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## Selontra<sup>®</sup> Rodent Bait

Worldwide Technical Information Brochure



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**Preface:** *This technical brochure provides general information about Selontra® Rodent Bait, based on the active substance cholecalciferol, developed and marketed by BASF. This information is being distributed to different countries where registrations and approved uses will vary. BASF emphasizes that Selontra must be used in accordance with local regulations. The laws of each country govern the use of Selontra. Please refer to the approved product label in your country for further information.*

*The product discussed in this technical brochure may not be registered in your country and may not be available for sale. Accordingly, this educational material is provided for informational purposes only and is not intended to promote the sale of the product. Any sale of this product after registration is obtained shall be solely on the basis of approved product labels, and any claims regarding product safety and efficacy shall be addressed solely by the label.*



## Introduction

Selontra® Rodent Bait effectively controls rats and mice, such as brown rats, black rats, and house mice, including those that are resistant to anticoagulant rodenticides. Selontra will be used by pest management professionals and non-professionals alike in urban and rural settings to control rodents which cause millions of dollars in damage and spread life-threatening diseases every year. In urban settings, Selontra can reduce the contamination of food and structural damage caused by rodents. In rural areas, Selontra can help protect stored grain and livestock, farm equipment and buildings.

Cholecalciferol, the active ingredient in Selontra rodent bait, belongs to the sterol class of chemistry and has a novel mode of action. It is a natural compound found in all animals and was first used as a rodenticide in the 1970s by Sorex, a professional pest management chemical company acquired by BASF in 2008.

Selontra offers several important advantages from anticoagulant rodenticides, which are a class of chemicals that work to prevent the coagulation (clotting) of blood. The mode of action of cholecalciferol causes rodents to stop feeding after approximately 24 hours, which allows for a shorter baiting regime and faster control. The unique formulation of Selontra is highly palatable to rodents, even in the presence of attractive food sources. In addition, studies show cholecalciferol has a favorable toxicological profile with low toxicity to most mammals and avian species, but with rodents showing a particular sensitivity.

No known resistance to cholecalciferol has been found in rodents, and the development of resistance is considered highly unlikely since it is an essential vitamin that controls physiological processes within animals.

Within the next few years, BASF anticipates registering Selontra in more than 30 countries around the world. Selontra is expected to launch first in Australia, followed by Brazil and the United States.

### Key Features and Benefits:

- Shorter baiting regimes and quicker rodent control compared to anticoagulant baits
- Highly palatable even when other attractive food sources are available
- Lower risk of primary and secondary non-target poisoning
- Suitable for burrow and fence line baiting
- Durable in all control situations and stable under extreme temperatures
- No known resistance, and development of resistance considered highly unlikely



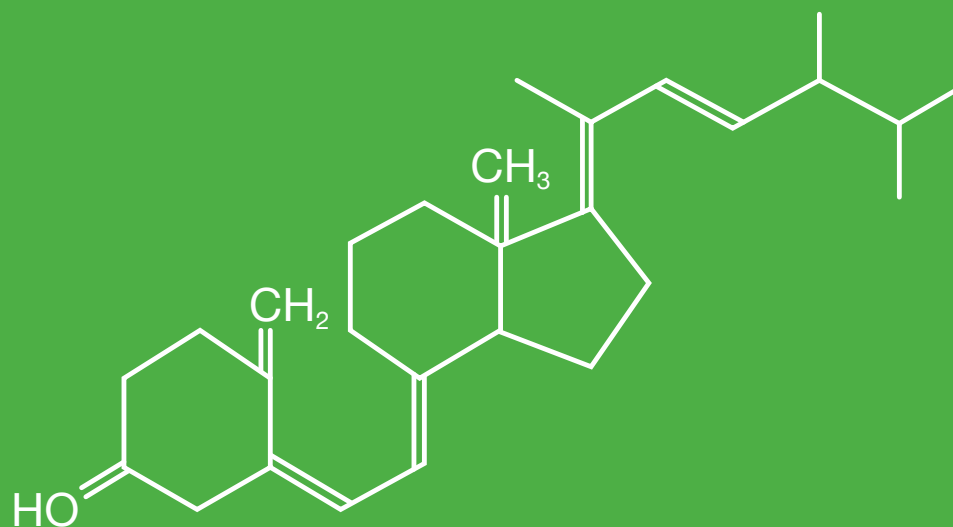
#### above:

*Selontra will be used in both urban and rural settings to reduce the contamination of food caused by rodents and help protect livestock and stored grain from rodent infestations.*

