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**In Case of Emergency, Call
1-800-327-8633 (FAST MED)**

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MSDS prepared by:
Department of Regulatory & Biology Assessment
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SECTION – 1: PRODUCT IDENTIFICATION

Product Identifier: RATAK+™ Rodenticide Mini-Pellets for Mice & Rats Formulation No.: A10976W
Registration Number: 17354 (Pest Control Products Act)
Chemical Class: A coumarin-type anticoagulant rodenticide.

Active Ingredient (%): Brodifacoum (0.005%) CAS No.: 56073-10-0
Chemical Name: 3-[3-(4'-bromo[1,1'-biphenyl]-4-yl)-1,2,3,4-tetrahydro-1-naphthalenyl]-4-hydroxy-2H-1-benzopyran-2-one

Product Use: Solid rodenticide for control of rodents. For further details please refer to product label.

SECTION – 2 : COMPOSITION/INFORMATION ON INGREDIENTS

Material	OSHA PEL	ACGIH TLV	Other	NTP/IARC/OSHA Carcinogen	WHMIS†
Crystalline Silica, Quartz and Cristobalite	10 mg/m ³ / (%SiO ₂ +2) (respirable dust)	0.025 mg/m ³ (respirable silica)	0.05 mg/m ³ (respirable dust)**	IARC 1; ACGIH 1	Yes
Kaolin Clay (CAS # 1332-58-7)	15 mg/m ³ TWA (total); 5 mg/m ³ TWA (respirable)	2 mg/m ³ TWA (respirable)	10 mg/m ³ TWA (total); 5 mg/m ³ TWA (respirable)**	No	Not Established
Brodifacoum	Not Established	Not Established	0.002 mg/m ³ TWA ***	No	Not Established

** Recommended by NIOSH

*** Syngenta Occupational Exposure Limit (OEL)

† Material listed in Ingredient Disclosure List under Hazardous Products Act.

Ingredients not precisely identified are proprietary or non-hazardous. Values are not product specifications.
Syngenta Hazard Category: A

SECTION – 3: HAZARDS IDENTIFICATION

Symptoms of Acute Exposure

May be harmful or fatal if swallowed or absorbed through the skin. Contains the allergen wheat. The active ingredient is designed to cause bleeding after repeated ingestion.
If pet or livestock poisoning is suspected, immediately contact a veterinarian.

Hazardous Decomposition Products

Can decompose at high temperatures forming toxic gases.

Physical Properties

Appearance: Green, solid pellets.

Odour: Slight cereal odour.

Unusual Fire, Explosion and Reactivity Hazards

During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

SECTION – 4: FIRST AID MEASURES

IF POISONING IS SUSPECTED, contact a physician, poison information centre, or nearest hospital IMMEDIATELY. For all cases of human ingestion, immediately notify a physician or poison control centre. If pet or livestock poisoning is suspected, immediately contact a veterinarian. Have the product container, label or Material Safety Data Sheet with you when calling Syngenta, a poison control center or doctor, or going for treatment. Tell the person contacted the complete product name, and the type and amount of exposure. Describe any symptoms and follow the advice given. Call the Syngenta Emergency Line [**1-800-327-8633 (1-800-FASTMED)**], for further information.

EYE CONTACT: Flush eyes with clean water, holding eyelids apart for a minimum of 15- 20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call Syngenta, a poison control center or doctor for treatment advice. Obtain medical attention immediately if irritation persists.

SKIN CONTACT: Immediately remove contaminated clothing and wash skin, hair and fingernails thoroughly with soap and water. Flush skin with plenty of water for 15-20 minutes. Call Syngenta, a poison control centre or doctor for treatment advice.

INHALATION: Move victim to fresh air. If not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call Syngenta, a poison control centre or doctor for treatment advice.

INGESTION: If swallowed, immediately contact Syngenta, a poison control centre, doctor or nearest hospital for treatment advice. Have person sip a glass of water if able to swallow. Do not give anything by mouth to an unconscious person. Do not induce vomiting unless directed by a physician or a poison control center. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer water.

