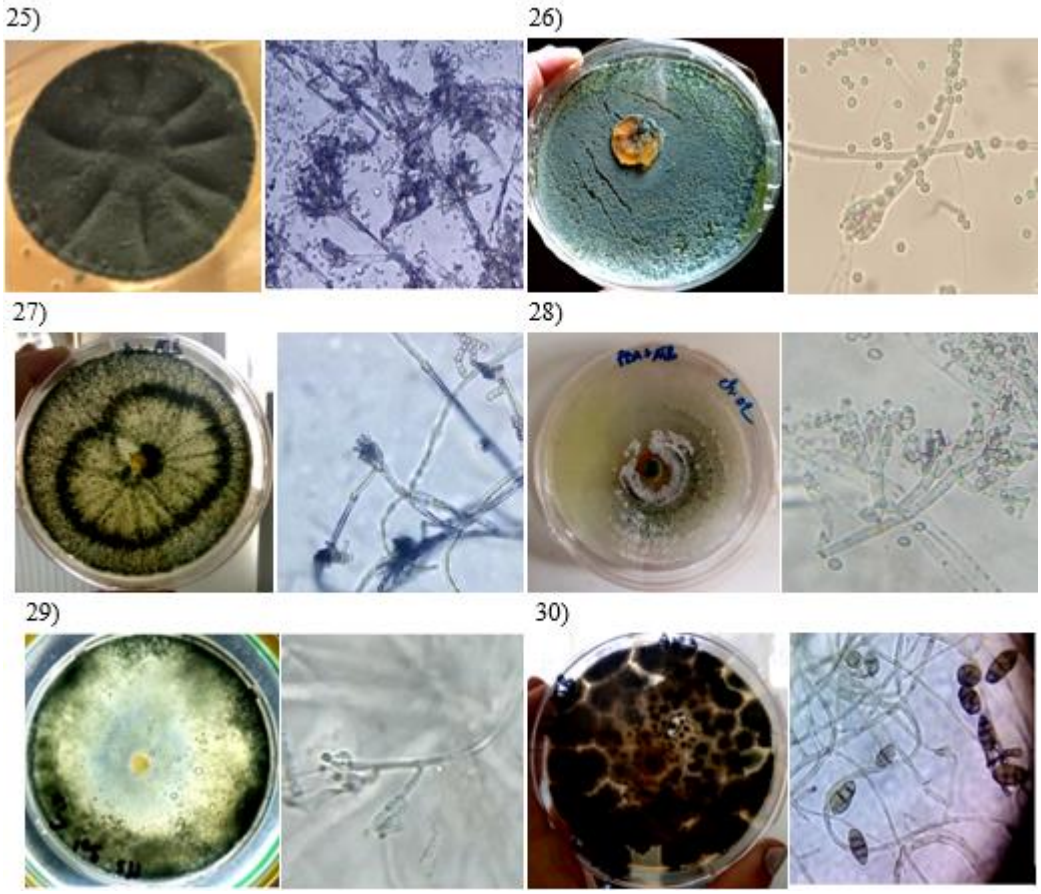

Source: Prepared by the authors (2025)

Figure 4. Macroscopic and microscopic observation of fungi species isolated from "*Solanum elaeagnifolium*" green compost. 17) *Metarhizium anisopliae*, 18) *Mucor sp*.,19) *Neofusicoccum parvum*,20) *Penicillium chrysogenum*, 21) *Penicillium digitatum*,22) *Penicillium frequentans*,23) *Penicillium jensenii*,24) *Penicillium notatum*.




Source: Prepared by the authors (2025)

Figure 5. Macroscopic and microscopic observation of fungi species isolated from "*Solanum elaeagnifolium*" green compost. 25) *Penicillium raistrickii*, 26) *Penicillium sp*., 27) *Trichoderma harzianum*, 28) *Trichoderma paucisporum*, 29) *Trichoderma viride*, 30) *Ulocladium artum*.




