Butyraldehyde

sc-239448

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Butyraldehyde

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

NFPA

SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800
EMERGENCY:
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C4-H8-O, CH3-CH2-CH2-CHO, butal, butaldehyde, butanal, n-butanal, butanaldehyde, "butyl aldehyde", "n-butyl aldehyde", butyral, n-butyraldehyde, "butyric aldehyde"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	3		
Toxicity:	0		
Body Contact:	2		
Reactivity:	2		
Chronic:	2		

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

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

HARMFUL - May cause lung damage if swallowed.
Irritating to eyes and skin.
Highly flammable.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733).
■ Although ingestion is not thought to produce harmful effects, the material may still be damaging to the health of the individual following ingestion, especially where pre-existing organ (e.g. liver, kidney) damage is evident.
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EYE

■ There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain.
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■ In six cases of industrial corneal injury from butyraldehyde, recovery was prompt and complete.
0.005 ml of a 15% solution produced severe eye injury when instilled into rabbit eyes. 0.02 ml of neat material produced moderate to severe corneal injury with iritis; 0.005 ml produced trace to moderate corneal injury.

SKIN

■ 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.
■ Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.
■ 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.
■ Tested at 1% butyraldehyde in petrolatum in humans, there was no irritation after a 48 hour closed patch test. One of 25 humans had a non-specific sensitisation reaction.

INHALED

■ Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.
■ There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
■ In a controlled study to test the irritancy of butyraldehyde, 15 males were exposed to 230 ppm of butyraldehyde for 30 minutes and experienced irritation. The lowest reported airborne concentration that produced irritation in humans was 197 ppm (580 mg/m3) for an unspecified duration.
Rats exposed 6 hours/day, 5 days/week for 12 exposures to 1000 ppm exhibited no clinical signs and organs were normal at necroscopy.
Rats, mice and guinea pigs exposed to mean butyraldehyde concentrations of 6400 ppm for 6 hours/day, 5 days/week for 9 exposures during a 2-week period showed signs of ocular and respiratory irritation, loss of coordination and anaesthesia prior to death. All animals died.
■ Exposure to aldehydes causes neurological symptoms such as headache, drowsiness, dizziness, seizures, depression and coma. Cardiovascular involvement may result in increased heart rate, collapse and low blood pressure; respiratory effects include throat spasms, irritation, difficulty swallowing, pulmonary edema and an asthma-like condition.
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CHRONIC HEALTH EFFECTS

■ There is limited evidence that, skin contact with this product is more likely to cause a sensitization reaction in some persons compared to the general population.
Exposure to Aliphatic aldehydes can cause irritation of the skin.
Rats and dogs exposed to mean butyraldehyde concentrations of 117, 462 or 1852 ppm for 6 hours/day, 5 days/week, for 13-14 weeks showed clinical signs of ocular and upper respiratory tract irritation at both levels. No exposure related effects on body-weight, serum chemistry, haematology, urinalysis or liver or kidney weights were seen. No abnormal ophthalmic findings were recorded for rats, whilst all dogs showed slight conjunctivitis at 1852 ppm. Histopathologic findings in dogs exposed at 1852 ppm included marked rhinitis with mucosal cell hyperplasia, inflammation and squamous metaplasia. Squamous metaplasia also occurred in the larynx and trachea of one dog. Dogs in the 117 and 462 ppm groups had goblet cell hyperplasia in the nasal mucosa. Histopathologic changes in rats included mild to severe rhinitis and mild to severe squamous metaplasia of the respiratory epithelium in all three exposure groups, with the incidence and severity generally decreasing with decreased concentration. Goblet cell hyperplasia of the nasal epithelium generally occurred in rats of the 117 and 462 ppm group; atrophy of goblet cells occurred at 1852 ppm. There were no exposure-related histopathologic lesions in the lungs or testes of dogs or rats in the study.
When rats and mice were dosed with butyraldehyde by gavage, (5 days/week for 90 days) histopathologic evaluation revealed that the stomach and nasal cavity were the principal target organs. Lesions in the stomach included inflammation, erosion, ulceration, necrosis, hyperplasia, and haemorrhage which probably resulted from direct toxicity to the mucosal epithelium. Inflammation of the nasal cavity is

thought to have resulted from reflux. The no-effect level was 300 mg/kg for mice of both sexes and female rats, and 150 mg/kg for male rats.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
butyraldehyde	123-72-8	>98

Section 4 - FIRST AID MEASURES

SWALLOWED
· Immediately give a glass of water. · First aid is not generally required. If in doubt, contact a Poisons Information Center or a doctor. · If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

EYE
■ If this product comes in contact with the eyes: · Wash out immediately with fresh 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
■ If skin contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

INHALED
· If fumes or combustion products are inhaled remove from contaminated area. · Other measures are usually unnecessary.

