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Degradation of Fluoroquinolone Antibiotics and Identification of Metabolites/Transformation Products by LC-MS/MS

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Abstract: Antibiotics are a therapeutic class widely found in environmental matrices and extensively studied due to its persistence and implications for multi-resistant bacteria development. Degradation of four fluoroquinolone antibiotics, namely Ofloxacin (OFL), Norfloxacin (NOR), Ciprofloxacin (CPF) and Moxifloxacin (MOX), at 10 mg L⁻¹ using a mixed bacterial culture, was assessed for 60 days. The assays were followed by a developed and validated analytical method of HPLC with Fluorescence Detection using a Luna PFP (2) 3 μ m column. The optimized conditions allowed picturing metabolites/transformation products formation and accumulation during the process, stating an incomplete mineralization, also shown by fluoride release. OFL and MOX presented the highest (98.3%) and the lowest (80.5%) extent of degradation after 19 days of assay, respectively. Some of these intermediate compounds were identified by LC-MS/MS in selected degradation samples. Most of the intermediates were already described as biodegradation and/or photodegradation products in different conditions, but new and/or unknown metabolites were also present.

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