NOTES TO PHYSICIAN:

This product contains the anticoagulant, brodifacoum, with an effect similar to warfarin, interfering with the synthesis of prothrombin, and reducing clotting ability of the blood and possibly causing hemorrhaging. The specific measure of effect is the prothrombin time. Note that prothrombin time may not become prolonged until 12-18 hours after ingestion.

The specific antidote is Vitamin K1 (Phytomenandione BP).

Antidote must be administered under medical supervision. For human cases, Vitamin K1 is initially administered at doses of 10-20 mg. Repeated doses may need to be given up to two weeks based on monitoring of prothrombin time. In severe cases the use of fresh frozen plasma may be required. The prothrombin time and hemoglobin level should be monitored. For veterinary cases, Vitamin K1 is antidotal at 2-5 mg/kg.

MEDICAL CONDITIONS KNOWN TO BE AGGRAVATED: As stated above, this product contains anticoagulants with an effect similar to that of warfarin. The anticoagulant interferes with the synthesis of prothrombin. Significant exposure (e.g. ingestion) can cause anticoagulation effects and could aggravate existing blood clotting disorders. This product may contain wheat, which may cause an allergic reaction in sensitive individuals.

SECTION – 5: FIRE FIGHTING MEASURES

Flash point and method: > 190 °C (paraffin wax) Method: PMCC

Upper and lower flammable (explosive) limits (%) in air: Not applicable.

Auto-ignition temperature: Not available.

Flammability: Not flammable.

Hazardous combustion products: During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

Conditions under which flammability could occur: Keep fire exposed containers cool by spraying with water.

Extinguishing media: Use foam, carbon dioxide, dry powder, halon extinguishant or water fog or mist, (avoid use of water jet). Wear full protective clothing and self-contained breathing apparatus. Evacuate nonessential personnel from the

area to prevent human exposure to fire, smoke, fumes or products of combustion. Prevent use of contaminated buildings, area, and equipment until decontaminated. Water runoff can cause environmental damage. Contain run-off water with, for example, temporary earth barriers.

Sensitivity to explosion by mechanical impact: None known.

Sensitivity to explosion by static discharge: None known.

SECTION – 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Make sure all personnel involved in the spill cleanup follow good industrial hygiene practices. A small spill can be handled routinely. Use adequate ventilation and wear equipment and clothing as described in Section 8 and/or the product label.

Procedures for dealing with release or spill: Control the spill at its source. Contain the spill to prevent from spreading or contaminating soil or from entering sewage and drainage systems or any body of water. Clean up spills immediately, observing precautions outlined in Sections 7 and 8. Scoop or sweep up material, keeping dust to a minimum, and place into a disposable container. Wash area with detergent and water. Pick up wash liquid with additional absorbent and place into compatible disposal container. On soils, small amounts will naturally decompose. For large amounts, skim off the upper contaminated layer and collect for disposal. Once all material is cleaned up and placed in a disposal container, seal container and arrange for disposal. Spillages or uncontrolled discharges into watercourses must be reported to the appropriate regulatory authority.

SECTION – 7: HANDLING AND STORAGE

Handling practices: KEEP OUT OF REACH OF CHILDREN. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. Avoid breathing dust or vapours. Wear full protective clothing and equipment (see Section 8). After work, rinse gloves and remove protective equipment, and wash hands thoroughly with soap and water after handling, and before eating, tobacco use, drinking, applying cosmetics or using the toilet. Wash contaminated clothing before re-use and separate from household laundry. Keep containers closed when not in use. Protect product, wash or rinse water, and contaminated materials from uncontrolled release into the environment, or from access by animals, birds or unauthorized people.

If pet or livestock poisoning is suspected, immediately contact a veterinarian.

Appropriate storage practices/requirements: Store in original container only in a well-ventilated, cool, dry, secure area inaccessible to children and non-target animals. Protect from heat, sparks and flame. Do not expose sealed containers to temperatures above 40 °C. Keep separate from other products to prevent cross contamination. Rotate stock. Clean up spilled material immediately.

National Fire Code classification: Not applicable.

