Rodenticide resistance and environmental monitoring

Environmental exposure assessment of anticoagulant rodenticides and α-chloralose in domestic cats (*Felis catus*) in Slovenia

Cerkvenik-Flajs, Vesna[1*]; Schenke, Detlef[2]; Korenjak-Černe, Simona[3]; Perpar, Anton[4]; Jacob, Jens[5]; Schwonbeck, Susanne[6]; Kleine Bardenhorst, Sven[7]; Torsten, Hahn[6]; Cvetko, Marko[1]; Gombač, Mitja[1]

[1] University of Ljubljana, Veterinary Faculty, Institute of Pathology, Wild Animals, Fish and Bees, Ljubljana, Slovenia
[2] Julius Kühn Institute (JKI) - Federal Research Centre for Cultivated Plants, Institute for Ecological Chemistry, Plant Analysis and Stored Product Protection, Berlin, Germany
[3] University of Ljubljana, School of Economics and Business & Institute of Mathematics, Physics and Mechanics, Ljubljana, Slovenia
[4] University of Ljubljana, Biotechnical Faculty, Department of Agronomy, Ljubljana, Slovenia
[5] Julius Kühn-Institute (JKI) - Federal Research Centre for Cultivated Plants, Rodent Research, Münster, Germany
[6] Fraunhofer Institute for Toxicology and Experimental Medicine ITEM, Hannover, Germany
[7] University of Münster, Institute of Epidemiology and Social Medicine, Clinical Epidemiology, Germany
* vesna.cerkvenik.flajs@vf.uni-lj.si

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Rodenticides as biocidal products are regulated by the Biocidal Products Regulation (EU) 528/2012 and 11 of the originally authorized 16 active substances are now in a renewal phase. Risk assessment including the assessment of secondary exposure is part of the substance evaluation. It is particularly important for anticoagulant rodenticides (ARs) that can be harmful to non-target wildlife and domestic animals. The residues of eight ARs and α-chloralose were monitored in domestic cats (*Felis catus*) in Slovenia. From 2021 to 2022, carcasses of 99 animals originating from veterinary clinics, animal shelters and roadkill were collected. Rodenticides were extracted from liver tissue and measured by liquid chromatography-electrospray tandem mass spectrometry. Residues of at least one rodenticide were detected in 65% of samples. The ARs brodifacoum (54% of samples), bromadiolone (25%) and coumatetralyl (21%) were most common. We determined brodifacoum at concentrations of ≥800 ng/g in 3 of 99 cat liver (3%), and one of these (1%) contained residues of >1,800 ng/g, which seems sufficient to cause mortality. α-chloralose was found in one sample (1.0%) at 561.7 ng/g. Two older animals living outdoors contained hepatic residues of four ARs. Exposure of cats to ARs is prevalent but seems lower than in predatory wildlife.

Individual characteristics of cats (sex, age, roaming in/outdoors) did not affect the occurrence or concentration of liver residues but environmental factors did. The number of rodenticides present was positively associated with human population density as well as rural land use and was negatively associated with farm density. A similar trend was evident for the presence of brodifacoum and bromadiolone. The concentration of brodifacoum was higher at low farm density.

The results highlight a potential environmental problem related to the ARs in a pet species – a group of animals rarely considered in this regard. As the study indicates an ecotoxicological risk for domestic cats in Slovenia, any kind of asymptomatic secondary poisoning related to rodenticides should be monitored in the future to identify the relevance of the issue apart from mortality.