

## 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 and environmentally safe Animal and Insect repellents. These were later compounded into a master batch.

The products are Rodrepel™® & Termirepel™®

This paper deals with why to use these products and the mechanism of action of these products.

#### A} ANIMAL REPELLANTS

##### 1.Why animal repellents in wire and cables/pipes/Optical fibre ducts and plastic products?.

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 many fires. An independent study shows that 40% of short circuit fires could be attributed to rodents chewing wires and cables.

Rodent teeth grow everyday unlike humans and rodents have to grind their teeth on objects such as hard plastic cables, pipes etc.

Rodents often disrupt underground train services, cause signalling failure and it is quite common all over the world to find rodent chewed automobile cables which result in failure to start the vehicle.

Insurance does not cover automobile cable failures and is an expensive proposition, as the entire wire harness is required to be changed.

Rodents have disrupted large institutions such as stock exchanges and other financial exchanges due to optical fibre cable failure, resulting in a loss of millions of dollars; a recent example is when the New Zealand Stock Exchange was off line due to rodents eating through Optical fibre cables carrying data.

Polymers (plastics) 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

We now have an environmentally safe solution against insects and termites, which can also help reduce the pollution of ground water resources by reducing the need to add pesticides and insecticides.

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.

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.

These products are also used in agricultural applications such as pipes used for drip irrigation, micro irrigation and agricultural mulch and agricultural films such as bale wrapping film etc.

## 2.HOW DOES RODREPEL™®WORK?

RODREPEL™® works on the following 5 principles,

- 1)Aversion, By adding an extremely foul property to the polymer making contact with the polymer unpalatable
- 2)Discomfort, By adding an component which causes severe distress to the mucosa of the animal, without harming the animal but causing severe distress to the sensitive regions in the animals ear, nose, and mouth.
- 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.

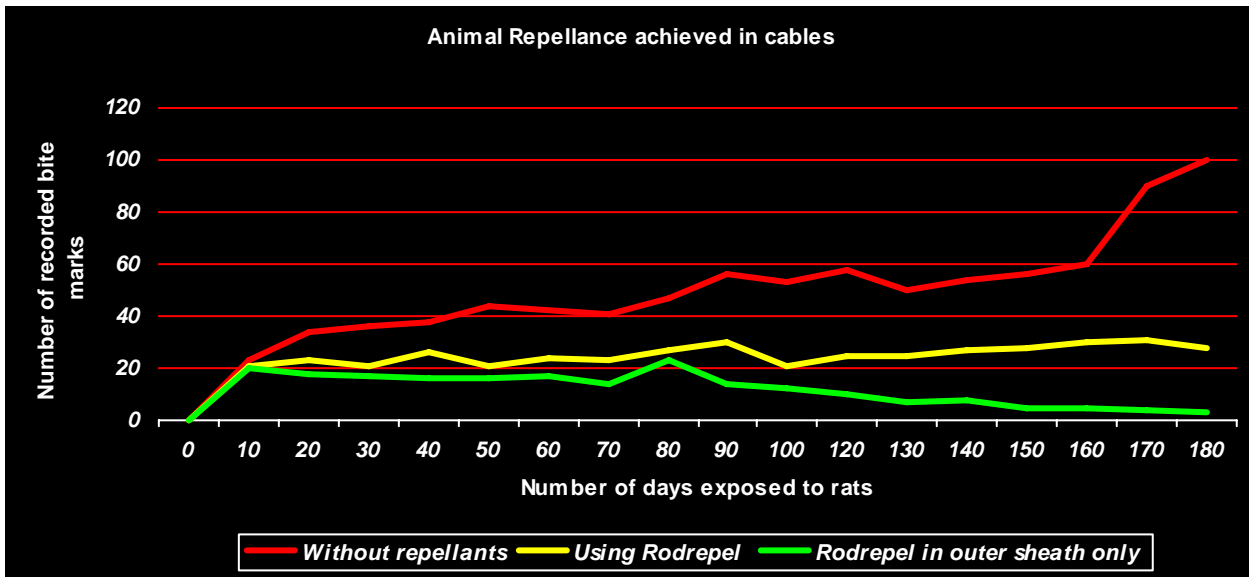
We have isolated the particular chemicals which these large predators have in common in their urine. These compounds have been isolated & incorporated into Rodrepel® in their synthetic form.

