Schering-Plough Animal Health Corporation
556 Morris Avenue
Summit, NJ 07901

MATERIAL SAFETY DATA SHEET

Schering-Plough urges each user or recipient of this MSDS to read the entire data sheet to become aware of the hazards associated with this material.

SECTION 1. IDENTIFICATION OF SUBSTANCE AND CONTACT INFORMATION

MSDS NAME: **Imidocarb Dipropionate Injectable Solution**

SYNONYM(S): Carbesia
Carbesia B.
Imizol

MSDS NUMBER: SP000787

EMERGENCY NUMBER(S): Schering-Plough Security Control Center (908) 820-6921 (24 hours)

Transportation Emergencies - CHEMTREC:
(800) 424-9300 (Inside Continental USA)
(703) 527-3887 (Outside Continental USA)

Rocky Mountain Poison Center (For Human Exposure):
(303) 595-4869

Animal Health Technical Services:
For Animal Adverse Events: Small Animals and Horses: (800) 224-5318
For Animal Adverse Events: Livestock: (800) 211-3573
For Animal Adverse Events: Poultry: (800) 219-9286

INFORMATION: Animal Health Technical Services:
For Small Animals and Horses: (800) 224-5318
For Livestock: (800) 211-3573
For Poultry: (800) 219-9286

SCHERING-PLOUGH MSDS HELPLINE: (800) 770-8878 (US and Canada)
(908) 629-3657 (Worldwide)
Monday to Friday, 9am to 5pm (US Eastern Time)

SECTION 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Clear, Pale amber
Solution
Odor unknown

May be irritating to skin, eyes, or mucous membranes.

May cause effects to:
- nervous system
- liver
- kidney

POTENTIAL HEALTH EFFECTS:

The toxicological properties of the mixture(s) have not been fully characterized in humans or animals. However, there are data to describe the toxicological properties of the individual ingredients. The following summary is based upon available information about the individual ingredients of the mixture(s), or of the expected properties of the mixture(s).

Imidocarb dipropionate is a cholinesterase inhibitor. Signs of acute toxicity may include blurred vision, weakness, nausea, vomiting, abdominal cramps, loose stool, salivation, sweating, pin-point pupils, tremors, and convulsions.

Acute effects of workers exposed to propionic acid included mild to moderate skin burns and mild eye redness. No chronic or cumulative effects are known from industrial exposures. Propionic acid is an irritant to skin, eyes, and mucous membranes and concentrated solutions can cause local damage. Breathing propionic acid can irritate the nose, throat and lungs causing coughing wheezing and shortness of breath. Overexposure to this material may cause blurred vision, corneal burns, skin burns, abdominal pain, headache, nausea, vomiting, and asthma-like allergies.

LISTED CARCINOGENS

Not listed as a carcinogen by OSHA, IARC, NTP or ACGIH.

SECTION 3. COMPOSITION AND INFORMATION ON INGREDIENTS

PRODUCT USE: Veterinary product

CHEMICAL FORMULA: Mixture.

The formulation for this product is proprietary information. Only hazardous ingredients in concentrations of 1% or greater and/or carcinogenic ingredients in concentrations of 0.1% or greater are listed in the Chemical Composition table. Active ingredients in any concentration are listed. For additional information about carcinogenic ingredients see Section 3.

The formulation may contain propionic acid for pH adjustment.

CHEMICAL COMPOSITION

CHEMICAL NAME	CAS NUMBER	PERCENT
Imidocarb Dipropionate	55750-06-6	12.1
Propionic Acid	79-09-4	< 10

ADDITIONAL INFORMATION: This MSDS is written to provide health and safety information for individuals who will be handling the final product formulation during research, manufacturing, and distribution. For health and safety information for individual ingredients used during manufacturing, refer to the appropriate MSDS for each ingredient. Refer to the package insert or product label for handling guidance for the consumer.

SECTION 4. FIRST AID MEASURES

INHALATION: Remove to fresh air. If any trouble breathing, get immediate medical attention. Administer artificial respiration if breathing has ceased. If irritation or symptoms occur or persist, consult a physician.

SKIN CONTACT: In case of skin contact, while wearing protective gloves, carefully remove any contaminated clothing, including shoes, and wash skin thoroughly with soap and water. If irritation or symptoms occur or persist, consult a physician.

EYE CONTACT: In case of eye contact, immediately rinse eyes thoroughly with plenty of water. If wearing contact lenses, remove only after initial rinse, and continue rinsing eyes for at least 15 minutes. If irritation occurs or persists, consult a physician.

