Capsaicin

sc-3577

Material Safety Data Sheet

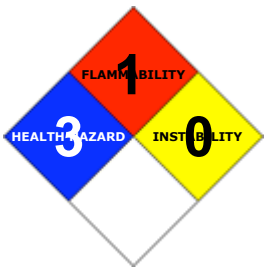
Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Capsaicin

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER
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SYNONYMS
C18-H27-NO3, "6-nonenamide, N-((4-hydroxy-3-methoxyphenyl)methyl)-8-methyl-, (E)-", capsaicine, N-((4-hydroxy-3-methoxyphenyl)methyl)-8-methyl-6-n, onenamide, trans-N-((4-hydroxy-3-methoxyphenyl)methyl)-8-meth, yl-6-nonenamide, (E)-8-methyl-N-vanillyl-6-nonenamide, trans-8-methyl-vanillyl-6-nonenamide, NCI-C56564, "6-nonenamide, 8-methyl-N-vanillyl-, (E)", "capsicum/ chili/ pepper extract"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	3		
Body Contact:	3		
Reactivity:	1		
Chronic:	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Toxic if swallowed.
Risk of serious damage to eyes.
May cause SENSITISATION by inhalation and skin contact.
Irritating to respiratory system and skin.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
■ Mucous membranes throughout the gastrointestinal tract from mouth to anus may be temporarily irritated by ingestion of capsaicin. In addition to irritation, diarrhea and vomiting may occur
Capsaicinoids may produce severe gastritis and diarrhoea. Intragastric infusion of powdered red chillies (0.8 and 1.6 g per hour) caused a rapid and marked increase in the DNA content of the gastric aspirate, indicating exfoliation of the epithelial cells from the gastric mucosa. [Desai et al, Gut, 1973, 14, 974].

EYE

■ If applied to the eyes, this material causes severe eye damage.

SKIN

■ The material may accentuate any pre-existing dermatitis condition.
■ Researchers applied 0.8 g of gel containing 0.075% of capsaicin to the skin of six human volunteers for 8 hours of exposure. They then calculated the average absorbed dose as 22.65 ug/cm2 with a standard deviation of 3.73 ug/cm2. Topical application of pure capsaicin to the skin of mice resulted in peak plasma concentrations occurring 4 to 12 hours later, and capsaicin was detectable in the blood 24 hours after dosing. Doses of 5.12 mg/mouse/week led to maximum plasma concentrations of 51.5 ng/ml in male and 84.8 ng/ml in female mice
Capsaicin,caused erythema and burning, but not vesication when applied to the skin [Smith et al, J. Invest. Derm., 1970, 54,170]
Administration may cause intense pain in humans and experimental animals. Prolonged treatment causes insensitivity to painful stimuli. In new-born rats it induces selective degeneration of certain primary sensory neurones which mediate chemogenic pain. [Merck Index].
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
■ The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering.

INHALED

■ The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
■ Inhalation of dusts, generated by the material during the course of normal handling, may produce serious damage to the health of the individual.
■ Capsaicin temporarily causes bronchoconstriction, coughing, nausea, and incoordination in the upper body in humans following inhalation. Capsaicin administered in a nasal spray resulted in human volunteers experiencing greatly increased nasal discharge and lacrimation, and burning sensation.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
■ The material is a sternutator i.e. may produce violent sneezing.