# physical and chemical properties

<b>BSI Common Name (ISO)</b>	Cholecalciferol
<b>CAS Number</b>	67-97-0
<b>Chemical Name (IUPAC):</b>	(5Z,7E)-9,10-secocholesta-5,7,10(19)-trien-3 $\beta$ -ol
<b>Molecular Formula</b>	C <sub>27</sub> H <sub>44</sub> O
<b>Molecular Weight</b>	384.7
<b>Melting Point</b>	72.5 to 83°C
<b>Bulk Density</b>	1.02
<b>Vapor Pressure</b>	4 x 10 <sup>-5</sup> Pa at 20°C
<b>Henry's Law Constant</b>	33.77 Pa m <sup>3</sup> /mole
<b>Appearance</b>	Solid white powder, no odor
<b>Partition Coefficient</b>	LOG P <sub>ow</sub> > 5.9 at 20°C (mean pH = 6.9)
<b>Solubility in Water</b>	< 0.5 $\mu$ g/L at 20°C at pH 7.0
<b>Solubility in Organic Solvents</b>	n-Heptane: > 250 g/L Xylene: > 250 g/L 1,2-dichloroethane: > 250 g/L Methanol: > 250 g/L Acetone: > 250 g/L Ethyl acetate: > 250 g/L

## Structural Formula



## Biological Profile

### Mode of Action

Cholecalciferol is a natural compound found in all animals. It is synthesized in animal skin by the action of sunlight. Natural dietary sources of cholecalciferol include fish, liver, fish oils, egg yolk, and milk fat. However, all compounds, even natural ones, will cause toxicity and death if the dose is high enough.

In order to gain biological and toxicological activity, (externally acquired) cholecalciferol must undergo two reactions in the body for activation. At toxic doses, the active metabolites cause disruption of calcium homeostasis by increasing calcium absorption from the small intestine and mobilization of calcium stores from bones into the blood stream, as well as decreased calcium excretion by the kidneys. The net result is dangerously high concentrations of blood calcium (hypercalcemia) and tissue calcification. After ingestion of a lethal dose, the free calcium levels are raised sufficiently that blood vessels and soft tissues, such as the heart, kidneys, liver, stomach and lungs are calcified, i.e. the formation of crystals of calcium salts in the tissues. This calcification causes disruption of normal metabolic processes leading to death.

Cholecalciferol at toxic doses has a stop-feeding action after about 24 hours, and animals that ingest a lethal dose of cholecalciferol bait usually die within two to seven days.

### Selectivity

Selontra® has been shown to effectively control rats and mice such as *R. norvegicus*, *R. rattus*, *M. musculus/domesticus*, including strains resistant to anticoagulant rodenticides. Compared to most other rodenticides, including anticoagulants and bromethalin, Selontra is less toxic to non-target birds and mammals.

## Rodents Controlled by Selontra

The following table illustrates the key target rodents controlled by Selontra.

Scientific Name	EPPO Code	Common Name
<i>Mus musculus/domesticus</i>	MUSXMU	House mouse
<i>Rattus norvegicus</i>	RATTNO	Brown / Norway rat
<i>Rattus rattus</i>	RATTRA	Black rat



### above:

*Selontra quickly and effectively controls key target rodents including the house mouse, Norway rat and black rat.*



**above:**

For best results, place *Selontra* at covered bait points, in burrows or in bait boxes throughout the infested area. Please refer to the approved product label in your country for specific use information.

## Formulation and Use

*Selontra*® is a high performance ready-to-use rodenticide soft block bait for professional and non-professional use. The product contains 0.75 g/kg (0.075% w/w) cholecalciferol based on an innovative formulation offering quick and effective control of rodent pests such as mice (*Mus musculus/domesticus*), brown rats (*Rattus norvegicus*) and black rats (*Rattus rattus*), including strains resistant to anticoagulants and other difficult to control rodents.

*Selontra* causes rodents to lose their appetite after eating, which means they will not return to the bait to feed. This allows other less dominant rodents quicker access to feed on the bait. As a result, there are more rodent kills per bait station, thus obtaining the most economical use of bait. Individual rodents can be controlled within three days after they start feeding and complete control of infestations can be achieved within seven days after rodents start feeding. Infestation control with only two bait applications is possible.

## Typical Directions for Use

Species	Situation	Application rate for each bait point
Mice	Domestic, commercial, agricultural	Up to 40g (1 or 2 units) every 1-2 meters
Rats	Domestic, commercial, agricultural	Up to 140g (5 to 7 units) every 5-10 meters

Place *Selontra* at covered bait points, in burrows or in bait boxes throughout the infested area. Use the higher bait point density and the maximum number of bait units wherever rats or mice have been seen. Be aware of under baiting.

