Sociedad Argentina de Microbiología General

XIX CONGRESO DE LA SOCIEDAD ARGENTINA DE MICROBIOLOGÍA GENERAL

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Centro cultural y Pabellón Argentina de la Universidad Nacional de Córdoba, Córdoba, ARGENTINA.

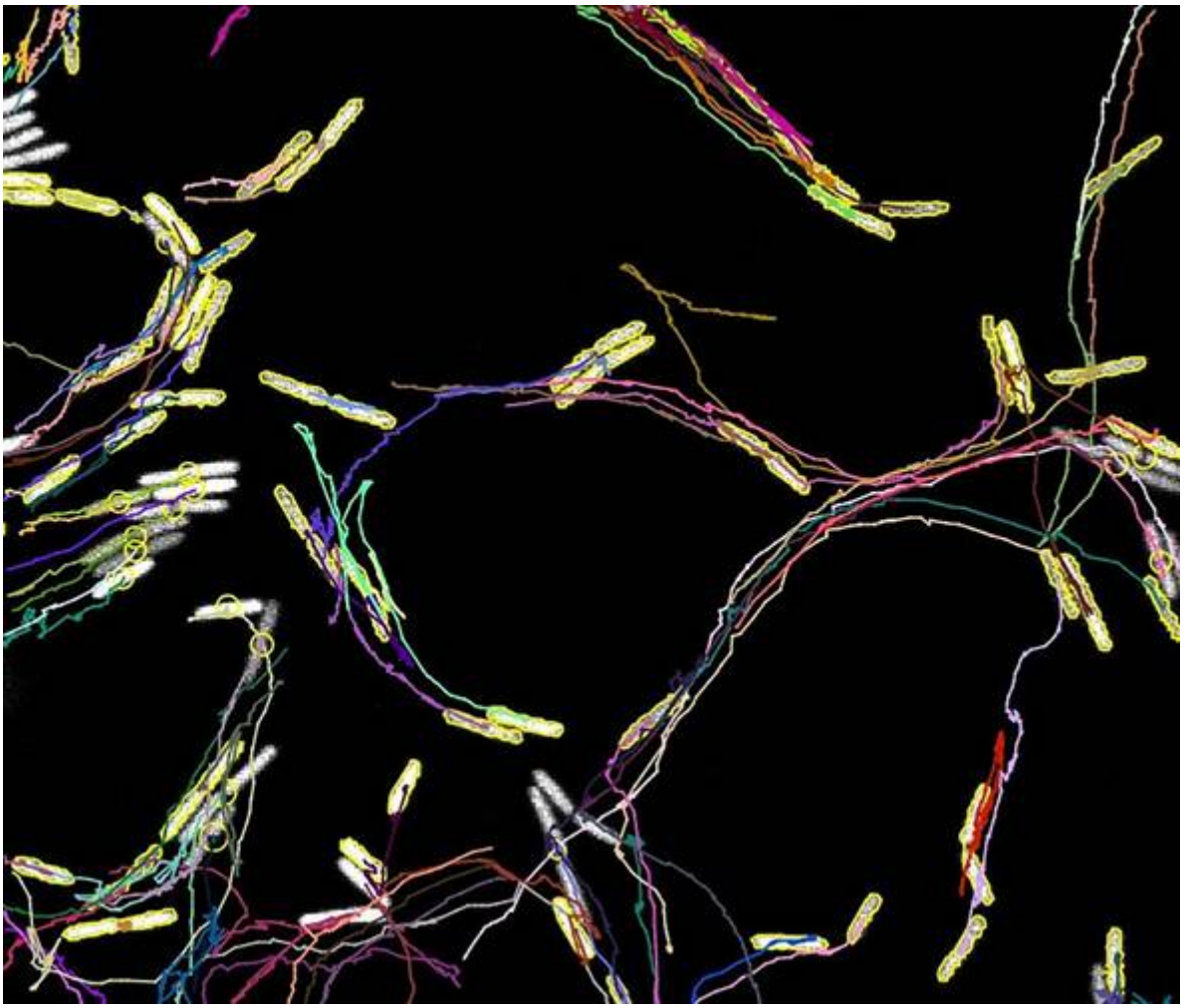

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

4 - Microbiología Ambiental, Agrícola y del Suelo

EVALUATION OF UV-LED TECHNOLOGY FOR DISINFECTION OF WATERBORNE FUNGAL SPORES

Delgado Armijos Nicole [1]- Duque Sarango Paola [1,2]

1) Grupo de Investigación en Recursos Hídricos (GIRH-UPS), Universidad Politécnica Salesiana, Azuay-Cuenca- Ecuador
2) Departamento de Recursos Hídricos y Ciencias Ambientales, Universidad de Cuenca- Cuenca- Ecuador
Contacto: nicole.delgado027@gmail.com

The presence of fungi in the water supply can cause several significant problems, such as alterations in water odor and taste, superficial or invasive infections in immunocompromised individuals, increased water turbidity, and complications in treatment systems due to biofilm formation and resistance to traditional disinfection methods. These issues affect both the perceived quality of water and sanitary safety, highlighting the need for more effective disinfection technologies. Some fungi, such as *Aspergillus* spp. and *Penicillium* spp., can produce mycotoxins, toxic compounds that can have harmful health effects if ingested through contaminated water. Growing concern over these issues has led to the investigation and development of more effective disinfection methods, such as the use of UV LED to ensure the safety and quality of the water supply. In this study, a collimated UV-LED reactor was used to irradiate *Aspergillus niger* and *Penicillium* sp. spores at wavelengths of 265 nm and 280 nm. Fungal spore suspensions were prepared under controlled conditions and subjected to UV treatment and post-treatment conditions (light and dark). Plate count experiments were conducted to determine inactivation efficacy. A kinetic model was used to determine UV radiation resistance and damage repair capacity in the studied strains. The results showed that UV wavelength and post-treatment conditions influenced treatment efficacy, with *A. niger* showing greater resistance than *Penicillium* sp. with D2 values (UV dose required for 99% inactivation) of 323.7 ± 90 mJ cm^{-2} and 321.9 ± 43.8 mJ cm^{-2} (265 nm and 280 nm). *Penicillium* sp. required 167.7 ± 13 mJ cm^{-2} and 146.5 ± 29.2 mJ cm^{-2} (265 nm and 280 nm). Both strains exhibited different resistance to UV treatment and damage repair capacity. Dark repair is insignificant, but photoreactivation is significant: *A. niger* is more resistant, although *Penicillium* sp. has a greater photoreactivation capacity. The use of UV-LED not only significantly improves disinfection efficacy but also promotes more sustainable and safe practices, aligned with public health and environmental conservation objectives.

Palabras clave: UV-LED- water disinfection- fungal spores- photoreactivation.