CHRONIC HEALTH EFFECTS

■ Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
Inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.
Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
Chronic feeding studies in rodents consistently demonstrated weight loss when animals were either dosed via gavage or when the capsaicin was mixed with the food. However, another feeding study showed no such effects using ground red pepper Capsicum annuum at up to 10% of the total diet in mice.
Different diets affected the toxic effects of capsaicin on the liver and spleen in rabbits, such that effects were greatest in animals fed the high-fat diets. In contrast, animals fed high protein, high carbohydrate diets showed no effects relative to
controls. Test animals were given 5 g/kg of “red pepper” daily for one year.
Researchers applied pure capsaicin topically to the backs of mice once weekly for 26 weeks. Doses of 0.64, 1.28, and 2.56
mg/mouse/week resulted in skin abnormalities including inflammation, epidermal crusts, epidermis thickening, and
ulcerations. Other signs included gross lesions in the stomach, salivary glands, and oral cavity.
Capsaicin applied to the hind-paws of rats twice daily for 10 weeks led to increased pain sensitivity in the animals
exposed to the highest dose (0.75% capsaicin) although this sensitivity decreased with time. Rats treated with a lower dose (0.075% capsaicin) demonstrated reduced function in certain cells known as C fibers following prolonged dosing,
but this impairment disappeared after treatment stopped.
Chronic exposure to capsaicin in a factory setting resulted in cough thresholds that were related to the extent of
exposure on the job. Workers exposed to capsaicin demonstrated a bimodal cough threshold response that was not observed in unexposed

workers, who showed a unimodal response. Some exposed workers were much more sensitive to capsaicin than other exposed workers
A condition known as “Hunan hand”, which is a form of contact dermatitis, has been noted in workers handling peppers.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.
<\p>.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
capsaicin	404-86-4	>98
commercial product may contain		
dihydrocapsaicin	19408-84-5	

Section 4 - FIRST AID MEASURES

SWALLOWED
· Give a slurry of activated charcoal in water to drink. NEVER GIVE AN UNCONSCIOUS PATIENT WATER TO DRINK. · At least 3 tablespoons in a glass of water should be given.

EYE
■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN
■ In case of skin contact (with capsaicinoids), bathe or immerse the irritated area in vinegar (5% acetic acid). Immersion should be continued as long as irritation is felt upon drying the affected area. several hours of immersion may be required in severe cases. An alternative treatment involves immersion of the irritated area in vegetable oil. Studies indicate that vegetable oil immersion provides better long-term relief than cold water. [New England J. Med. 306, 178, 1982 & Vet. and Human Tox., 28, 486, 1986 - quoted by Sigma/Aldrich].

INHALED
· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN
■ Treat symptomatically.
Treatment regime for capsaicin may be useful:
Management is entirely supportive and involves cleansing of the effected area with water. Cases of aspiration may require bronchoscopy and pulmonary lavage. Immersion of irritated skin areas in vinegar (5% acetic acid) may provide relief even if initiated 30 minutes or longer after exposure. Several hours of bathing may be required in severe cases.
Comparison of cold water and vegetable oil immersion indicated that vegetable oil provided better long-term relief from green chili (C.annum) than cold water. [Ellenhorn & Barceloux, Medical Toxicology.
for poisons (where specific treatment regime is absent):
----------BASIC TREATMENT----------
· Establish a patent airway with suction where necessary.
· Watch for signs of respiratory insufficiency and assist ventilation as necessary.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	Not available
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA
· Foam.
· Dry chemical powder.

FIRE FIGHTING
· Alert Emergency Responders and tell them location and nature of hazard.
· Wear full body protective clothing with breathing apparatus.
When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
· Combustible solid which burns but propagates flame with difficulty.
· Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
Combustion products include: carbon monoxide (CO), carbon dioxide (CO_2), nitrogen oxides (NOx), other pyrolysis products typical of

burning organic material.
May emit poisonous fumes.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:
Gloves:
Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· Clean up waste regularly and abnormal spills immediately.
· Avoid breathing dust and contact with skin and eyes.
· Wear protective clothing, gloves, safety glasses and dust respirator.
· Use dry clean up procedures and avoid generating dust.
· Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
· Dampen with water to prevent dusting before sweeping.
· Place in suitable containers for disposal.
Wipe area with a slurry of diatomaceous earth and ethanol.
MAJOR SPILLS
· Clear area of personnel and move upwind.
· Alert Emergency Responders and tell them location and nature of hazard.
Wipe area with a slurry of diatomaceous earth and ethanol.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of exposure occurs.
Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
· Do NOT cut, drill, grind or weld such containers.
· In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

