

N°724 / PC

TOPIC(s) : Alternative technologies / Waste valorization

A New Green Biodegradable Packing Produced by *Calotropis Procera* (*C. procera*) an Ecological Alternative to Agroindustry

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PURPOSE OF THE ABSTRACT

The fungus *Colletotrichum musae*. Sp (Berk. & Curtis) Arx is responsible for pathologies as anthracnose that affects banana, being a disease author of great damages. The main control method of this disease is the use of fungicides [1]. However, this method causes a great damage of environment and human health. Some alternatives are being developed as the use of plant extracts with fungitoxic properties among others. In this sense, *Calotropis procera* (Apocynaceae) is a non-native species that has its origin in Africa and Asia. Therefore, it was introduced into the northeastern region of Brazil in the beginning of last century. The species grow with enormous facility and produces fruits all year round. The *C. procera* has the capacity to successfully establish in arid, degraded, and nutrient poor soils, such as Minas [2-5]. In some areas, the dry biomass of *C. procera* is used as animal feed [5]. However, previous studies indicated that the species is capable of accumulating many chemical elements, as cellulose and antifungal, which may use at agroindustry as biodegradable packing. In this way, this purpose designed and developed a new biodegradable packing based on green synthesis of cellulose and derivatives with antifungal element extracted by *C. procera* to storing and transport of comestible fruits. These biodegradable packing were comprehensively characterized by swelling and degradation behaviors, FTIR spectroscopy, SEM and antifungal activity against *Colletotrichum musae*, responsible for pathologies as an anthracnose that affects banana. The results demonstrated that the ethanolic extract of *C. procera* seeds presented differences in the mycelial development of the fungus in the different extracts concentrations ($F = 93.377$ $p < 0.001$), as well as the dependence of concentration in this relation, the higher the concentration of the ethanolic extract of the seeds of *C. procera*, smaller the growth of the fungus. Furthermore, the results have demonstrated the effective extraction of cellulose and nanocellulose by *C. procera* enabling the chemical modification to produce a biodegradable packing. Hence, the *C. procera* made possible to produce a new green biodegradable packing with antifungal activity to be used at comestible fruits offering a broad range of possibilities to be exploited as a novel eco-friendly packing as an innovative alternative to agroindustry.

FIGURES

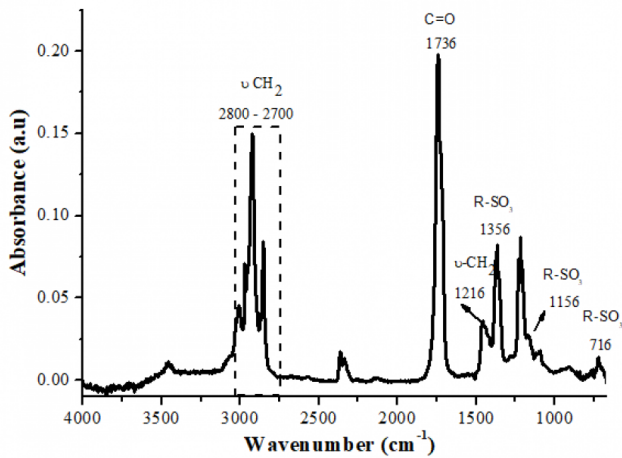


FIGURE 1

Figure 1.
FTIR Spectra of cellulose extracted by *C. procera*

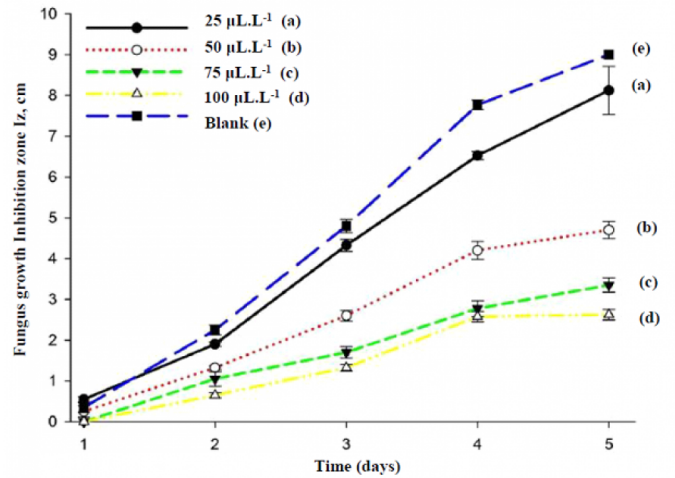


FIGURE 2

Figure 2.
Fungus development of *C. musae* with different concentrations of ethanolic extract of *C. procera* for 5 days.

KEYWORDS

Eco-friendly Biodegradable Packing | *Calotropis procera* | Antifungal activity | Innovative Technology for Agroindustry

BIBLIOGRAPHY

- [1] BAILEY, A. J.; JEGER, J.M. *Colletotrichum: biology, pathology and control*. Oxford: British Society for Plant Pathology, 88-120 p.1992.
- [2] COLOMBO R, MARÍN O, IRAZÁBAL S, TEZARA W. Relaciones hídricas, fotosíntesis y anatomía foliar de dos especies del género *Calotropis*. *Interciencia*. 2007; 32:791–796.
- [3] BARBOSA, N. P. U., FERNANDES, G. W., UERUMA, G., MENEZES, M. A. B. C., MATOS, L. V. S., SILVA, M. A., ALMEIDA-CORTEZ, J. S. *Calotropis procera*: A preliminary survey on its phytoextraction capabilities in Brazil. *Neotrop Biol Conserv*, 8 (2013) 150-155.
- [4] FERREIRA, M.B. Distrito Federal e Goiás sob ameaça de invasora *Calotropis procera* (Ait). *R. Br. Revista Cerrados* 21:20-22. 1973.
- [5] SOBRINHO, M. S.; TABATINGA, G. M.; MACHADO, I. C.; LOPES, A. V. Reproductive phenological pattern of *Calotropis procera* (Apocynaceae), an invasive species in Brazil: annual in native areas; continuous in invaded areas of caatinga. *Acta Botanica Brasilica*, v. 27, n. 2, p. 456-459, 2013.