NOTES TO PHYSICIAN
■ Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically.
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For acute or short-term repeated exposures to formaldehyde:
INGESTION:
· Patients present early with severe corrosion of the gastro-intestinal tract and systemic effects.
· Inflammation and ulceration may progress to strictures.
Symptoms and treatment of intoxication may be similar to that prescribed for formaldehyde poisoning:

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	90.007 @ 20 deg C
Upper Explosive Limit (%):	11.8
Specific Gravity (water=1):	0.8
Lower Explosive Limit (%):	2

EXTINGUISHING MEDIA
· Alcohol stable foam.
· Dry chemical powder.

FIRE FIGHTING
· Alert Emergency Responders and tell them location and nature of hazard.
· May be violently or explosively reactive.
When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 1000 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
· Liquid and vapor are highly flammable.
· Severe fire hazard when exposed to heat, flame and/or oxidizers.
Combustion products include: carbon dioxide (CO2), other pyrolysis products typical of burning organic material.

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

PERSONAL PROTECTION
Glasses:
Chemical goggles.
Gloves:
1.BUTYL 2.TEFLON 3.PVA 4.VITON
Respirator:
Type A Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

· Remove all ignition sources.
· Clean up all spills immediately.
MAJOR SPILLS
· Clear area of personnel and move upwind.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Containers, even those that have been emptied, may contain explosive vapours.
· Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of exposure occurs.
· DO NOT allow clothing wet with material to stay in contact with skin.
The substance accumulates peroxides which may become hazardous only if it evaporates or is distilled or otherwise treated to concentrate the peroxides. The substance may concentrate around the container opening for example.
Purchases of peroxidisable chemicals should be restricted to ensure that the chemical is used completely before it can become peroxidised.
· A responsible person should maintain an inventory of peroxidisable chemicals or annotate the general chemical inventory to indicate which chemicals are subject to peroxidation. An expiration date should be determined. The chemical should either be treated to remove peroxides or disposed of before this date.
· The person or laboratory receiving the chemical should record a receipt date on the bottle. The individual opening the container should add an opening date.
· Unopened containers received from the supplier should be safe to store for 18 months.
· Opened containers should not be stored for more than 12 months.

RECOMMENDED STORAGE METHODS

· DO NOT use mild steel or galvanised containers.
Packing as supplied by manufacturer. Plastic containers may only be used if approved for flammable liquid.
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· For low viscosity materials (i): Drums and jerricans must be of the non-removable head type. (ii): Where a can is to be used as an inner package, the can must have a screwed enclosure.
· For materials with a viscosity of at least 2680 cSt. (23 deg. C).

STORAGE REQUIREMENTS

· Store in original containers in approved flame-proof area.
· No smoking, naked lights, heat or ignition sources.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm
_____	_____	_____
US AIHA Workplace Environmental Exposure Levels (WEELs)	butyraldehyde (Butyraldehyde)	25

ENDOELTABLE

PERSONAL PROTECTION




RESPIRATOR

Type A Filter of sufficient capacity
Consult your EHS staff for recommendations

EYE

· Safety glasses with side shields.
· Chemical goggles.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.
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.

OTHER

· Overalls.
· PVC Apron.
· Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
· For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

■ For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.
Mixes with water.

State	Liquid	Molecular Weight	72.12
Melting Range (°F)	-140.8	Viscosity	Not Available
Boiling Range (°F)	167	Solubility in water (g/L)	Miscible
Flash Point (°F)	12.002	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	390.002	Vapor Pressure (mmHg)	90.007 @ 20 deg C
Upper Explosive Limit (%)	11.8	Specific Gravity (water=1)	0.8
Lower Explosive Limit (%)	2	Relative Vapor Density (air=1)	2.5
Volatile Component (%vol)	100	Evaporation Rate	Not available

■ log Kow (Prager 1995): 0.88 ■ log Kow (Sangster 1997): 0.88

BUTYRALDEHYDE

APPEARANCE

Water-white liquid with characteristic pungent odour; mixes with water (7.1%). Miscible in ethanol, ether, ethyl acetate, acetone, toluene and oils. May undergo autopolymerisation to produce viscous liquids.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

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

STORAGE INCOMPATIBILITY

■ Butyraldehyde:
· may form explosive peroxides with air; polymerisation may occur.
· is incompatible with strong oxidisers, strong acids (with elevated temperatures and pressures), caustics, amines, ammonia.
· Flammable and/or toxic gases are generated by the combination of aldehydes with azo, diazo compounds, dithiocarbamates, nitrides, and strong reducing agents.
· Many aldehydes are incompatible with strong acids, amines, strong oxidizers, and alkaline materials.
Avoid reaction with oxidizing agents, bases and strong reducing agents.