■ Glass container.
· Lined metal can, Lined metal pail/drum
· Plastic pail.
For low viscosity materials
· Drums and jerricans must be of the non-removable head type.
· Where a can is to be used as an inner package, the can must have a screwed enclosure.
All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

STORAGE REQUIREMENTS

· Store in original containers.
· Keep containers securely sealed.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

• capsaicin:	CAS:404-86-4
• dihydrocapsaicin:	CAS:19408-84-5

PERSONAL PROTECTION




RESPIRATOR

Particulate
Consult your EHS staff for recommendations

EYE

· Chemical protective goggles with full seal
· Shielded mask (gas-type)
· Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

■ NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
· Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
· Rubber gloves (nitrile or low-protein, powder-free latex). Employees allergic to latex gloves should use nitrile gloves in preference.
· Double gloving should be considered.
· PVC gloves.
· Protective shoe covers.
· Head covering.

OTHER

· For quantities up to 500 grams a laboratory coat may be suitable.
· For quantities up to 1 kilogram a disposable laboratory coat or coverall of low permeability is recommended. Coveralls should be buttoned at collar and cuffs.
· For quantities over 1 kilogram and manufacturing operations, wear disposable coverall of low permeability and disposable shoe covers.
· For manufacturing operations, air-supplied full body suits may be required for the provision of advanced respiratory protection.
· Eye wash unit.
· Ensure there is ready access to an emergency shower.
· For Emergencies: Vinyl suit.

ENGINEERING CONTROLS

■ For potent pharmacological agents:
Powders
To prevent contamination and overexposure, no open handling of powder should be allowed.
· Powder handling operations are to be done in a powders weighing hood, a glove box, or other equivalent ventilated containment system.
· In situations where these ventilated containment hoods have not been installed, a non-ventilated enclosed containment hood should be used.
· Pending changes resulting from additional air monitoring data, up to 300 mg can be handled outside of an enclosure provided that no grinding, crushing or other dust-generating process occurs.
· An air-purifying respirator should be worn by all personnel in the immediate area in cases where non-ventilated containment is used, where significant amounts of material (e.g., more than 2 grams) are used, or where the material may become airborne (as through grinding, etc.).
· Powder should be put into solution or a closed or covered container after handling.
· If using a ventilated enclosure that has not been validated, wear a half-mask respirator equipped with HEPA cartridges until the enclosure is validated for use.
Solutions Handling:
· Solutions can be handled outside a containment system or without local exhaust ventilation during procedures with no potential for aerosolisation. If the procedures have a potential for aerosolisation, an air-purifying respirator is to be worn by all personnel in the immediate area.
· Solutions used for procedures where aerosolisation may occur (e.g., vortexing, pumping) are to be handled within a containment system or with local exhaust ventilation.
· In situations where this is not feasible (may include animal dosing), an air-purifying respirator is to be worn by all personnel in the immediate

area. If using a ventilated enclosure that has not been validated, wear a half-mask respirator equipped with HEPA cartridges until the enclosure is validated for use.
· Ensure gloves are protective against solvents in use.
Unless written procedures, specific to the workplace are available, the following is intended as a guide:
· For Laboratory-scale handling of Substances assessed to be toxic by inhalation. Quantities of up to 25 grams may be handled in Class II biological safety cabinets *; Quantities of 25 grams to 1 kilogram may be handled in Class II biological safety cabinets* or equivalent containment systems Quantities exceeding 1 kg may be handled either using specific containment, a hood or Class II biological safety cabinet*,
· HEPA terminated local exhaust ventilation should be considered at point of generation of dust, fumes or vapors.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.
Does not mix with water.