SECTION – 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

THE FOLLOWING RECOMMENDATIONS FOR EXPOSURE CONTROLS/PERSONAL PROTECTION ARE INTENDED FOR THE MANUFACTURE, FORMULATION, PACKAGING AND USE OF THIS PRODUCT.

CONSULT THE PRODUCT LABEL FOR COMMERCIAL APPLICATIONS AND/OR ON-FARM APPLICATIONS.

Personal protective equipment for each exposure route:

General: Avoid breathing dust, vapours or aerosols. Avoid contact with eye, skin and clothing. Wash thoroughly after handling and before eating, drinking, applying cosmetics or handling tobacco.

INGESTION: Do not eat, drink, handle tobacco, or apply cosmetics in areas where there is a potential for exposure to this material. Always wash thoroughly after handling.

EYES: Where eye contact is likely, use chemical splash goggles. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

SKIN: Where contact is likely, wear chemical-resistant gloves (such as nitrile or butyl), coveralls, socks and chemical-resistant footwear. For overhead exposure, wear chemical-resistant headgear.

INHALATION: A respirator is not normally required when handling this substance. Use effective engineering controls to comply with occupational exposure limits. In case of emergency spills, use a NIOSH approved respirator with any N, R, P or HE filter.

Use a self-contained breathing apparatus in cases of emergency spills, when exposure levels are unknown, or under any circumstances where air-purifying respirators may not provide adequate protection.

SECTION – 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Green pellets.
Formulation Type:	Solid.
Odour:	Slight cereal odour.
pH:	228 – 232 °C (Brodifacoum)
Vapour pressure and reference temperature:	6×10^{-6} mmHg @ 20 °C (Brodifacoum technical).
Vapour density:	Not applicable.
Boiling point:	Not applicable.
Melting point:	Not available.
Specific gravity or density:	1.15 g/mL @ 20 °C
Evaporation Rate:	Non-volatile.
Water/oil partition coefficient:	Not available.
Odour threshold:	Not available.
Viscosity:	Not applicable.
Solubility in Water:	Insoluble (< 10mg/L for Brodifacoum technical).

SECTION – 10: STABILITY AND REACTIVITY

Chemical stability: Stable under normal use and storage conditions.

Conditions to avoid: Open flames.

Incompatibility with other materials: None known.

Hazardous decomposition products: Decomposes at high temperatures forming toxic gases, including carbon dioxide, carbon monoxide and, possibly, irritating gases.

Hazardous polymerization: Will not occur.

SECTION – 11: TOXICOLOGICAL INFORMATION

Acute toxicity/Irritation Studies (Finished Product):

Ingestion:	<u>Low Acute Toxicity</u> Oral (LD50 Rat):	> 5,000 mg/kg body weight
Dermal:	<u>Mild Acute Toxicity</u> Dermal (LD50 Rat):	> 500 mg/kg body weight
Inhalation:	<u>Not Available</u> Inhalation	Not applicable to product form.
Eye Contact:	See "Other Toxicity Information", Sec. 11	
Skin Contact:	See "Other Toxicity Information", Sec. 11	
Skin Sensitization:	Not Available	

Reproductive/Developmental Effects:

Brodifacoum	Not teratogenic, embryotoxic or fetotoxic in rats or rabbits at doses up to 0.02 mg/kg/day – the dose causing excessive maternal toxicity.
Technical:	Non-genotoxic in a range of assays.

Chronic/Subchronic Toxicity Studies:

Brodifacoum	The biological half-life for brodifacoum in body tissue in rats is >100 days. Adverse clinical effects can develop from body accumulation. Prolonged prothrombin time, depression, pallor, subcutaneous hemorrhage, bleeding of nose or gums,
Technical:	

gastrointestinal hemorrhage, cerebral hemorrhage, shock and death can develop following exposures.

No neurotoxicity studies have been conducted.

Carcinogenicity:

Brodifacoum

Unlikely to be carcinogenic.

