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ABSTRACT BOOK

S2_OP11: Microbial and electrochemincal synergy for sustainable groundwater remediation: combining pyrite-based denitrification and electrochlorination

S2_OP12: The environmental fate and impact on the soil microbial community composition, resistome and mobilome of the veterinary antibiotics sulfomethoxazole, tiamulin and tilmicosin.

S2_OP13: Drivers of the composition of root-associated microbial communities in garrigue ecosystem

S2_OP14: From Micro to Macro - Defining Crete's Macroecology based on its soil Microbial Interactome

S4_OP21: Genomic signatures of symbiotic lifestyle in sponge-associated bacteria

S4_OP22: The Role of Microbes in Mitigating Greenhouse Gas Emissions from a Toxic Cave

S4_OP23: Are microbial communities resilient to heat waves in a shallow intertidal sediment?

S4_OP24: How vulnerable to hydraulic connectivity are phytoplankton assemblages across a salinity gradient?

S4_OP25: The impact of temperature, acidity, and nutrient availability on marine bacteria-bacteriophage interactions

S4_OP26: Microbial diversity and sulfur cycling in a hypersaline marsh microbial mat community

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BIOTECHNOLOGY

S3_OP15: Exploitation of novel fungal oxidative biocatalysts for the sustainable production of valuable monomers from biobased furans

S3_OP16: Comparative Genomic Analysis of Enterobacter spp. Isolated from Fruit flies : New Insights into bacteria-host interactions

S3_OP17: Hydroxy fatty acid production by chemo-enzymatic conversion of waste cooking oils

S3_OP18: Effect of light wavelength on polysaccharides production by submerged cultivation of Pleurotus ostreatus

S3_OP19: Optimization of a new industrial bioprocess on pilot-scale for 2,3-butanediol by Klebsiella oxytoca ACA-DC 1581 cultivated on biodiesel-derived glycerol

S2_OP12

THE ENVIRONMENTAL FATE AND IMPACT ON THE SOIL MICROBIAL COMMUNITY COMPOSITION, RESISTOME AND MOBILOME OF THE VETERINARY ANTIBIOTICS SULFOMETHOXAZOLE, TIAMULIN AND TILMICOSIN

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Manure amendments lead to contamination of agricultural soils with veterinary antibiotics (VAs). These might exert toxicity on native microbiota and threaten soil functions, environmental quality, and human health. We assessed the impact of sulfamethoxazole (SMX), tiamulin (TIA) and tilmicosin (TLM) on the soil microbiota, antibiotic resistance gene (ARG) and intl1 abundances, in microcosms repeatedly exposed to VAs either directly or via fortified swine manures. Two soils differing at pH and their VA dissipation capacity were used. Repeated VA applications resulted in accelerated degradation of TIA but not of SMX, and accumulation of TLM, with dissipation patterns differing by soil and application method. We then investigated ecotoxicology-relevant soil N-cycling activities and microorganis. Potential nitrification rates (PNR), and ammonia-oxidizing microorganism (AOM) abundances were reduced by SMX and TIA, but not by TLM. Concerning microbial diversity, VAs had strong structural effects on total prokaryote and AOM communities, whereas fungal and protist communities were affected mostly by manure addition. Furthermore, SMX stimulated the abundance of the associated resistance gene sul1 in both the manure amended and the manure free soils, demonstrating its currently acknowledged broad distribution, while manure was the major factor stimulating the rest tested ARGs and the intl1 horizontal gene transfer surrogate. Zinc supplements received by the animals, putatively induced an ARG co-selection that might have resulted in the increased ARG abundances found in the manure amended soils. Correlation testing identified opportunistic pathogens like Clostridia, Burkholderia-Caballeronia-Paraburkholderia, and Nocardioides as potential ARG reservoirs in soil, with or without manure amendments. These taxa encompass environmentally persistent and potent pathogens, suggesting the urge for putting appropriate associated risk assessment strategies in place. Our results provide unprecedented evidence about the effects of understudied VAs (TIA, TLM) on soil microbiota and showcases environmental, and possibly human-health, risks posed by the dispersal of VA-contaminated manures.

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