

TITLE: EVALUTION OF THE EXPOSURE TO RESIDUES OF ANTIMICROBIALS, PESTICIDES AND RESISTANT MICROORGANISMS PRESENT IN THE WATER FROM DIFFERENT SOURCES IN THE CITY OF PORTO ALEGRE

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ABSTRACT:

Water is consumed by every individual and corporation on a daily basis and, as an important vehicle, can cross cities and countries, being able to carry infectious microorganisms and chemicals such as pesticides and antimicrobials. These contaminants end up in the environment, later resulting in public health issues. Therefore, this work aims to evaluate the exposure of the population to these chemical residues and resistance genes in the water. Two types of water sources were collected in Porto Alegre: Water Treatment Plant samples (WTPS) – raw and post-treatment - and Public Water Sites samples (PWSS), these were collected in two seasons: winter of 2018 and summer of 2019. Analysis referring the presence of 46 antimicrobials and 140 pesticides were performed by LC-MS/MS. DNA extraction was performed by thermal lysis and 16S rDNA and *bla*_{TEM} genes were performed by *in-house* PCR. In all winter WTPS, both raw and post-treatment, 13 different pesticides were identified. Summer data for pesticides is currently being processed. Referring antibiotics, in the summer, we found doxycycline in 6/6 and nalidixic acid in 1/6 of the raw WTPS and nalidixic acid, in 1/11 of the PWSS. Antibiotics were not found in any post-treatment summer WTPS, also none were identified in the winter samples. 16S rDNA was found in 9/11 of the summer PWSS, in 10/10 of the winter WTPS (5/5 raw; 5/5 post-treatment) and in 8/12 of the summer WTPS (4/6 raw; 4/6 post-treatment). The *bla*_{TEM} gene was present in 4/12 of the summer WTPS (4/6 raw; 0/6 pos-treatment) and absent in all of the other samples evaluated. Further analysis of resistance genes will be performed. These findings are concerning since it is already known that pesticides and antimicrobials can promote selective pressure onto microorganisms, leading to resistance emerging. Results exemplify that our water sites in general need better constant monitoring methods and the data suggests a wide range of contaminants in the water sources explored in this study, varying according seasons of the year and their specificities.

Keywords: water contaminants, resistance genes, LC-MS/MS, sanitation

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