State	Divided solid	Molecular Weight	305.4
Melting Range (°F)	149	Viscosity	Not Applicable
Boiling Range (°F)	410- 428(0.01mm)	Solubility in water (g/L)	Immiscible
Flash Point (°F)	Not available	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	Not applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not applicable

APPEARANCE

White crystalline powder; does not mix with water. Soluble in alcohol, ether, benzene, chloroform.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

· Presence of incompatible materials.
· Product is considered stable.

STORAGE INCOMPATIBILITY

■ Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

CAPSAICIN

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
■ For capsaicin (as a congener of the capsaicinoids)
Acute toxicity: Capsaicin can cause skin irritation. Little absorption occurs across the skin. Oedema following dermal exposure in mouse ears in several studies peaked within 1 hour of application, although subsequent applications produced less of a response. Capsaicin can severely irritate the eyes, and was found to cause corneal lesions in rats and mice
Airway resistance increased following inhalation of capsaicin in both mild asthmatics and non-asthmatic people at doses that are below those eliciting the cough response
People suffering from asthma and other respiratory diseases may be more sensitive to capsaicin than other individuals.
A more recent study suggested that people with sensory hyper-reactivity have enhanced sensitivity to capsaicin. This was associated with increased levels of serum nerve growth factors in nasal lavage fluid.
Capsaicin produces its repellent effect when it contacts either eye or respiratory tract mucus membranes. In animals signs of acute exposure include coughing, inability to vocalise, and temporary blindness.
Mice and rats dosed orally with 96 to 200 mg/kg capsaicin demonstrated immediate salivation, convulsions, reddening of the skin, and dyspnea, or labored breathing. Animals either died within 26 minutes of dosing, or showed no further symptoms 24 hours after dosing. Capsaicin fed to rats was rapidly absorbed from the stomach, with 85% of a 3 mg dose absorbed within 3 hours
Inhalation exposure to capsaicinoids in pepper sprays damaged rat bronchial, tracheal, nasal, and alveolar cells, causing acute inflammation.
Carcinogenicity: Several researchers reviewed evidence that capsaicin is carcinogenic in animals and found that the evidence was inconclusive.
Researchers have demonstrated that capsaicin is mutagenic and genotoxic in some studies using bacterial and rodent models but not in others.
Researchers applied pure trans-capsaicin to the dorsal skin of mice weekly for 26 weeks at rates of 0.64, 1.28, or 2.56 mg/ mouse/week. No increase of neoplastic skin lesions or other abnormal skin growth was noted over control mice. A lifetime diet containing 0.03% capsaicin fed