Bait may only have to be placed for seven days to achieve control provided that sufficient bait for the size of the infestation is placed on day 1 of the treatment. To ensure that sufficient bait has been placed for the size of the infestation it is recommended to inspect baits 1-2 days after the first bait placement. If a bait point is completely consumed, double the amount of bait at that bait point. This will ensure optimum control in the shortest time is achieved. Inspect baits regularly. Note that if insufficient amount of bait is used at any time of the treatment, this may lead to sub-optimal results. If bait uptake should continue for longer than a week, continue placing bait every seven days until consumption ceases. When the uptake of bait has stopped, the remaining bait should be collected and disposed of safely.



Good hygiene practices should be employed to aid rodent control. Remove rubbish which may attract rodents and provide harbourage. To increase the likelihood of bait acceptance, the availability of other food sources should be minimized at the onset of treatment. Try to establish a barrier of bait points between living and feeding areas.

Baits must be securely placed in a way that minimizes the risk of consumption by other animals or children. Where possible, secure baits so that they cannot be carried away. The product must never be placed indiscriminately.

Rodent death will occur two to four days after ingestion of a lethal amount of bait. Search for and remove dead rodents at frequent intervals during treatment, at least as often as when baits are checked. Dispose of dead rodents and unused bait in accordance with local requirements.

## Resistance Management

It is considered highly unlikely that resistance to cholecalciferol could develop and there is not a single known report on rodents showing resistance to cholecalciferol. Cholecalciferol is the key regulator of calcium levels in the blood, crucial for a variety of physiological processes, including bone formation, blood clotting, and neuromuscular action. The amount of calcium circulating in the blood is very carefully regulated, generally keeping blood calcium levels within 2-3 percent of normal; in most mammals, changes of more than 10-15 percent can be fatal.

To develop resistance to cholecalciferol would require rodents to become less sensitive to the physiological actions of cholecalciferol, either through loss of receptors, increased metabolism, accelerated clearance, or other mechanisms. However, any significant change in sensitivity to cholecalciferol would, at the same time, profoundly affect physiological processes and would therefore, very likely, be fatal.

For these reasons, there is very limited likelihood of resistance developing.



**above:**

*Inspect areas of harbourage for rodents such as stacks of straw bales and feed bags. Practicing good hygiene such as removing rubbish and other food sources will help control rodent infestations.*





**above:**  
*One of the key benefits of  
 Selontra is its lower toxicity to  
 non-target mammals such  
 as cats.*

## Toxicological Profile

Studies show cholecalciferol has a favorable toxicological profile with low toxicity to most mammals and avian species, but with rodents showing a particular sensitivity. It is rapidly adsorbed from the gastrointestinal tract and has a plasma half-life of 4-6 hours. This is the time it takes for the amount of cholecalciferol in the plasma to reduce by half.

Overall, the likelihood of adverse exposure to non-target animals via secondary poisoning is limited. Available secondary poisoning studies repeatedly demonstrate minimal adverse effects to non-target animals.

### Toxicity to Mammals

Cholecalciferol has low acute mammalian toxicity (except to rodents) via the oral, dermal and inhalation exposure routes. It is not an eye or skin irritant, nor a skin sensitizer. Studies indicate cholecalciferol is unlikely to have any genotoxic or carcinogenic potential following dietary exposure. There is no evidence of toxicity to reproduction or development.

Species	Study	Effect Level
Rat	Acute oral LD <sub>50</sub>	41 mg/kg
Rat	Acute dermal LD <sub>50</sub>	61 mg/kg
Rat	Acute inhalation LD <sub>50</sub>	> 130 – 380 mg/m <sup>3</sup> (0.13-0.4 mg/L)
Rabbit	Eye irritation	Non-irritant
Rabbit	Skin irritation	Non-irritant
Rabbit	Skin sensitization	Non-sensitizing
Dog	Acute oral LD <sub>50</sub>	88 mg/kg
Cat	Acute oral LD <sub>50</sub>	1000 mg/kg

### Toxicity to Avian Species

Cholecalciferol is considered to have low toxicity to birds following acute oral and dietary exposure.