The sense of taste is common to all animals and most birds, the addition of effective chemicals such as Rodrepel® based products offers a mix of extreme spicy pungent taste to the polymer compound which in turn renders contact with the object containing Rodrepel extremely unpalatable.

Rodrepel works from a distance by producing a classical “flight” response in animals and also works in case the animal comes into contact with an object containing Rodrepel.

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.

Rodrepel is completely non toxic and non hazardous to the animals and plants. Rodrepel does not leach out into ground water nor does it cause any pollution.



### 3. 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 repellents to the actual point of contact in plastics

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

## B } REPELLING TERMITES AND INSECTS

### TERMIREPEL®

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.

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

Insect cause huge amounts of damage estimated in the trillions of US\$, globally, what we use to control insects is many a times more dangerous as we release these insecticides in air and water.

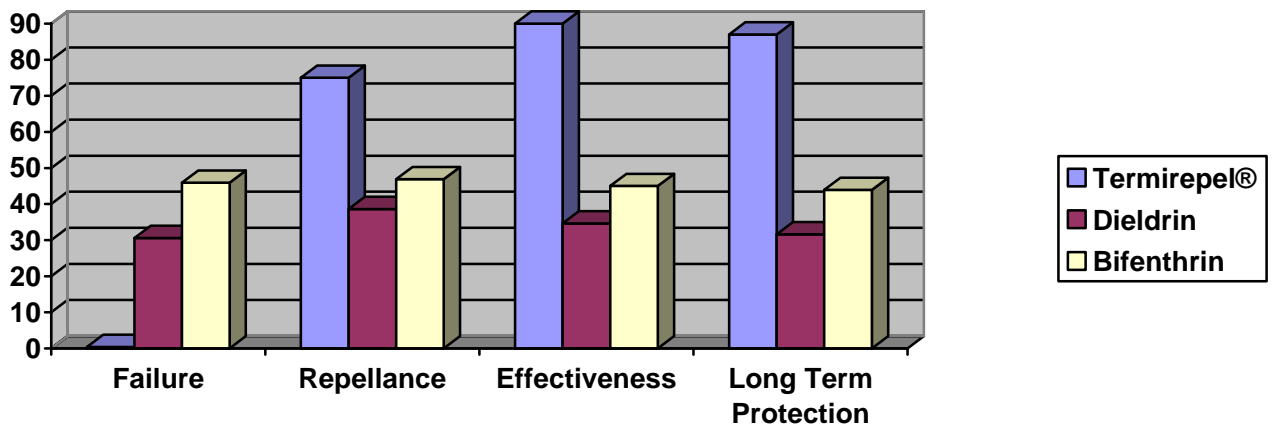
The Anti termite/insect master batch we have produced functions in a special way, It does not kill insects immediately, instead it repels and disrupts their growth and reproduction. The product incapacitates the insects rather than killing them directly.

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.

The termites or insect will not approach the objects containing Termirepel, neither will they tunnel through or walk on a treated area or an object containing Termirepel®™

## Comparison of Termirepel against Toxic Pyrethroids



## Environmental Safety

All are products are non poisonous.

