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Poster

## Activated sludge response to detergent spill in sewage



Ignacio M. Rodríguez<sup>1</sup>, Eva Rodríguez<sup>2</sup>, Antonio Tijero<sup>3</sup> y Ana Moral<sup>1\*</sup>

<sup>1</sup> Chemical Engineering Department, Experimental Sciences Faculty, Pablo de Olavide University of Seville, Ctra. Utrera km. 1. 41013 Seville. Spain. 1\*e-mail: amoram@upo.es

<sup>2</sup> DGrupo GBS, C/ San Jose de Palmete s/n., 7279, Seville. Spain

<sup>3</sup> Chemical Engineering Department, Chemistry Faculty, Complutense University of Madrid, Avda. Complutense s/n 28040 Madrid, Spain

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### RESUME

**Motivation:** The aim of this study is to determine the response of activated sludge microorganisms to detergent spill events that occurs sporadically in the Wastewater Treatment Plants (WWTPs). This detergent spill can cause loss of floccular structures and the disappearance of part of the microbiota constituent of the mixed liquor.

**Methods:** The pilot plant used for the study consists of four series-connected lagoons, with aeration systems in three of them, and a feed tank of 25L. The lagoon stabilization process allows the generation and maturation of activated sludge necessary for wastewater treatment. The mixed liquor was sampled to identify its functional groups present in the water allowing a later comparative after applying detergent. Four spills in total, based on Sodium Dodecyl Sulfate (SDS) were carried out and its effects studied.

**Results:** Observations showed the existence of floccular structures of remarkable resistance of as well as the presence of many functional groups of microorganisms in the detergent spills up to 37,5mg/l. Higher spills from 60mg/l to 120mg/l increase floccular damages and microbiota mortality. It was observed a proliferation of filamentous bacteria *Beggiatoa* on the surface of activated sludge after spills, as well as *Paramecium* association to it.

**Conclusions:** Lagooning system seems to respond well to detergent discharges lower than 40mg / l SDS, keeping floccular structures very compact and the presence of groups of microorganisms.

Discharges of 60mg / l to 120mg / l significantly increase the mortality rate of activated sludge microbiota and the loss of structure at the floc, especially in the first two ponds.

The system seems to cushion the spills in the first ponds reducing further damage in rear lagoons.

The third lagoon had the highest average number of individuals per milliliter that can be due to a lower impact by detergent spills and the contribution of aeration system.

*Beggiatoa* proliferation could be motivated by an oxygen descent in lagoons associated to detergent discharges.

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