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B46 Microbial chitosan production from digestate-based liquid growth medium

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Several technical elements make the fungal route of production of chitosan an exciting alternative to the conventional extraction approaches from the shellfish residues. In fact, the better quality of chitin and chitosan present in the fungal cell wall and the lower environmental impact of their extraction process from fungal sources compared to that from crustacean waste, boost recent research to mycobiotechnology, relying on fungal strains able to produce chitosan directly in their cell wall, possibly using wastes as production medium.

The present study assesses the possibility of using a digestate-based liquid growth medium for microbial chitosan production. To this end, a digestate arising from an anaerobic process underwent various chemical pretreatments to yield a sugar-enriched liquid phase was tested for its ability to support growth and chitosan production of 17 selected fungal strains. A first scale transfer to bioreactor (STR) has been studied for the best producer strains of both *Absidia blakesleeana* and *Rhizopus oryzae*. To the best of our knowledge, this is the first study claiming the use of a digestate-based liquid medium for fungal chitosan production.

B47 Bacterial biofilms on biopolymeric sorbent supports for environmental bioremediation

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Bioremediation encompasses a broad range of environmental biotechnology, which require multidisciplinary approaches through implementation of innovative tools to the natural biological process occurring in soil, water and air. Immobilization of hydrocarbon-degrading microorganisms on biodegradable sorbent supports significantly promotes bioremediation processes. Recently ecofriendly, low cost bioremediation devices based on polylactic acid (PLA) and polycaprolactone (PCL) membranes hosting a biodegrading bacterial biofilms were obtained[1]. This work investigates the higher effectiveness of immobilizing hydrocarbon-degrading bacteria compared to that of planktonic cells. Soil hydrocarbon (HC) degrading Actinobacteria *Nocardia cyriacigeorgica* strain SoB, *Gordonia amicalis strain* SoCg[2], and the marine hydrocarbonoclastic *Alcanivorax borkumensis* strain AU3-AA-7[3] were immobilized on PLA and PCL membranes and tested on hexadecane. The capacity of adhesion and proliferation of these biodegrading biofilms within the biopolymers were evaluated at various time points (5, 10, 15, and 30 incubation days) using scanning electron microscopy (SEM). The SEM images revealed that PLA and PCL nanofibers were nearly completely covered by a complex three-dimensional bacterial film for all tested strains. Quantification of total biomass (estimated as total dsDNA) confirmed biofilm growth up to 30 days of incubation. Crude oil biodegradation ability of biofilms-membranes systems, assessed

by Gas Chromatography-FID analysis, demonstrated the removal of over 60% of the oil after 5 days of incubation, outperforming free-living bacteria by 24%. Viable plate counts showed that bacterial biofilms adsorbed on biopolymers were still viable after 30 days, indicating their potential for long-term applications.

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B48 Gastroduodenal *in vitro* digestion of Linezolid Resistant Enterococci (LRE) isolated from intensive swine farm.

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Enterococcus faecalis is part of the human and animal grastrointestinal microbiomes. It is able to acquire and transfer antibiotic resistance genes (ARGs). Linezolid resistance, encoded on mobile genetic elements, causes great concern since this molecule is a last resort antibiotic to treat antibiotic resistant enterococcal infections. Specifically, Linezolid Resistant Enterococci (LRE) may exist and spread within intensive swine farms, posing a risk of transmission to consumers through the food chain (*i.e.*, by consumption of salami and raw sausages). Furthermore, enterococci withstand the unfavourable and stressful conditions such as human digestion, reaching the gut in a viable form and hence able to spread ARGs through horizontal gene transfer.

This study aims to investigate the effects of an "*in vitro*" digestion on Linezolid resistant *E. faecalis* strains (n=3) isolated from a swine farm. The strains are positive for the Linezolid resistance gene *optr*A, carried on mobile genetic elements. The obtained results underline that: (i) the digestive stress decreases the number of bacteria; (ii) surviving bacteria maintain the expression of Linezolid resistance; (iii) after the "*in vitro*" digestion the strains can spread Linezolid resistance genes through conjugation at a similar frequency to the undigested strains. Overall, these results demonstrate that LRE, isolated from food-producing animals, could pose a serious safety risk if transmitted to humans.