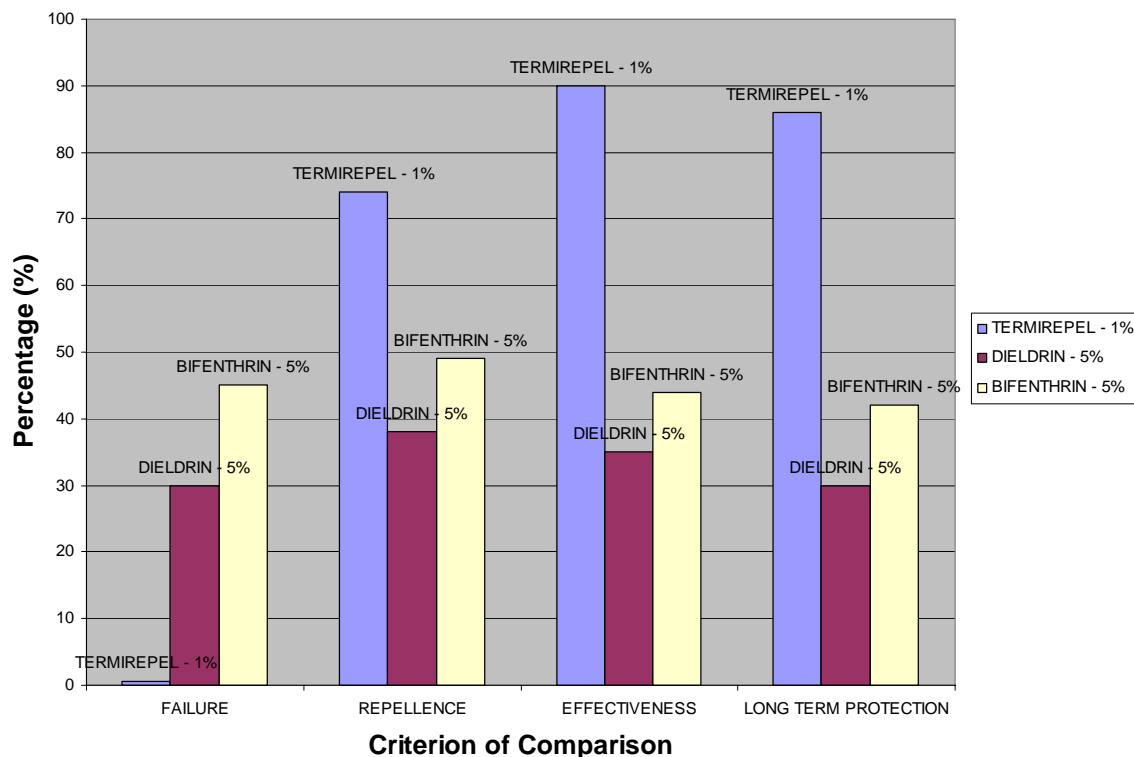
All the products manufactured by us do not migrate or leach out from the polymer to contaminate ground water resources.

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 compared to Polyamide Jacketing, Glass roving or metal barriers and tape.

## Greater Effectiveness of Termirepel compared to toxic products



### 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.

## **CERTIFICATE OF SAFETY AND DECLARATION OF HAZARDOUS SUBSTANCES AS PER EUROPEAN UNION ( EU) DIRECTIVE 2002/95/EC**

### **PRODUCTS:**

- 1) RODREPEL™@ 5% MASTERBATCH IN LDPE
- 2) RODREPEL™@ 5% MASTERBATCH IN EVA
- 3) TERMIREPEL™@ 5% MASTERBATCH IN LDPE
- 4) TEREMIREPEL™@ 5% MASTERBATCH IN EVA
- 5) RODREPEL RROD™@
- 6) RODREPEL NANO GRANULES™@
- 7) RODREPEL™@

WE HEREBY STATE THAT RODREPEL AND TERMIREPEL PRODUCTS MENTIONED ABOVE DONOT CONTAIN ANY HAZARDOUS PRODUCTS MENTIONED IN THE EUROPEAN UNION DIRECTIVE 2002/95/EC.

WE HEREBY STATE THAT THE RODREPEL™@ AND TERMIREPEL™@ PRODUCTS COMPOUNDS AND MASTERBATCHES ( MENTIONED ABOVE NO.1-7)

DO NOT CONTAIN LEAD OR HEAVY METALS IN ANY FORM, INSECTICIDES, RODENTICIDES, HEAVY METAL COMPOUNDS, BROMINE, CHLORINE OR ANY OTHER HALOGEN IN ANY FORM, PTHALATE OR ANY OTHER PLASTICISER.

WE ALSO STATE THAT THE RODREPEL™@ AND TERMIREPEL™@ PRODUCTS COMPOUNDS AND MASTERBATCHES ( MENTIONED ABOVE NO.1-7) CONTAIN NO HAZARDOUS OR TOXIC PRODUCTS AS MENTIONED PER EU DIRECTIVE 2002/95/EC.

THE RODREPEL™@ AND TERMIREPEL™@ PRODUCTS COMPOUNDS AND MASTERBATCHES ( MENTIONED ABOVE NO.1-7) DO NOT CONTAINS ANY BROMINATED OR HALOGENATED DERIVATIVES, BI PHENYLS ETC.

RODREPEL® AND TERMIREPEL PRODUCTS ARE COMPLETELY NON TOXIC, NON HARMFUL NON POISONOUS AND NON FLAMMABLE PRODUCTS



ISO 9001: 2000 REGISTERED



ISO 14001: 1996 REGISTERED

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