INGESTION: Rinse mouth and drink a glass of water. Do not induce vomiting unless under the direction of a qualified medical professional or Poison Control Center. If symptoms persist, consult a physician.

SECTION 5. FIRE FIGHTING MEASURES

FLAMMABILITY DATA:

Flash Point: Not determined (liquids) or not applicable (solids).

SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing and self-contained breathing apparatus (SCBA).

SUITABLE EXTINGUISHING MEDIA:
Water, carbon dioxide (CO_2), foam, or dry chemical.

See Section 9 for Physical and Chemical Properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:
Keep personnel away from the clean-up area. Wear appropriate personal protective equipment as specified in Section 8.

SPILL RESPONSE / CLEANUP:
All spills should be handled according to site requirements and based on precautions cited in the MSDS. In the case of liquids, use proper absorbent materials. For laboratories and small-scale operations, incidental spills within a hood or enclosure should be cleaned by using a HEPA filtered vacuum or wet cleaning methods as appropriate. For large dry or liquid spills or those spills outside enclosure or hood, appropriate emergency response personnel should be notified. In manufacturing and large-scale operations, HEPA vacuuming prior to wet mopping or cleaning is required.

See Sections 9 and 10 for additional physical, chemical, and hazard information.

SECTION 7. HANDLING AND STORAGE

HANDLING:
Keep containers adequately sealed during material transfer, transport, or when not in use.

Appropriate handling of this material is dependent on many factors, including physical form, duration and frequency of process or task, and effectiveness of engineering controls. Site-specific risk assessments should be conducted to determine the feasibility and the appropriateness of all exposure control measures. See Section 8 (Exposure Controls) for additional guidance.

STORAGE:
Store between 2 and 25 deg C. Do not freeze.

See Section 8 for exposure controls and additional safe handling information.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

The following guidance applies to the handling of the active ingredient(s) in this formulation.

EXPOSURE CONTROLS:
The health hazard risks of handling this material are dependent on many factors, including physical form, duration and frequency of process or task, and effectiveness of engineering controls. Site-specific risk assessments should be conducted to determine the feasibility and the appropriateness of all exposure control measures. Exposure controls for normal operating or routine procedures follow a tiered strategy. Engineering controls are the preferred means of long-term or permanent exposure control. If engineering controls are not feasible, appropriate use of personal protective equipment (PPE) may be considered as alternative control measures. However, PPE should not be used as a method of permanent or long-term exposure control. Exposure controls for non-routine operations must be evaluated and addressed as part of the site-specific risk assessment.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

Respiratory Protection:	Respiratory protective equipment (RPE) may be required for certain laboratory and large-scale manufacturing tasks if potential airborne breathing zone concentrations of substances exceed the relevant exposure limit(s). Workplace risk assessment should be completed before specifying and implementing RPE usage. Potential exposure points and pathways, task duration and frequency, potential employee contact with the substance, and the ability of the substance to be rendered airborne during specific tasks should be evaluated. Initial and ongoing strategies of quantitative exposure measurement should be obtained as required by the workplace risk assessment. All RPE must conform to local and regional specifications for efficacy and performance. Consult your site or corporate health and safety professional for additional guidance.
Skin Protection:	Gloves that provide an appropriate barrier to the skin are recommended if there is potential for contact with this material. Consult your site safety staff for guidance.
Eye Protection:	Safety glasses with side shields. Use of goggles or full face protection may be required based on hazard, potential for contact, or level of exposure. Consult your site safety staff for guidance.
Body Protection:	In small-scale or laboratory operations, lab coats or equivalent protection is required. Disposable Tyvek or other dust impermeable suit should be considered based on procedure or level of exposure. Use of additional PPE such as shoe coverings, gauntlets, hood, or head covering may be necessary. Consult your site safety staff for guidance. In large-scale or manufacturing operations, disposable Tyvek or other dust impermeable suit is recommended and based on level of exposure. Use of additional PPE such as shoe coverings, gauntlets, hood, or head covering may be necessary. Consult your site safety staff for guidance.

EXPOSURE LIMIT VALUES

CHEMICAL NAME	CAS NUMBER	ACGIH TLV (TWA)	OSHA PEL (TWA)
Propionic Acid	79-09-4	10 ppm	

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

FORM: Solution
COLOR: Clear, Pale amber
ODOR: Odor unknown
pH: 4.5
BOILING POINT / RANGE: 100 deg C (212 deg F)
FREEZING POINT: 0 deg C (32 deg F)
SOLUBILITY:
Water: Soluble

See Section 5 for flammability/explosivity information.