to mice led to slight increases in benign tumors of the caecum
Capsaicinoids fed to male mice at 1% of the diet for 79 weeks resulted in kidney lesions in male mice. However, female mice fed a diet of 0.25% capsaicinoids for 83 weeks developed fewer tumors compared with controls. Hepatocellular neoplasms, or abnormal growths in the liver, also occurred less often in male and female mice fed greater concentrations of capsaicinoids in their diet.
Genetic toxicity: Capsaicin has demonstrated mutagenic effects in some research but not in other studies. Impurities in the extract may be responsible for mutagenic effects because the studies that failed to demonstrate mutagenic effects used pure capsaicin.
People consuming 90-250 mg of capsaicin per day (in the form of jalapeno peppers) had a greater risk of gastric cancer
compared with people who consumed less capsaicin (0-29.9 mg capsaicin per day).
Capsaicin exerted an anti-proliferative effect on human prostate cancer cells in vitro in a dose-dependent manner, completely halting proliferation at 5 x 10-4 mol/L.
Distribution: Rats injected intravenously accumulated capsaicin primarily in the brain and spinal cord 3 minutes after dosing, with lower levels found in the liver and blood. Ten minutes after dosing, the greatest concentrations remained in the spinal cord.
When the capsaicin was injected subcutaneously, rat blood concentrations peaked 5 hours following dosing, and brain and spinal cord tissue concentrations were somewhat lower. Kidneys contained the greatest concentrations and liver concentrations were low. Researchers detected capsaicin in all tissues 10 minutes following dosing but residues were undetectable in any tissues 17 hours later. The researchers concluded that the low concentrations in the liver were due to metabolic breakdown of the capsaicin
Metabolism: Metabolism occurs primarily by the liver in the rat Metabolism of capsaicin by P450 enzymes may follow a number of pathways and produce a variety of metabolites, some of which may be associated with increased toxicity. Research using human, rat, mouse, goat, and rabbit liver and lung microsomes demonstrated that metabolism rates were much greater in liver microsomes compared with lung microsomes for each species. Although the same metabolites were produced, the relative amounts of each metabolite were species-dependent.
Excretion: Less than 10% of an oral dose of capsaicin given to rats was excreted unchanged 48 hours after dosing
Capsaicin is representative of the capsaicinoids although each may differ in potency Capsaicin is the main capsaicinoid in chili peppers, followed by dihydrocapsaicin. These two compounds are also about twice as potent to the taste and nerves as the minor capsaicinoids nordihydrocapsaicin, homodihydrocapsaicin, and homocapsaicin. The pharmacological action and toxicology of capsaicin has been well developed in both human and animal studies. Capsaicin is highly toxic by all routes of administration except rectal and dermal. Intravenous doses cause convulsions within 5 secs and death within 2 to 5 minutes. Toxic signs include excitement, convulsions with limbs extended, dyspnea and death due to respiratory failure. Capsaicin's acute toxicity in mice falls between that of nicotine and strychnine, two well known potent poisons. The toxicity of the oleoresin which contains capsaicin, in female mice, is around 4 times more toxic than capsaicin alone. Guinea pigs appear to more susceptible than rats and mice whilst hamsters and rabbits were less vulnerable to the toxic effects both capsaicin
Inhalation of capsaicin is consistent with the induction of the Kratshmer reflex, which is apnoea, bradycardia, and a biphasic fall and rise in aortic blood pressure. Exposure to capsaicin cause bronchoconstriction in animals and humans, the release of substance P, a neuropeptide, from sensory nerve terminals and mucosal oedema. The pulmonary effects appear to be species dependent. In guinea pigs, intravenous and intra-arterial administration causes bronchoconstriction. The bronchoconstriction in dog and cat after intravenous capsaicin depends on vagal cholinergic reflex, as does bronchoconstriction in the cat after aerosol exposure. In guinea pig, bronchoconstriction following aerosol exposure suggest both a vagal-cholinergic and non-cholinergic local axon reflex
The burning and painful sensations associated with capsaicin result from its chemical interaction with sensory neurons.
Capsaicin triggers the release of the neuropeptide P from the sensory nerve fibers of the C type. In mammals, capsaicin (a member of the vanilloid family .binds to a receptor called the vanilloid receptor subtype 1 (TRPV1). TRPV1 is an ion channel-type receptor. TRPV1, which can also be stimulated with heat and physical abrasion, permits cations to pass through the cell membrane and into the cell when activated. The resulting depolarisation of the neuron stimulates it to signal the brain. By binding to the TRVP1 receptor, the capsaicin molecule produces the same sensation that excessive heat or abrasive damage would cause, explaining why the spiciness of capsaicin is described as a burning sensation.Research has shown that the capsaicinoids are all physiologically (virtually) identical, with very few differences other than binding efficacy to TRPV1. Upon binding to TRPV1 receptor capsaicin releases sensory neuropeptides that trigger a neurogenic inflammatory response.
CAPSAICIN:

TOXICITY	IRRITATION
Intraperitoneal (rat) LD50: 9.5 mg/kg	Nil Reported
Oral (mouse) LD50: 47.2 mg/kg	
Dermal (mouse) LD50: >512 mg/kg	
Subcutaneous (mouse) LD50: 9 mg/kg	

Equivocal tumorigen by RTECS criteria

DIHYDROCAPSAICIN:

■ No significant acute toxicological data identified in literature search.
NOTE: Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.
Hamster lung cell mutagen.

