Taj Agro Products®

Refreshing World

Bromadiolone

Bromadiolone
A second generation Anticoagulant Rodenticide.

Identity
Coumarin based compound.
Common name: bromadiolone (BSI, E-ISO, F-ISO); broprodifacoum
IUPAC: 3-[3-(4'-bromobiphenyl-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxycoumarin
CAS Number: 28772-56-7
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Activity
Features as highly appetizing for rodents. 50 mg/kg is a sufficient dose for killing Rattus norvegicus and Rattus rattus in 5 days time. This delay in the lethal effect means that rodents do not mistrust the bait. It prevents blood coagulation and prothrombine formation. It is effective against rats and mice resistant to Warfarin and Coumatetrlyl. It is a non-specific poison, but since the concentration of Active Ingredient in baits is so low, several doses have to be consumed for it to be lethal, hence risk for accidental poisoning of non-target species, including humans, is very small.

Applications
Recommended for preparing baits against rats, mice, moles, etc. Effective against: Apodemus agrarius, Arvicola terrestris, Microtus arvalis, Mus domesticus, Pitymis spp., Rattus norvegicus and Rattus rattus. For general use it is applied as formulated bait at 0,005%, using 5 to 20 kg per hectare.

ECHNICAL GRADE PRODUCT
Bromadiolone 2.5% liquid
Red and blue colour available.
Bromadiolone 1.0% liquid
Red and blue colour available.
Bromadiolone 0.25% liquid
Red and blue colour available.

Other concentrations available on demand

TYPES OF BAIT:
Bromadiolone 0,005% Granulated Cereal
Bromadiolone 0,005% Cereal Pellet
Bromadiolone 0,005% Wax Blocks
0,005% Fresh Bait

1.2 Physical and Chemical Properties

Bromadiolone is a white to off-white powder. Its solubility in water is very low (less than 20 mg/litre at 20°C). It is slightly soluble in ethanol and ethyl acetate, and soluble in dimethylformamide. The flash-point temperature is 218°C.

Further physical and chemical properties of bromadiolone are given in the "Summary of Chemical Safety Information" (section 6).

1.3 Analytical Methods

The determination of bromadiolone is based on high-performance liquid chromatography with a detection limit of 0.01 mg/kg.

1.4 Production and Uses

The rodenticidal properties of bromadiolone were reported in 1976. It is an anticoagulant that is effective against rats and mice, including those resistant to first generation anticoagulants. It is used in the form of ready-to-use baits of low concentration containing 0.005% bromadiolone.

2. SUMMARY AND EVALUATION

2.1 Identity, Physical and Chemical Properties, and Analytical Methods Bromadiolone is a white to off-white powder. It is stable at room temperature and has a melting point of 200-210°C. Its solubility in water is very low. It is slightly soluble in ethanol and ethyl acetate, and soluble in dimethylformamide. The determination of bromadiolone is based on high-performance liquid chromatography.

2.2 Sources of Human and Environmental Exposure

Bromadiolone does not occur naturally. It is used as a rodenticide in urban and farm rodent control and acts by disrupting the normal blood clotting mechanisms causing an increased tendency to bleed.

2.3 Environmental Transport, Distribution, and Transformation

Bromadiolone is unlikely to enter the atmosphere, because of its low volatility. It is practically insoluble in water. Bromadiolone is readily adsorbed on soils rich in clay and organic compounds, with no leaching. Degradation in soil is significant with half-lives ranging from 1.8 to 7.4 days.

2.4 Environmental Levels and Human Exposure

Bromadiolone is not intended for direct application to growing crops and never for use as a food additive. No information is available on concentrations in air, water, and soil.

2.5 Kinetics and Metabolism in Laboratory Animals and Humans

Bromadiolone is absorbed through the gastrointestinal tract, skin, and respiratory system. The major route of elimination in different species after oral administration is via the faeces. The liver is the main organ of accumulation and storage. Bromadiolone has been found in the liver as the unchanged parent compound. Elimination from the liver is biphasic with an initial rapid phase of 2-8 days and a slower phase with a half-life of 170 days. No data are available on the kinetics and metabolism of bromadiolone in humans.