SECTION 10. STABILITY AND REACTIVITY

STABILITY/ REACTIVITY:
Stable under normal conditions.

INCOMPATIBLE MATERIALS / CONDITIONS TO AVOID:
Water-reactive materials. Oxidizers.

HAZARDOUS POLYMERIZATION PRODUCTS / REACTIONS:
Does not occur.

HAZARDOUS DECOMPOSITION PRODUCTS / REACTIONS:
Carbon monoxide. Carbon dioxide (CO2).

SECTION 11. TOXICOLOGICAL INFORMATION

The information presented below pertains to the following individual ingredients, and not to the mixture(s).

ACUTE TOXICITY DATA

SKIN:
Propionic acid: Dermal LD50: 495-500 mg/kg (rabbit)
The application of 495 mg to rabbit skin produced a severe response. In a rabbit skin irritation test, tissue necrosis was observed after the application of 10 mg of undiluted propionic acid for 24 hours.

EYE:
Propionic acid produced severe corneal damage in the eyes of rabbits.

ORAL:
Imidocarb dipropionate: Oral LD50: 454-1251 mg/kg (rat); 646-723 mg/kg (mice)
Rats and mice treated with a single oral dose of imidocarb dipropionate exhibited signs that were generally consistent with anticholinesterase activity and included lethargy, salivation, lacrimation, ataxia, tremors and convulsions.

Propionic acid: Oral LD50: 2600-5160 mg/kg (rat); 5100 mg/kg (mouse)

REPEAT DOSE TOXICITY DATA

SUBCHRONIC / CHRONIC TOXICITY:
Repeat dose toxicity studies for imidocarb dipropionate were conducted in rats, dogs, and primates. Rats were administered imidocarb dipropionate orally for three months at dose levels of 125, 250, 750 and 1500 mg/kg/day. Mortality was observed in all animals in the high dose group. Pathological changes, such as cloudy swelling, were observed in the livers of rats administered 125 and 250 mg/kg/day. No histopathology was carried out at higher doses and no NOEL was established. In a dietary study, rats were treated at doses as high as 415 and 554 mg/kg/day in males and females, respectively. Body weight gain was reduced in male and female rats at the high dose. No effects on hematology, clinical chemistry, urinalysis or brain cholinesterase were observed. In the high dose at termination, mild bile stasis in the liver was observed. The NOEL for reduced body weight gain and liver toxicity was 75 and 101 mg/kg/day in males and females, respectively.

Imidocarb dipropionate was administered orally (capsules) to beagle dogs for three months at doses of 5, 20, or 80 mg/kg/day. All males and 2 of 4 females at the high dose died or were euthanized. Signs of toxicity at the high dose included recumbency, salivation muscle fasciculation, ataxia and splayed legs. Eosinophilia and increased liver enzymes were also observed at the high dose. Similar but less severe effects were noted at 20 mg/kg/day. Kidney, thyroid and adrenal weight increases were observed at the high dose. Pathology changes observed in the mid and high dose groups included alterations in the kidney and liver. A NOEL was not determined based on minor changes in hematology and clinical chemistry values and hepatocellular changes observed at the low dose level.

Five primates were administered 5 mg/kg imidocarb dipropionate orally by stomach tube daily for 30 days. All animals survived. Apart from minor biological variations, there were no important changes noted.

In a combined chronic toxicity/carcinogenicity study rats were administered imidocarb dipropionate in the diet at dose levels of 15, 60 and 240 mg/kg/day for 104 weeks. Only 9 of 65 males survived in the high dose group at study termination. Animals at the high dose level exhibited emaciation, reduced body weight gain and food consumption, anemia, and liver and kidney effects. The mid and high dose group animals exhibited cystic distension of the renal tubules and glomeruli, and mineralization of the renal medulla [NOEL for chronic toxicity: 15 mg/kg/day].

Rats, mice, and hamsters fed diets containing 4 percent propionic acid for 7 days showed evidence of damage and cellular proliferation in the epithelium of the forestomach. The administration of propionic acid in the diet had no effect after 9 days; however, it induced a five- to six-fold increase in cell perliferation in the midregion of the rat forestomach after 27 days of treatment. Rats fed calcium propionate at 1 percent in the diet for 4 weeks (about 750 mg of propionic acid kg/day) followed by 3 percent for 3 weeks showed no change in weight gain compared with controls.