Source: Prepared by the authors (2025)

In modern agriculture, the use of green compost is safe and advantageous than the other kind of composts made from animals manure, industrial wastes, where they presents a high risk for human and animal health and the pollution of the environment.

Green compost could be a promising way for the biological control of plant diseases and so could reduce the need for fungicide use because of their harmful effect on human health and cause the environmental pollution.

Several reserches had shown that the mycoflora of compost plays the major role in plant pathogen supression (Camozzi, 2003). Benefical fungi present in green compost are implicated in various supressive activities and strains of *Trichoderma sp*., *Penicillium sp*. and *Aspergillus sp*. Isolated from compost, were shown to be effective antagonistes against several pathogens. Strains of Trichoderma hamatum suppressed Fusarium oxysporum. Isolates of Penicillium sp. and *Aspergillus sp*. were suppressive to *Fusarium solani*, *F.graminarum*, *F.oxysporum* (Daami-Remadi, 2006).

In the present study, the isolation and the identification of fungi from green compost made from "*Solanum elaeagnifolium*" plants debris concerned only the cultivable ones. For non cultivated fungi, techniques based on PCR identification will be necessary to identify them (Peters et al. 2000; Beaulieu et al. 2011).

The evaluation of total mycoflora from green compost demonstrate that contain approximately 6,24 x105 CFU/g of dried green compost. This value is calculated only from strains cultivated on PDA medium and incubated at 30°C, where the majority of fungi species can growth at this temperature (mesophilic fungi), while it not the optimal temperature of development for thermophilic ones.

The riches of green compost with fungi allow the biodiversity of exploited soils, where the amendment of soil with green compost increase it microorganims population with a factor of 1000 (Lazarovits, 2001). What it explain the benefic effect of compost use compared with peat amendement witch is poor on microorganisms (Larbi, 2006).

Total mycoflora indentifed in the present rearch shown similair results with Riachi (1998), where it was demonstrate that the total fungi load from green compost it was beteween 105 and 106 CFU/g of dried compost. The same results were obtaind with Anastasi et al. (2005), where the total fungi charge it was between 5x104 and 8,2x105 CFU/g dried compost, and about 5,3x104 and 4,105 CFU/g dried compost in a vermicompost depending on culture media and incubation temperature. Fungi flora charge from urban solid waste compost was from 0,8x105 to 14,89x105 CFU/g dried compost (Mouria, 2012). Eida et al. (2016) demonstrated that compost mesophilic fungi load was 6,3x105 CFU/ of diried compost.

It so important to know that the initial composition of materials used for composting and the technique used, can essentially affected the composition of compost on its mycoflora witch is responsible of bio-decomposition degree and maturity of the compost. A young compost in thermopilic phase is essentially dominated with bacteria, then with fungi as a finally phase. The high load of the green compost used in this study with fungi, indicated its good degree of maturity (Levanon et Pluda, 2002; Larbi, 2006).

The variation of fungi charge in green compost between 2,2 x105 and 6,24 x105 CFU/g of dried compost, is depending on incubation temperature and the thermosensibility of mesophilic fungi species not able to growth at a high temperature.

The screening of green compost fungi species showed the existence of 30 species from 10 genera whose three principal genera: *Aspergillus sp*., *Penicillium sp*. and *Trichoderma sp*.

The isolation of an important number of fungi species witnessed the diversity of fungi population of the studied green compost.

The most fungi species identified are from two principal genera "*Aspergillus sp*. and *Penicillium sp*." The same results were demonstrated by Khattabi (2004). Anastasi et al. (2005), demonstrated the same results from vermicompost. The same results were shown by Mouria (2012) from urban solid waste compost.

In other study, did by Riachi (1998), it was shown that 60 species from 26 genera of fungi were isolated from green compost in which 9 were the same identified in the present study: *Aspergillus, Penicillium, Trichoderma, Emericelle* and *Humicola*.

Anastasi et al. (2005), had also isolated 17 species of fungi from a vermicompost, the same identifed in this study, like *Aspergillus* flavus, A.ochraceus, A. versicolor, A. niger, A. terreus, *A. wentii, A.puniceus, Cladosporium cladosporoides, Emericella nidulans, Penicillium chrysogenum, P.digitatum, P.jensenii, P.frequentans, P.raistrickii, P.notatum , Trichoderma harizianum* and *Mucor sp*.