2.6 Effects on Laboratory Mammals and in vitro Test Systems

Bromadiolone has a high, acute oral toxicity (LD50 of 1-3 mg/kg) for various species including rodents and non-rodents. The dermal toxicity is also high (LD50 of 9.4 mg/kg in rabbits). Signs of poisoning are those associated with an increased tendency to bleed.
Note: Bromadiolone is non-irritant to the skin. It is a slight irritant for the eye.

In feeding studies on rats, the only effect found has been that associated with anticoagulant action. In a 12-week feeding study on rats, the maximum tolerated dose was 10 µg/kg body weight per day.

Mutagenicity and teratogenicity studies have not shown any mutagenic, embryotoxic, or teratogenic effects.

2.7 Effects on Humans

Symptoms of acute intoxication by bromadiolone include an increased tendency to bleed in less severe cases of poisoning, and massive haemorrhaging in more severe cases. The signs of poisoning develop with a delay of one to several days after ingestion.

Incidents of poisoning have been reported.

2.8 Effects on Other Organisms in the Laboratory and Field

Bromadiolone has shown toxicity for aquatic organisms. The LC50 (96-h) for various fish species ranged from 1.4 to more than 3 mg/litre.

Bird species appear to be less susceptible to bromadiolone than mammals with a reported acute, oral LD50 of at 138 mg/kg.
Secondary poisoning through the consumption of rats and mice killed with bromadiolone may occur in dogs and cats in urban situations, but more likely in farm situations.

2.9 Evaluation of Human Health Risks and Effects on the Environment

2.9.1 Evaluation of human health risks

As bromadiolone is mainly used in urban rodent control in the form of low-concentration baits, increased levels in air are unlikely. Furthermore, as it is only slightly soluble in water, its use cannot be a significant source of water contamination. Bromadiolone is not intended for direct application to growing crops and no residues in plant food-stuffs are expected. Occupational exposure may occur during manufacture, formulation, and bait application, but data oncerning the levels of exposure are not available. Bromadiolone may be absorbed through the gastrointestinal tract and also through the
skin. The major route of elimination is via the faeces. The liver is the major organ for the accumulation of bromadiolone, which has mainly been found as the unchanged parent compound. Elimination from the liver is slow.

As a technical material, bromadiolone is extremely toxic for many mammalian species. Signs of poisoning in all species, including humans, are associated with an increased tendency to bleed.

Incidents of poisoning have been reported.
The level of prothrombin time is a satisfactory guide to the severity of acute intoxication, and also the effectiveness and duration of the therapy.

The specific antidote is vitamin K1 in both animals and man (see section 4.1.1).

2.9.2 Evaluation of effects on the environment

Some secondary toxicity laboratory studies on wildlife have shown that captive predators could be intoxicated by no-choice feeding of bromadiolone-poisoned or dosed prey. The significance of these results in terms of hazards under field conditions is difficult to assess, because the predators would not be expected to eat only poisoned animals. However, predators may take poisoned small mammals that are still alive, preferentially. In areas close to baiting, poisoned rodents may represent a high proportion of the diet for individual birds. However, only few individuals will be affected,
unless there is very widespread and constant use of the baits.

Therefore, some kills of owls can be expected, but there will be no severe population effects. This ties in with small numbers of poisoned owls observed in the field.

BROMADIOLONE

Chemical formula: C30H23BrO4
CAS chemical name:3-[3-(4'-bromo-[1,1'-biphenyl]-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxy-2H-1-benzopyran-2 one (9CI)
IUPAC chemical name: 3-[3-(4'-bromobiphenyl-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxycoumarin
CAS registry number: 28772-56-7
RTECS number: GN4934700

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TAJ AGRO INTERNATIONAL
(A Division of Taj Pharmaceuticals Limited)
http://www.tajagroproducts.com
E-mail :
tajagroproducts@gmail.com
tajagrointernational@gmail.com