REPRODUCTIVE / DEVELOPMENTAL TOXICITY:
In a multigeneration study, rats were treated with imidocarb dipropionate at dose levels as high as 135 mg/kg/day. Maternal body weights were reduced at the high dose. The number of live births was reduced at the high dose following the first mating of the F0 generation and there was an increase in the number of dead or missing fetuses. A similar trend was evident following the first mating of the F1 generation [NOEL: 45 mg/kg/day].

Imidocarb dipropionate was evaluated in rat teratogenicity studies at dose levels of 47, 138 and 760 mg/kg (dietary)and 19, 76, and 304 mg/kg (gavage). No evidence of teratogenicity was observed in either study. In rabbits administered 20, 60 or 180 mg/kg of imidocarb dipropionate all animals administered the high dose and most animals treated at 60 mg/kg died. No evidence of teratogenicity was observed at any dose level [NOEL for maternal and fetal toxicity: 20 mg/kg/day].

Calcium propionate, the calcium salt form of propionic acid, did not have an effect on maternal or fetal survival. There was no increase in the number of fetal abnormalities observed when it was fed to pregnant mice and rats (as high as 300 mg/kg/day for 10 days), hamsters (as high as 400 mg/kg/day for 5 days), or rabbits (as high as 400 mg/kg/day for 13 days).

MUTAGENICITY / GENOTOXICITY:
Imidocarb dipropionate was negative in the in vitro S. typhimurium assay and in the in vitro assay for gene mutation in mouse lymphoma cells. It was also negative in three in vivo assays including the cytogenetics assay, the mouse micronucleus assay and the dominant lethal assay. Three chromosomal aberration assays were carried out in human peripheral blood lymphocytes. The first study was negative, the second study was positive with metabolic activation. The third study was designed to test for aneuplody and tested the ability of imidocarb dipropionate to induce micronuclei in human peripheral lymphocytes. No increase in micronuclei was observed. Slides from a single interim dose level (the only level examined) confirmed the induction of polyploidy at this dose level (895.5 ug/mL).

Propionic acid was negative in the following tests: a Salmonella microsome mutagenicity test (Ames), a sister chromatid exchange test in vitro, and in a micronucleus test in vivo. Propionic acid was also negative in mutagenicity assays using Salmonella typhimurium or Saccharomyces cerevisiae with or without mammalian liver preparation.

CARCINOGENICITY:
This material or product has not been evaluated for carcinogenicity.

In a combined chronic toxicity/carcinogenicity study rats were administered imidocarb dipropionate in the diet at dose levels of 15, 60 and 240 mg/kg/day for 104 weeks. Only 9 of 65 males survived in the high dose group at study termination. The high dose group exhibited an increase in the incidence of multiple fibroadenomas of the mammary gland in females and multiple subcutaneous fibromas in males. The significance of these findings was considered doubtful due to the excessive toxicity observed at this dose level, poor survival, and inadequate histopathology. There were no significant increases in any types of malignant tumors.

Rats fed high levels of propionic acid (4 percent) in the diet developed forestomach neoplasia, due to sustained high levels of cellular proliferation. The persistent damage to cells of the forestomach and associated proliferative responses are common factors in rodent tumorigenesis. The relevance to humans has not been determined.

SECTION 12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA

INGREDIENT ECOTOXICITY

Propionic acid: 96-hour LC50 (fathead minnow): 4740 mg/L
Propionic acid: 24-hour LC50 (daphnid): 130 mg/L

ENVIRONMENTAL DATA

There are no environmental data available for this product or its components.

SECTION 13. DISPOSAL CONSIDERATIONS

MATERIAL WASTE:
Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations. Incineration is the preferred method of disposal, when appropriate. Operations that involve the crushing or shredding of waste materials or returned goods must be handled to meet the recommended exposure limit(s).

PACKAGING AND CONTAINERS:
Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations.

SECTION 14. TRANSPORT INFORMATION

This material is not subject to the transportation regulations of DOT, ICAO, IMO, and the ADR.

SECTION 15. REGULATORY INFORMATION

TSCA LISTING

CHEMICAL NAME	TSCA
Propionic Acid	Listed

U.S. STATE REGULATIONS

CHEMICAL NAME	California Proposition 65	CARTK	NJRTK	CTRTK	MARTK
Propionic Acid		Listed.	Substance no. 1599 Listed.	Listed.	Listed.

CHEMICAL NAME	PARTK	MNRTK	MIRTK	ILRTK	LARTK	RIRTK
Propionic Acid	Listed.	Listed.		Listed.		Listed.

SECTION 16. OTHER INFORMATION

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequence of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

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