

## THE IMPORTANCE OF A SENSITIVE METHOD FOR PESTICIDES ANALYSIS IN DRINKING WATER SURVEILLANCE

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**INTRODUCTION:** Brazil is one of world's largest consumers of pesticides, which are found in food, soil, and water used for human consumption. Therefore, there is a need for a reliable and sensitive analytical method to detect these compounds in the environment. **OBJECTIVE:** To verify the importance of sensitivity analytical method for pesticides evaluation in drinking water surveillance in 2024. **METHODOLOGY:** The method for 99 current used pesticides analyses consisted in solid-phase extraction (C<sub>18</sub> cartridges), elution and concentration by nitrogen flow, followed by detection and quantification in a GC-MS/MS equipment. **RESULTS AND CONCLUSION:** Limits of detection and quantification limits for most analytes ranged from 0.003 to 0.018 µg L<sup>-1</sup> and 0.0096 to 0.0540 µg L<sup>-1</sup>, respectively. In 2024, approximately 3,208 samples were received from 21 Brazilian states, with 1,485 testing positive for any pesticide, above LOD. These samples were compared to previous limits of detection and quantification from 2023, which ranged from 0.016 to 1.156 µg L<sup>-1</sup> and 0.048 to 3.504 µg L<sup>-1</sup>. Notably, for example, Pernambuco had 54% of positive samples, above LOD, under new limits, compared to 17% under old limits. Paraná had 62% of positive samples, above LOD, under new limits and 11% under old limits. The same happened in other states, but on a smaller scale. This significant increase in positive samples is due to equipment sensitivity amplification, combined with optimized and validated methodology for analyzing pesticides in drinking water. The 5-fold reduced limits demonstrated the difference in positive sample percentages compared to both perspectives. Despite all results were below maximum allowed values in Brazilian ordinance for drinking water, pesticides are poisons and not desirable in water for consumption. The sensitive method ensures greater result reliability and contributing to state and municipals surveillance work.

**Key-words:** Pesticides; drinking water; validation; optimization

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