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
capsaicin	HIGH		LOW	LOW
dihydrocapsaicin	HIGH		LOW	LOW

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / EHS TRN A1a A1b A1 A2 B1 B2 C1 C2 C3 D1 D2 D3 E1 E2 E3 Cas No / RTECS No _____ Fatty 226 277 (4) NI (4) R (4) (1) (0) (0) (1) (1) (1) Fp 3 acids, 0 9 linear, C8- C18 saturated with C18 unsaturat ed / CAS:404- 86- 4 /

Legend: EHS=EHS Number (EHS=GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships) NRT=Net Register Tonnage, A1a=Bioaccumulation log Pow, A1b=Bioaccumulation BCF, A1=Bioaccumulation, A2=Biodegradation, B1=Acuteaquatic toxicity LC/ECIC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acutemammalian dermal toxicity LD50 (mg/kg), C3=Acute mammalian inhalation toxicity LC50 (mg/kg), D1=Skin irritation & corrosion, D2=Eye irritation& corrosion, D3=Long-term health effects, E1=Tainting, E2=Physical effects on wildlife & benthic habitats, E3=Interference with coastal amenities, For column A2: R=Readily biodegradable, NR=Not readily biodegradable. For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lunginjury, N=Neurotoxic, I=Immunotoxic. For column E1: NT=Not tainting (tested), T=Tainting test positive. For column E2: Fp=Persistent floater, F=Floater, S=Sinking substances. The numerical scales start from 0 (no hazard), while higher numbers reflect increasing hazard. (GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships)

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:
· Reduction
· Reuse
· Recycling
· Disposal (if all else fails)
This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
· Recycle wherever possible.
· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: None Hazard class or Division: 6.1
Identification Numbers: UN1544 PG: II
Label Codes: 6.1 Special provisions: IB8, IP2,
IP4, T3,
TP33
Packaging: Exceptions: 153 Packaging: Non- bulk: 212
Packaging: Exceptions: 153 Quantity limitations: 25 kg
Passenger aircraft/rail:
Quantity Limitations: Cargo 100 kg Vessel stowage: Location: A
aircraft only:
Vessel stowage: Other: None
Hazardous materials descriptions and proper shipping names:
Alkaloids, solid, n.o.s. or Alkaloid salts, solid, n.o.s. poisonous

Air Transport IATA:

ICAO/IATA Class: 6.1 ICAO/IATA Subrisk: None
UN/ID Number: 1544 Packing Group: II
Special provisions: A3
Cargo Only
Packing Instructions: 615 Maximum Qty/Pack: 100 kg
Passenger and Cargo Passenger and Cargo
Packing Instructions: 613 Maximum Qty/Pack: 25 kg
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: Y613 Maximum Qty/Pack: 1 kg
Shipping Name: ALKALOID SALTS, SOLID, N.O.S. *(CONTAINS
CAPSAICIN)

Maritime Transport IMDG:

IMDG Class: 6.1 IMDG Subrisk: None
UN Number: 1544 Packing Group: II
EMS Number: F-A , S-A Special provisions: 43 274
Limited Quantities: 500 g
Shipping Name: ALKALOIDS, SOLID, N.O.S. or ALKALOIDS SALTS, SOLID, N.O.S.(contains capsaicin)

Section 15 - REGULATORY INFORMATION

capsaicin (CAS: 404-86-4) is found on the following regulatory lists;
"Canada Domestic Substances List (DSL)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe, with qualifications","US Food Additive Database","US Toxic Substances Control Act (TSCA) - Inventory"
Regulations for ingredients

dihydrocapsaicin (CAS: 19408-84-5) is found on the following regulatory lists;
"GESAMP/EHS Composite List - GESAMP Hazard Profiles"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
■ Inhalation may produce serious health damage*.
■ Cumulative effects may result following exposure*.
* (limited evidence).

ND
Substance CAS Suggested codes capsaicin 404- 86- 4 dihydrocapsaicin 19408- 84- 5

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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