Tamara Perellón, Pharm Anal Acta 2018, Volume 9
DOI: 10.4172/2153-2435-C4-043

18th Annual Pharmaceutical and Chemical Analysis Congress

November 05-06, 2018 | Madrid, Spain

Exploring ligninolytic fungi capabilities for pharmaceuticals detoxification in waste water effluents

Tamara Perellón
Catalan Institute for Water Research, Spain

Statement of the Problem: Researchers have reported that current wastewater treatments are not efficient in pharmaceuticals removal. Then they are released to environment through wastewater contaminated by the industry and consumer's urine or faeces, both human and veterinary. Due to their biological activity, pharmaceuticals are potentially ecotoxic although their effects are not fully understood. Anyway, there is a growing concern on them and new wastewater treatments are studied to improve pharmaceuticals removal in highly contaminated water, as hospital and pharmaceutical industry wastewater effluents. The purpose of this study is to assess bioremediation treatment in terms of removal efficiency and identification of degradation processes.

Methodology & Theoretical Orientation: Artificially contaminated water with ten selected pharmaceuticals was used for *in vitro* experimental treatment with fungus. Controls were defined to identify removal not caused by fungal metabolization. Pharmaceuticals and their degradation products were analyzed by HPLC-HRMS both in water and fungus. A library of previously reported degradation products was used for the screening.

Findings: Trametes versicolor was in average the most efficient fungus for water treatment in this experiment. Each fungus species studied had considerable differences in removal efficiency of some selected pharmaceuticals and performed degradation by different metabolic pathways. All degradation products detected are reported to be less toxic than the parental pollutant. Some transformation products and parental compounds were detected at the fungal pellet.

Conclusion & Significance: Fungi studied were in average as useful to detoxify water with high pharmaceuticals concentration as conventional wastewater treatment. Scaling up and combining the fungi studied should be done to assess performance and synergy between fungi species. Even though, elimination of solid fungal pellet should be studied as some pollutants were adsorbed onto it.

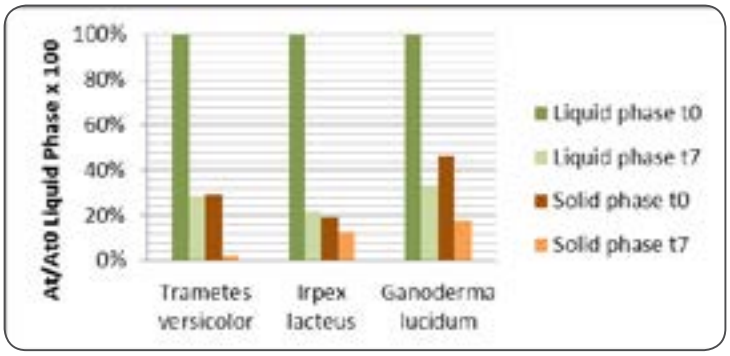

Figure: Representation of total elimination of target pollutants in liquid phase (n=3) and solid phase (n=1) of experimental batches for each fungal treatment. Elimination is calculated as the sum of the ten selected pollutants relative chromatographic peak area (A), referred to the chromatographic peak area detected at initial time (t0) in liquid phase (LP). The peak areas used are expressed as area arbitrary units/mL, both in liquid and solid phase.

Recent Publications

1. Haddad T, Baginska E and Kümmerer K (2015) Transformation products of antibiotic and cytostatic drugs in the aquatic cycle that result from effluent treatment and abiotic/biotic reactions in the environment: An increasing challenge calling for higher emphasis on measures at the beginning of the pipe. Water Res. 72:75–126.
2. López Serna R, Petrović M and Barceló D (2012) Occurrence and distribution of multi-class pharmaceuticals and their active metabolites and transformation products in the Ebro River basin (NE Spain). Sci. Total Environ. 440:280–289.

3. Lucas D, Castellet Rovira F, Villagrasa M, Badia Fabregat M, Barceló D, Vicent T, Caminal G, Sarrà M and Rodríguez Mozaz S (2018) The role of sorption processes in the removal of pharmaceuticals by fungal treatment of wastewater. Sci. Total Environ. 610-611:1147-1153.

Biography

Tamara Perellón has successfully completed her Master Thesis on Applied Chromatography Techniques at Catalan Institute for Water Research. She has a Bachelor's degree in Biomedicine and in Biochemistry. Her strong knowledge of analytical chemistry and biology and expertise in quality assurance aspects lead her to collaborate in projects with an open-minded perspective both in academic field and pharmaceutical industry. Her methodical literature research on transformation products created a useful transformation products screening database for the project H2PHARMA. The results obtained on elucidation of removal processes taking place *in vitro* on the preliminary experiment of the project were helpful to the further development of the research line. Based on a quality insight, she analyzed weak points of the research project. This approach is responsive to the finding of apparently inappropriate containers used for sample collection during some points of the research.

tperellon@gmail.com

Notes: