

## WHITE PAPER

### **NON TOXIC ANIMAL, RODENT AND INSECT REPELLANTS FOR POLYMERS**

We manufacture some of the most special chemicals and plastic additives in the world.

We have developed completely non toxic & environmentally safe Animal & Insect repellents. These New Molecules were later compounded into a master batch.

The products are Rodrepel™® & Termirepel™®

The paper deals with why to use these products & how they actually work.

#### A} ANIMAL REPELLANTS

##### 1.Why animal & insect repellents in wire & cables & other polymeric applications?

When we started studying animal behaviour; we also realized why animals are drawn to plastics products, the plasticizers & the aromatic odours of polymers, the bright colours & the texture of polymer products are all responsible for animals being attracted to plastic goods

Rodents are present everywhere & can cause a lot of damage to power cables. They chew on plastic doors, sidings, benches moulded plastic parts, cables, wires, railway components practically anything. In the wild too, several animals chew on products made of plastics such as plastic bins containers, cables etc. Rodents chewing cables exposing them & causing a short circuit also cause a many fires.

Rodents often disrupt even underground train services, I am sure a few of us have had trouble starting their car in the morning as a rat or a vole had eaten through the cable.

Termites are undisputedly the most destructive of all structural pests.  
Termite damage in the USA is estimated at 1.5 Billion US\$ annually by the NCPA

Polymeric articles are used everywhere, we have had problems with grizzly bears in north America, woodpeckers in Norway , birds in Italy & insects everywhere.

We have successfully solved the problems of animal damage by addition of our products

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We have successfully solved the problems of animal damage by addition of our products

Our approach is not to poison the animal or add hazardous chemicals.

Both Rodrepel as well as Termirepel are completely free of insecticides, heavy metals or products such as Copper or lead naphthenates, lindane etc or chemicals found dangerous or harmful to humans or animals.

The term “repellency” means to drive back, ward off, or keep away. If the termiticide is a repellent, the termite will approach the treatment and avoid the treated area. Termites generally will not tunnel through or walk on a repellent termiticide.

We have been working with several bio actives which are completely non toxic to humans as well as other animals.

Incorporating the repellent into manmade materials encasing cables is much more effective at limiting damage

Our approach has been to use Environmentally safe products which do not enter into ground water resources of poison the environment.

## 2.HOW DO THESE ANIMAL & TERMITE REPELLANTS WORK

RODREPEL™® works on the following 5 principles,

- 1)Aversion, By adding an extremely foul tasting component to the polymer
- 2)Discomfort, By adding an component which causes severe distress to the mucosa of the animal
- 3)Fear, by exploiting the olfactory response of animals to compounds which mimic the behaviour of predator urine
- 4)By Modification of Animal Behavior towards products made from Rodrepel, this involves sensory stimuli modification
- 5)By Association, the animal would remember the bad experience



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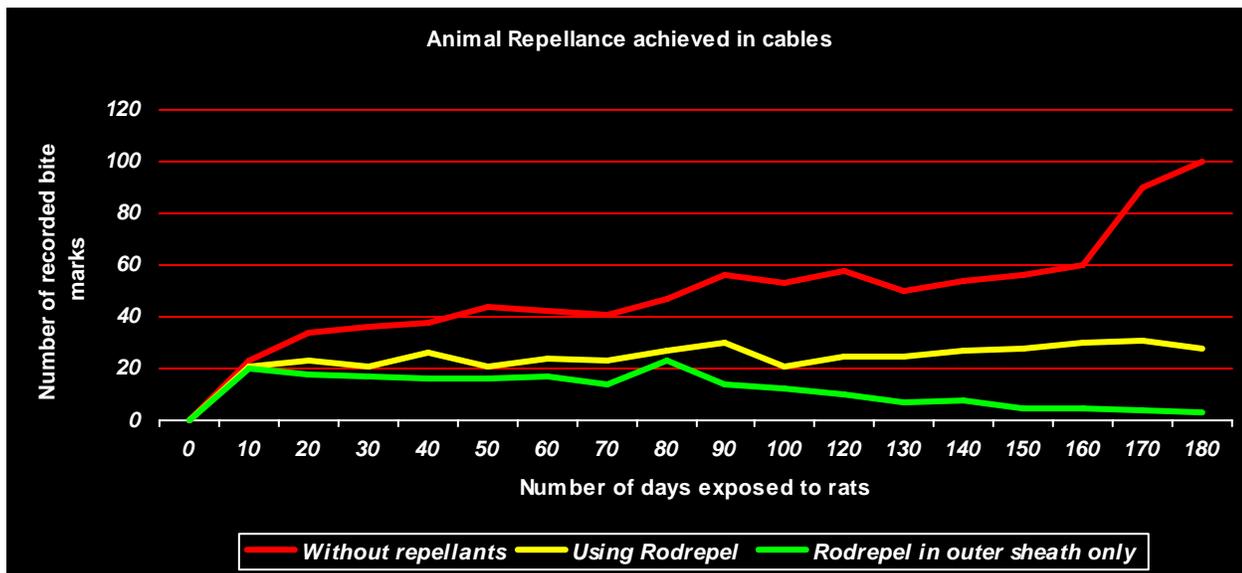
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Farmers often use very basic animal repellents. These are natural products. Tiger urine is very effective at keeping away animals. Coyote urine has become the product choice to repel and deter deer. Fox urine is used to repel and deter rabbits, groundhogs, woodchucks, squirrels and chipmunks. Bobcat urine repels moles, mice, voles and other rodents. Wolf urine is used to repel moose. One type of animal repellent may be effective for raccoons, while another animal repellent may be more effective for skunks. It is important to find an animal repellent that can take care of all different animals in one shot.

We have tried to isolate the particular chemicals which these animals have common in their urine. These compounds have been isolated & incorporated into Rodrepel ® in their synthetic form.

The sense of taste is common to all animals & birds, the addition of effective chemicals such as Rodrepel ® based products offers a mix of extreme spicy (Hot) & pungent taste to the polymer compound.

At each point, we had to be careful not to include any poisonous products for animals as in the wild; we could be dealing with endangered species or special animals & birds



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**Conclusions:**

- It is possible to actually train animals & modify their behaviour to polymeric objects containing animal repellents
- Animals need not be harmed or damage to the environment could be completely avoided by using Non toxic animal repellents in objects made of plastic
- Damage from animals can be completely controlled without harming the animals
- Repellence achieved maximum by addition of animal repellants to the actual point of contact in plastics

**B } REPELLING TERMITES**

Termirepel™® is designed to not poison the environment. It contains no products which are pesticides or insecticides. Termirepel is ROHS compliant & contains no chemicals mentioned in the ROHS directive.

**TERMIREPEL®**

The Anti termite master batch we have produced functions in a special way, It does not kill insects immediately, instead it repels and disrupts their growth and reproduction. The product incapacitates the insects rather than killing them directly.

The product is structurally similar to insect hormones called “ecdysones” which control the process of metamorphosis as the insects pass from larva to pupa to adult.

The product” Termirepel”™® has three modes of action on insects: it is a highly effective insect growth regulator (IGR), a feeding deterrent, and an oviposition deterrent.

The product is completely non toxic.

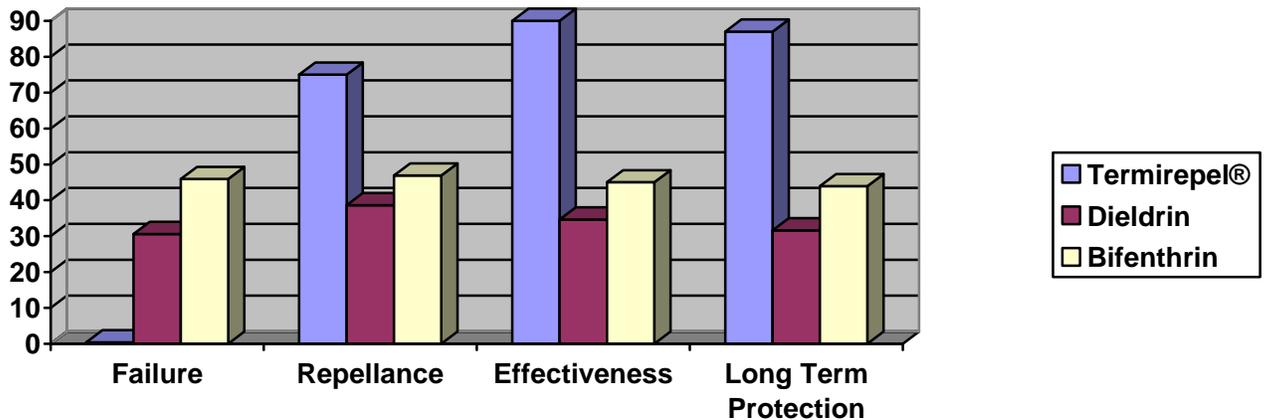


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## Comparison of Termirepel against Toxic Pyrethroids



## Environmental Safety

All are products are non poisonous.

All the products manufactured by us do not migrate or leach out from the polymer to contaminate ground water resources.

Currently the products used as animal repellents such as Lindane or Pyrethroid based insect repellent are toxins, harmful to both humans & animals. Our products offer a safer alternative.

These products can be used in wire & cable sheathing & can be used instead of Polyamide jacketing.

Rodrepel® and Termirepel® offer cost effective solutions



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Effectiveness of Termirepel is better than toxic products

Additive percentage	BAIT SPECIMEN							% Attack
	A	B	C	D	E	F	G	
TERMIREPEL( 0.05)	N	N	N	N	N	N	N	0%
BIFENTRHIN (0.06)	N	N	N	N	N	N	N	0%
DIELDRIN (1.0)	N	N	N	N	N	N	N	0%
UNTREATED	C	C	C	C	C	C	C	100%

N = No activity noted

C = Completely destroyed specimen

% = Percent of replicates attacked by insects

Period of Survey = 12 Months

## Handling the Masterbatch

Termirepel® or Rodrepel® masterbatches are safe to handle, however, because of its aversive properties, normal precautions should be taken to prevent it from adhering to the skin. When handling these masterbatches, the technician should wear rubber gloves, long sleeve lab coat or similar, and eye protection. If products should come into contact with the skin, wash with copious amounts of water & consult a physician.

The active ingredient is manufactured using non-hazardous and non-toxic materials. The intent is that if the material is ingested it will cause the human or animal to find the taste so objectionable that they are repelled. So, bearing in mind that both are intended to be extremely objectionable to all animals, it is nonetheless safe even if ingested. Hence, these masterbatches can even be ingested without harm.



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