Technical:

Other Toxicity Information:

Systemically toxic concentrations of this product will probably not be absorbed through human skin. Because this product is a solid, inhalation is not expected to be a normal route of exposure. No irritation is likely to develop following contact with human eyes. Irritation will probably not develop following contact with human skin.

Other effects of overexposure:

Effects of overexposure are those of anticoagulant overdose, i.e., reduced blood clotting ability with spontaneous bleeding in various organs. Body accumulation can result from repeated exposures since the half-life of brodifacoum is estimated to be >100 days. Individuals with blood clotting disorders may be more susceptible to overexposure effects.

Toxicity of Other Components

The acute toxicity test results reported in Section 11, above, for the finished product take into account any acute hazards related to the "other components" in the formulation.

Crystalline Silica, Quartz

Chronic inhalation exposure to crystalline silica is known to cause silicosis and pulmonary fibrosis in humans. Experimental animals exposed to crystalline silica developed respiratory tract cancers.

Kaolin Clay

The toxicological properties of this material have not been fully investigated. May cause eye and skin irritation. May cause respiratory and digestive tract irritation. This is expected to be a low hazard for usual industrial handling. Long term exposure to high concentrations of this dust may produce x-ray evidence of dust in the lungs. Continued long term overexposure may affect respiratory function in some individuals.

Other materials that show synergistic toxic effects together with the product: None known.

Target Organs:

Active Ingredients

Brodifacoum Technical:

Blood, Circulatory System.

Inert Ingredients

Crystalline Silica, Quartz

Respiratory tract.

Kaolin Clay

Eye, skin, lung, digestive tract, respiratory tract.

SECTION – 12: ECOLOGICAL INFORMATION

Summary of Effects

This product is an anticoagulant rodenticide manufactured as a solid pellet. As a result, the risk of this formulation to most non-target organisms is low. However, if this product is misused or stored improperly, birds and non-target animals may be at higher risk.

Eco-Acute Toxicity

Brodifacoum Technical:

Green Algae 5-Day EC₅₀

Not available

Invertebrates (Water Flea) *Daphnia magna* 48-hour EC₅₀

0.98 ppm

Fish (Rainbow Trout) 96-hr LC₅₀

0.015 ppm

Birds (Mallard Duck) 21-Day LC₅₀

0.26 mg/kg

Environmental Fate

The active ingredient, brodifacoum, has low bioaccumulation potential, little or no mobility in soil, and is not persistent in soil or water. The pellets will float and are sparingly soluble in water at first. They will degrade slowly in the environment

unless exposed to direct sunlight and moisture which will melt and disperse the material into soil, allowing biodegradation and photolysis to occur.

SECTION – 13: DISPOSAL CONSIDERATIONS

Waste disposal information: Do not reuse empty containers unless they are specifically designed to be refillable. Empty container retains product residue. Triple rinse, or equivalent, empty container, return rinse water to dilution mixture, and dispose of dilution mixture as a hazardous waste if it cannot be disposed of by use according to label instructions. Dispose of empty containers in accordance with local regulations. Consult provincial environment ministry for advice on waste disposal. Industrial/commercial waste may be handled at licensed facilities only. Waste shipments must be securely packaged and properly labelled. Only licensed carriers may be used, and proper documents must accompany the shipment.

SECTION – 14 : TRANSPORT INFORMATION

Shipping information such as shipping classification:

TRANSPORTATION OF DANGEROUS GOODS CLASSIFICATION - ROAD/RAIL

Not Regulated.

SECTION – 15: REGULATORY INFORMATION

WHMIS classification for product: Exempt

This MSDS has been prepared in accordance with WHMIS requirements, but the data are presented under 16 headings.

Other regulations; restrictions and prohibitions

Pest Control Products (PCP) Act Registration No.: 17354

SECTION – 16: OTHER INFORMATION

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Syngenta will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years. This product is under the jurisdiction of the Pest Control Products Act and is exempt from the requirements for a WHMIS compliant MSDS. Hazardous properties of all ingredients have been considered in the preparation of this MSDS. Read the entire MSDS for the complete hazard evaluation of this product.

Prepared by: Syngenta Canada Inc.
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