

Registration of zinc phosphide

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**An AHB
contracted
research project**

Why register new poisons?

- Public acceptance;
- Improved humaneness;
- Target specificity during:
 - a) primary poisoning,
 - b) secondary poisoning.
- Fewer residues:
 - a) in target species;
 - b) in non-targets.
- Environmental persistence.
- Reduced compliance costs.
- International considerations.

Status of zinc phosphide registration

- Pre-screen completed under ACVM act;
- Next steps:
 - updated package to NZFSA;
 - updated package submitted to ERMA;
 - public notification;
 - written submissions;
 - ERMA decision on HSNO classifications;
 - registration under ACVM act.

Objective of product development is:

1. Multispecies bait for POSSUM control;
2. Multispecies bait for RAT control; and,
3. Multispecies bait for MOUSE control.

Possums



Efficacy in cage studies: 98.4% (120/122)

Efficacy during field trials: 96.5% ($n=2$)

$LD_{50} = 9.6 \text{ mg/kg}$

Bait required to kill 50% = 1.9g

Bait required to kill 95% = 5.5g

Rats



Efficacy in cage studies: 100% (20/20)

Efficacy during field trials: pending

$LD_{50} = 27.2 \text{ mg/kg}$

Bait required to kill 50% = 0.4 g

Bait required to kill 95% $\approx 1.0\text{g}$

Mice



Efficacy in cage studies: 95% (20/21)

Efficacy during field trials: pending

$LD_{50} = 25.8 \text{ mg/kg}$

Bait required to kill 50% = 0.05g

Bait required to kill 95% $\approx 0.1\text{g}$

Toxicity compared to 1080

Species	1080	Zinc Phosphide
	Bait to kill 50% (or 95%)	Bait to kill 50% (or 95%)
Possum	2.8g (9g)	1.9g (5.5g)
Rat	0.06g (\approx 0.15g)	0.4g (\approx 1g)
Mice	0.3 (\approx 0.7g)	0.05g (\approx 0.1g)

- Slightly has longer latent period until appetite suppression
- Less zinc phosphide bait is required to kill all species

Primary mode of action of zinc phosphide

Bait ingested



zinc phosphide reacts with stomach acids



Phosphine into lungs or absorbed



Inhibits oxygen uptake by mitochondria



Death primarily by cardio-vascular failure and/or pulmonary oedema

Zinc phosphide persistence

- $\frac{1}{2}$ -life in carcasses is 3.4d (cf. 1080 >1 month);
- Persistence after sub-lethal poisoning <4 days;
- No zinc phosphide residues in meat;
- Low risk of secondary poisoning;
- Is not leached (into soils or water);
- $\frac{1}{2}$ -life in soils 10-20 days;
- Negligible uptake by plants;
- Is degraded by hydrolysis;
- Will persist in dry baits.

Non-target risks

$$\text{Risk} = \text{Hazard} \times \text{Exposure}$$

Hazard=Toxicity (LD_{50})

Exposure=Bait eaten when applied in field

Risks to non-target species



- Hazard (i.e., lethal bait wgt.) to small passerines is lower than 1080, and exposure is lower.

- Galliformes (e.g., chickens) are at risk.

- Raptors & owls unlikely to die by secondary poisoning



- Hazard to ruminants (i.e., 40-70 mg/kg) would suggest livestock need to eat a lot of bait.

- Invertebrate risks are lower than risks with 1080;

- ZP is hazardous to aquatic fauna but is not water soluble (i.e., exposure is low).



- Secondary poisoning of scavengers and predators unlikely.

- Is not leached into soils or water (i.e., exposure to micro-organisms is low

International considerations

Zinc Phosphide (selection of countries)	1080
USA	USA—very restricted
Australia	Australia
South Africa	
Asia (China, India, Japan, etc.)	
Europe (Germany, France, etc)	
Pacific region (Philippines, Indo	
UK	
Canada	

CONNNOVATION

C O N S E R V A T I O N B Y I N N O V A T I O N

Connovation will market zinc phosphide
paste in:

- tubes;
- paper bags;
- strikers;
- defenders.

Summary

Zinc phosphide is an alternative toxicant:

- ❖ for control of possums, rats and mice;
- ❖ that is more humane than 1080 and brodifacoum;
- ❖ that is not persistent;
- ❖ is unlikely to leave residues in meat or plants;
- ❖ that is widely registered offshore;
- ❖ registration is pending in NZ.