Species of *Aspergillus*, Emericella and *Penicillium genera* have been identified by Souza Dias, et al. (2009), where *Aspergillus ochraceus*, *Aspergillus terreus* were isolated from the formulations of growing compost of *A. brasiliensis*.

Mouria et al. (2012) has also isolated from urban solid waste compost, 23 species, in which 5 species were indentified also in this study like Aspergillus japonicus, *Cladosporium cladosporoides, Emericella nidulans, Penicillium sp., Trichoderma harizianum and Ulocladium sp. Aspergillus sp., Mucor sp., Penicillium sp., Tríchoderma sp.* were the most fungi genera isolated from municipal sewage sludge compost (Grisselle et al. 2014).

Eida et al. (2016) had isolated *Aspergillus glaucus*, A. terreus and Penicillium sp. from municipal solid waste (MSW) compost.

Yousofvand et al. (2020) had obtained 24 fungi isolates from municipal waste compost and mushroom compost, where *Aspergillus* species were the most abundant fungi identified: *Aspergillus nidulans, A. nigerand A. terrus*.

From the fungi species isolated in this study, only a few species had the capacity to growth at a high temperature like 45°C. These species are thermophilic (Mouchacca,1997) like *Aspergillus japonicus , A. terreus, A. niger, A. nidulans, A. flavus, Emericella nidulans* and *Humicola pulvericola* with a load charge varied between 0,5x102 and 4,2x103 CFU/g of dried green compost. This kind of fungi had proliferated during composting mature phase. It low concentration in compost is probably because of the way of composting; in which a mesophilic method made was used. Similar results were obtained by Witfeld et al. (2021), where 31 thermophilic fungal species from 08 composts piles were identified, belonging to 03 genera *Aspergillus sp., Penicillium sp., and Trichoderma sp.*

In fact, it will be shown that this new kind of green compost made was success and it so reach on fungi species and specially antagonist's ones like *Aspergillus, Penicillium, Ulocladium, Trichoderma viride* and *T.harizianum*.

Showing that, when the composting is made with the right way and in good conditions, a population of antagonist microorganisms are developed who gives at the green compost its capacity to protect plants from different soil pathogens (Pérez-Piqueres, 2006; Souza Dias, 2009)

The high load of green compost used in this research with antagonist species of *Trichoderma harizianum* and *T.viride*, with approximately 4,5x104 and 4,2x104 CFU/g of dried compost, gives them the possibility to be used as a biological control against several soil plant pathogens.

The concentration of Trichoderma harizanium in green compost is about 4,5x104 CFU/g dried green compost and about 4,2x104 CFU/g dgc of *T.viride*. The same values were observed with Larbi (2006), where the charge was between 104 and 106 CFU/g of fresh compost. Mouria et al. (2012) had also isolated 8,79x104 CFU/g of *T.harizianum* from urban solid waste compost. Anastasi et al. (2005), had isolated *T.harizianum* with a concentration of 3,0x103 and *T.hamatum* with 4,8x102 CFU/g of dried compost. Many studies had shown the same results (Anastasi, 2005; Souza Dias, 2009).

## 4 CONCLUSIONS

From the present study, it was shown that the quantitative and qualitative characterization of green compost's mycoflora is crucial as a first step for a best use and correct management practices to safeguard the health of compost workers and users in one hand, and to preserve benefic microbial community balance in agricultural soil without causing environmental pollution in the other hand.

It must be showed also, that the presences of a high concentration of antagonist species and the absence of pathogenic species witnessed the maturity of the green compost and make it as a good organic amendment for plant culture for stimulate their growth and to protect them from soil-borne pathogens.

Thus, the 30 fungi isolates should be tested in vitro and in vivo for their antagonist effect and under field conditions for future uses as biological control agents for FCRR disease management of tomato plants.

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