Species	Study	Effect Level
Bobwhite quail	Acute oral LD <sub>50</sub>	> 2000 mg/kg
Mallard duck	Acute oral LD <sub>50</sub>	> 2000 mg/kg
Bobwhite quail	Acute dietary LD <sub>50</sub>	> 600 ppm NOEC = 93.6 ppm
Mallard duck	Acute dietary LD <sub>50</sub>	> 1200 ppm NOEC = 93.6 ppm



### Toxicity to Aquatic Organisms

The exposure of the aquatic environment is considered to be unlikely when using Selontra®. However, data indicates low and medium acute toxicity of cholecalciferol to fish and aquatic invertebrates, respectively.

Species	Study	Effect Level
Fish	Acute (96h) LD <sub>50</sub>	1000 mg/l
Aquatic invertebrates	Acute (48h) EC <sub>50</sub>	13 mg/l

### Toxicity to Honeybees

Based on the method of application of Selontra, exposure to honeybees is considered very unlikely.

### Toxicity to Earthworms

The exposure of the soil environment will be very limited and localized to soil around baiting points if the bait is dropped on the ground. Cholecalciferol has a low toxicity to earthworms.

Species	Study	Effect Level
Earthworm	Reproductive toxicity LC <sub>50</sub>	>1000 mg/kg soil

### Environmental Profile

Cholecalciferol is a naturally occurring substance, which has a very low solubility in water. When used according to label directions, Selontra does not contaminate aquatic ecosystems. Cholecalciferol is not readily biodegradable, but is not persistent in soil. Due to low volatility, significant exposure of air is unlikely. Selontra is intended to be used in burrows and at covered and protected bait points, which will limit environmental exposure.

Environment	Study	Effect Level
Air	Vapor pressure	6.0 x 10 <sup>-5</sup> Pa at 25°C
Soil	Soil half-life	40 days
Water	Solubility	< 0.5 µg/L at 20°C



above:

*Selontra poses a lower risk of secondary poisoning to birds of prey such as barn owls.*



## Safety, Stewardship and First Aid Measures

### Safety Instructions

- Avoid contact of the product with eyes and skin. Protective gloves should be worn when handling the product.
- Do not eat, drink, or smoke while working with the product.
- After using the product, remove protective clothing and wash face and hands with soap and water.
- Use additional protective equipment or handling precautions as required by local conditions, ordinances or laws.

### Stewardship

Stewardship measures for Selontra® include bait-intrinsic safety features and the recommended application methods listed on the product label.

Bait-intrinsic features:

- Baits contain Bitrex® bittering agent, a human taste deterrent. A warning dye helps to distinguish Selontra from food and when observed in animal feces indicates that an animal has ingested Selontra.
- The bait presentations (soft block) is securable which has a lower risk of spilling or being carried away from bait-points than some others (i.e. pellets or loose grain).

Recommended application methods on product label:

- The use of the product is restricted to in and around buildings and in sewers.
- Baits should never be broadcast or placed indiscriminately.
- Baiting advice aims at efficient and quick control of infestations.
- If sufficient bait is offered for the infestation size, full control may be achieved within 7 days, thus minimizing the time the bait is available to non-target animals and birds.
- Bait placement should be in covered and protected bait points or tamper-resistant bait boxes so as to minimize the risk of consumption by other animals, domestic pets or children.
- Unless under the supervision of a pest control operator or other experienced person, baits should not be in place permanently.



### **Storage Notes**

Store in original container, tightly closed and keep in a cool, dry, well ventilated place away from products with an odor. Prevent access to bait by children, birds and non-target animals (particularly dogs, cats, pigs and poultry).

### **Disposal**

Destroy and dispose of empty product containers at an authorized waste disposal site. Do not reuse the container for any other purpose. Fill contents into a sealable container and take to an incineration plant. Contact BASF if there are any questions.

### **First Aid Measures**

- Rinse exposed skin immediately with soap and water.
- If in eyes, rinse with plenty of water for several minutes and seek medical advice.
- If swallowed, contact a poison control center or doctor immediately for treatment advice.
- Treat symptomatically. Treatments include a low calcium diet, high salt and fluid intake and avoidance of exposure to sunlight while monitoring calcium levels.

### **Poison Information Center at BASF**

Information on symptoms of poisoning or injury incurred while using BASF products may be obtained from the following address:

#### **BASF Contact Information**

Technical Emergency Center  
Carl-Bosch-Straße 38  
D-67056 Ludwigshafen  
Federal Republic of Germany  
Telephone: +49 621 60 43333 (day and night)  
Fax: +49 621 60 92664





**BASF**

26 Davis Drive  
Research Triangle Park, NC 27709  
USA  
+1 919-547-2000  
[www.agro.basf.com](http://www.agro.basf.com)

Always read and follow  
label directions.

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