

A national wastewater monitoring campaign for nitazene analogues and veterinary sedatives in wastewater: Temporal results from Australia

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Introduction: A class of novel synthetic opioids, nitazenes, have infiltrated the illicit drug market worldwide. Xylazine, medetomidine and etomidate are non-opiate sedatives typically used for veterinary applications and have been appearing in the illicit drug market. Wastewater analysis (WWA) is a tool that has been used to monitor population drug use in near real time and as a measure to indicate and inform policy as an early warning system for the presence of novel psychoactive substances (NPS). The aim of this study was to monitor nitazenes and other sedatives in Australia via wastewater analysis.

Methods: An analytical method was developed and validated to quantify 23 nitazenes, xylazine, medetomidine and etomidate in wastewater using LC-MS/MS. Over 500 wastewater samples covering both weekday and weekend samples from 60 different wastewater treatment plants in Australia were analysed between August 2024 and April 2025.

Results: The method limit of detections ranged between 0.075 and 0.4 ng/L. When applied to wastewater samples from across Australia, 10 different nitazenes and xylazine were detected. Xylazine was most frequently detected in August 2024 (23% of samples) and has decreased in subsequent collections. N-piperidinyl etonitazene was the most frequently detected nitazene with positive samples in all collections.

Discussions and Conclusions: This study has shown that a range of nitazenes and xylazine can be detected in influent wastewater samples in Australia. Solid phase extraction that results in preconcentration of the wastewater sample enables low detection limits, enabling detections in regions of Australia where no intelligence existed to suggest nitazene use.

Implications for Practice or Policy: The method presented in this study could be used as an early warning system to track the use of non-opiate sedatives and nitazenes internationally to inform public health policy and health care.

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