

Current state of poisoning by rodenticides' control in Catalonia



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INTRODUCTION

During the last years, a series of cultural changes are making society more aware of the implications surrounding animal abuse. As a result, animal cruelty allegations are also becoming more frequent. Many of them are due to the inappropriate use of Anticoagulant Rodenticides.

AIM

Carry out a Bibliographic Review of the rodenticide poisoning's current status in Catalonia, as well as propose the opening of an analytical service for rodenticides in the Department of Pharmacology, Therapeutics and Toxicology of UAB, taking into account the casuistry of intoxicated animals and the service demand.

RODENTICIDE INTOXICATIONS INCIDENCE (2021)

HCV- UAB	21 cases
OTHERS Osona - 3 Veterinary centers	27 cases

WILDLIFE INCIDENCE

- 60% of the wild animal population contains levels of anticoagulant rodenticides in their bodies (López-Perea et al., 2015).
- The most affected places are metropolitan areas with high population density (López-Perea et al., 2015).
- Nocturnal raptors (62%) and carnivorous mammals (38%) are the secondary consumers with the highest prevalence of exposure to Rodenticides (Sánchez-Barbudo et al., 2012)

RHODENTICIDE DETECTION LABORATORY:

ANALYTICAL TECHNIQUE

Liquid-liquid extraction → Blood or liver sample.

Liquid chromatography-mass spectrometry (LC-MS):

- Quantification limit of 1 ng/ml.
- High sensitivity

ADMINISTRATIVE REQUIREMENTS

- Reliable, validated, reproducible and representative analytical method.
- Traceability guarantees that the samples have followed all protocols and quality controls.

ISO 17025

ANTICOAGULANT RODENTICIDES

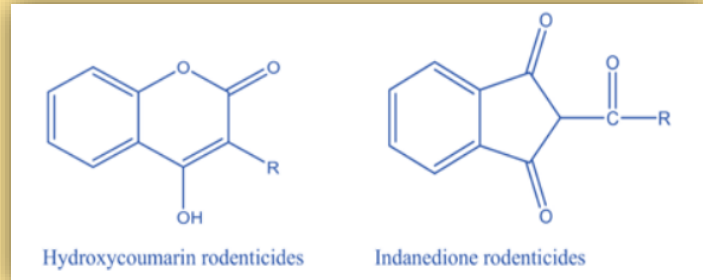


Figure 1: Anticoagulant Rodenticide Molecular Structure (Imran et al., 2015)

Table 2: Anticoagulant Rodenticide Clasification (Murphy, 2012)

CLASSIFICATION	HYDROXYCOUMARINES (WARFARINICS)		INDANDIONES
	1st GENERATION	2nd GENERATION	INDANDIONE
ACTIVE INGREDIENT	Coumachlor, Coumafuril, Warfarin	Brodifacoum, Bromadiolona, Difenacoum, Difethialona,	Difacinona, Pindona, Valona
POWER	1	100	1
SYMPTOMS ONSET	12-24 h post ingestion	4-5 days post ingestion	24-72 h post ingestion

Table 3: Superwarfarinics LD50 in dogs and cats (Lipatech., 2002)

Active ingredient	LD50 (mg/Kg)	%	g of bait needed to reach the LD50 in a 10 Kg animal
Bromadiolone	Dog: 8,1 Cat: 25	0,005%	Dog: 1.620 gr. Cat: 1000 gr.
Brodifacoum	Dog: 0,25-3,5 Cat: 25	0,0025%	Dog: 100 gr. Cat: 2000 gr.
Difenacoum	Dog: 50 Cat: 100	0,005%	Dog: 10000 gr. Cat: 4000 gr.

CONCLUSIONS

- Anticoagulant rodenticide poisonings are a common problem in our society.
- Superwarfarin rodenticide poisonings are the most common in Catalonia.
- It is difficult to find records of cases of rodenticide poisoning in Catalonia
- The slowness of the administration and the lack of ISO 17025 have slowed down the project.
- In the future, it would be very interesting to set up a rodenticide detection laboratory in Catalonia.

Imran, M., Shafi, H., Wattoo, S. A., Chaudhary, M. T., & Usman, H. F. (2015). Analytical methods for determination of anticoagulant rodenticides in biological samples. In *Forensic Science International*, 253, 94–102. <https://doi.org/10.1016/j.forsciint.2015.06.008>

Lipatech. (2002). The Veterinarians Guide to accidental rodenticide ingestion by dogs&cats. https://lipatech.com/wp-content/uploads/2018/02/vet_guide_pmd_case_studies.pdf

López-Perea, J. J., Camarero, P. R., Molina-López, R. A., Parpal, L., Obón, E., Solà, J., & Mateo, R. (2015). Interspecific and geographical differences in anticoagulant rodenticide residues of predatory wildlife from the Mediterranean region of Spain. *Science of the Total Environment*, 511, 259–267. <https://doi.org/10.1016/j.scitotenv.2014.12.042>

Michael J. Murphy. (2012) Chapter 56. Dins *Anticoagulant rodenticides*. Dins editor(s): Ramesh C. Gupta, Veterinary Toxicology. (pp 673-697, <https://doi.org/10.1016/B978-0-12-385926-6.00067-3>