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

Section 11 - TOXICOLOGICAL INFORMATION

BUTYRALDEHYDE

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Inhalation (rat) LC50: 174000 mg/m³/30m	Skin (rabbit): 410 mg(open)-Mild
Intraperitoneal (rat) LD50: 800 mg/kg	Skin (rabbit): 2 mg/24h - SEVERE
Subcutaneous (rat) LD50: 10000 mg/kg	Eye (rabbit):0.075 mg(open)SEVERE
Inhalation (mouse) LC50: 1140 mg/kg	Eye (rabbit): 20 mg/24h-Moderate
Subcutaneous (mouse) LD50: 2700 mg/kg	Skin (guinea pig): 100%-Moderate
Dermal (rabbit) LD50: 3560 mg/kg *[Sigma/Aldrich]	
Oral (rat) LD50: 5900 mg/kg *	

■ The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.

For n-alkyl aldehydes:

Acute toxicity hazard of the n-alkyl aldehyde cluster members is moderate via inhalation and low via oral and dermal routes of exposure. Cluster members have been shown to be eye and skin irritants, but not skin sensitisers.
Positive results for genotoxicity were reported for cluster members with lower molecular weights (<100), while members with molecular weights > 100 were negative, with the exception of nonanal (124-19-6). Although cancer bioassay data are not available for this cluster, several members of this cluster are considered potential carcinogens due to structural analogy to their carcinogenic lower homologs, acetaldehyde and formaldehyde .
The primary metabolism of linear saturated aliphatic aldehydes and acids is a fundamental part of cell biochemistry. Aldehydes are successively oxidized to their corresponding carboxylic acids. To a minor extent, aldehydes also may be reduced to alcohols or conjugated with labile sulfhydryl-containing substances, such as glutathione
In general, the inhalation route is expected to be of higher concern than the oral or dermal route because of rapid oxidation of the reactive aldehyde group to the relatively innocuous acid. However, individuals with genetic deficiency of aldehyde dehydrogenase may still be susceptible via the oral route.

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
butyraldehyde	LOW	LOW	LOW	HIGH

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 _____ Alcoholic 293 85 0 0 0 R 0 0 0 0 0 0 1 D 1 beverages / CAS:123- 72- 8 /

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

US EPA Waste Number & Descriptions

A. General Product Information
Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ 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. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. 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: 3
Identification Numbers: UN1129 PG: II
Label Codes: 3 Special provisions: IB2, T4,
TP1
Packaging: Exceptions: 150 Packaging: Non- bulk: 202
Packaging: Exceptions: 150 Quantity limitations: 5 L
Passenger aircraft/rail:
Quantity Limitations: Cargo 60 L Vessel stowage: Location: B
aircraft only:
Vessel stowage: Other: None
Hazardous materials descriptions and proper shipping names:
Butyraldehyde

Air Transport IATA:

ICAO/IATA Class: 3 ICAO/IATA Subrisk: None
UN/ID Number: 1129 Packing Group: II
Special provisions: None
Cargo Only
Packing Instructions: 307 Maximum Qty/Pack: 60 L
Passenger and Cargo Passenger and Cargo
Packing Instructions: 305 Maximum Qty/Pack: 5 L
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: Y305 Maximum Qty/Pack: 1 L
Shipping Name: BUTYRALDEHYDE

Maritime Transport IMDG:

IMDG Class: 3 IMDG Subrisk: None
UN Number: 1129 Packing Group: II
EMS Number: F-E , S-D Special provisions: None
Limited Quantities: 1 L
Shipping Name: BUTYRALDEHYDE

Section 15 - REGULATORY INFORMATION

REGULATIONS

butyraldehyde (CAS: 123-72-8) is found on the following regulatory lists;
"Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","OECD Representative List of High Production Volume (HPV) Chemicals","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which production, use or other presence must be reported","US - Massachusetts Oil & Hazardous Material List","US - Minnesota Hazardous Substance List","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US AIHA Workplace Environmental Exposure Levels (WEELs)","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA High Production Volume Program Chemical List","US EPA Master Testing List - Index I Chemicals Listed","US EPCRA Section 313 Chemical List","US Food Additive Database","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US -Texas Air Monitoring Comparison Values for Evaluating VOCs","US Toxic Substances Control Act (TSCA) - Inventory","US TSCA Section 8 (d) - Health and Safety Data Reporting"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
■ Potentially explosive peroxides may form on standing.*.
■ May produce discomfort of the respiratory system*.
■ Possible skin sensitiser*.

■ Repeated exposure potentially causes skin dryness and cracking*.
■ Vapours potentially cause drowsiness and dizziness*.
* (limited evidence).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ 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.

Issue Date: Oct-13-2008

Print Date:Oct-13-2010