MATERIAL SAFETY DATA SHEET

Bilirubin Oxidase

Section 1: Product and Company Identification

Material name **Bilirubin Oxidase**
Product No. 70-1021-00; 70-1021-01; 70-1021-88
Product description Lyophilized powder containing enzyme (protein), carbohydrate and buffering salts.
Product use Enzyme reagent for laboratory use.

Emergency Telephone Numbers
Americas: +1-760-476-3962
Europe, Middle East & Africa: +1-760-476-3961
Asia Pacific: +1-760-476-3960
Access code: 333512

Manufacturer/Distributor
Sekisui Diagnostics LLC
31 New York Avenue
Framingham, MA 01701
USA
Phone: 508-661-1835

Corporate Headquarters
Sekisui Diagnostics LLC
31 New York Avenue
Framingham, MA 01701
USA
Phone: 508-661-1835

Section 2: Hazards Identification

OSHA regulatory status This preparation is classified as hazardous under U.S. OSHA 29 CFR 1910.1200; E.C. Directive 1999/45/EC; Canadian R.S. 1985, c. H-3; U.K. CHIP 2002 No. 1689; and/or U.N. GHS ST/SG/AC 10/30. Refer to Sec. 15, Regulatory Information, for details regarding hazard classification.
None of the components present in this preparation at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

Precautionary statements CAUTION! The chemical, physical and toxicological properties of this preparation have not been thoroughly characterized. Avoid contact with eyes and skin. Do not ingest or inhale. Preparation appearance: light yellow to light blue powder.

Potential health effects:

- **Routes of exposure** Occupational exposure routes may include eye contact, skin contact and inhalation.
- **Eyes** No data available. Eye exposure may cause irritation, redness and itching.
- **Skin** No data available. Skin contact may cause irritation, dryness and redness.
- **Inhalation** No data available. Although there is no evidence that the enzyme(s) in this preparation induces specific respiratory hypersensitivity, all proteins are potential respiratory allergens and may result in respiratory sensitization in certain individuals after repeated and/or prolonged inhalation exposure, producing mild to severe symptoms similar to pollen allergy or asthma, including mucous membrane or eye irritation, itching of the skin or eyes, sneezing, nasal or sinus congestion, coughing, and tightness in the chest. These symptoms may develop as late as 12 hours after exposure.
- **Ingestion** No data available.
- **Chronic effects** No data available. Repeated inhalation may result in respiratory sensitization.
- **Target organs** Unknown.

Potential environmental effects No data available.

Section 3: Composition / Information on Ingredients

Ingredient Name	CAS #	EC #	% (wt/wt)
Bilirubin oxidase	80619-01-8	Not Assigned	50 - 60
EC R-Phrases: None	**EC Hazard Class:** None		
Ammonium sulfate	7783-20-2	231-984-1	10 - 20
EC R-Phrases: None	**EC Hazard Class:** None		
Potassium phosphate, monobasic	7778-77-0	231-913-4	10 - 20
EC R-Phrases: None	**EC Hazard Class:** None		
Sucrose	57-50-1	200-334-9	10 - 20
EC R-Phrases: None	**EC Hazard Class:** None		

NOTE - Bilirubin oxidase - Enzyme source: Myrothecium verrucaria, Enzyme Commission number: 1.3.3.5

Section 4: First Aid Measures

First aid procedures:

Eye contact	Immediately flush eyes with plenty of tepid water for 15 minutes while separating eyelids with fingers. Remove contact lenses if worn. Obtain medical attention if needed or if symptoms, such as redness or irritation persist.
Skin contact	In case of contact, flush skin with cool water and remove contaminated clothing. Obtain medical attention if needed or if irritation or other symptoms develop.
Inhalation	If inhaled, move from exposure area to fresh air. Seek medical attention if breathing becomes difficult or if cough or other symptoms develop.
Ingestion	In case of ingestion, contact a poison control center or physician for instructions.

Section 5: Fire Fighting Measures

Flammable properties	Material may burn when exposed to sufficient heat.
Suitable extinguishing media	Use extinguishing media suitable for surrounding fire, such as carbon dioxide, chemical foam, dry chemical or water spray.
Unsuitable extinguishing media	Unknown.
Specific hazards arising from the chemical	Toxic gases may be generated by combustion, including. ammonia (NH3), carbon monoxide (CO), carbon dioxide (CO_2), phosphorus oxides (POx), potassium oxides (KOx) and sulfur oxides (SOx).
Standard protective equipment and precautions for firefighters	Firefighters should wear NIOSH-approved or equivalent Self-Contained Breathing Apparatus and full protective gear.

Section 6: Accidental Release Measures

Personal precautions	Avoid physical contact with material and avoid generating or inhaling dust. Ensure adequate ventilation. Wear Personal Protective Equipment (PPE) as indicated in Section 8. Wash hands thoroughly after handling.
Environmental precautions	No information available.
Methods and materials for containment and clean-up	Do not dry sweep powder. Use HEPA-filtered vacuum, if available, otherwise wet mop to clean up a powder spill. Decontaminate the spill site following standard procedures. Dispose of materials in accordance with all applicable federal, state, local and provincial environmental regulations, per Section 13.

Section 7: Handling and Storage

Handling	Follow good laboratory hygiene practices. See Section 8, Engineering Controls. Minimize contact and contamination of personal clothing and skin. Wash hands thoroughly after handling.
Storage	Store desiccated at -20°C (-4°F). Do not store with incompatible substances; see Section 10.

Section 8: Exposure Controls / Personal Protection

Exposure guidelines:

ACGIH - Threshold Limits Values - Time Weighted Averages (TLV-TWA)		
Sucrose	57-50-1	10 mg/m3 TWA
Australia - Occupational Exposure Standards - TWAs		
Sucrose	57-50-1	10 mg/m3 TWA
Canada - Quebec - Occupational Exposure Limits - TWAEVs		
Sucrose	57-50-1	10 mg/m3 TWAEV
Israel - Occupational Exposure Limits - TWAs		
Sucrose	57-50-1	10 mg/m3 TWA
Korea - Occupational Exposure Limits - TWAs		
Ammonium sulfate	7783-20-2	10 mg/m3 TWA
Sucrose	57-50-1	10 mg/m3 TWA
U.S. - OSHA - Final PELs - Time Weighted Averages (TWAs)		
Sucrose	57-50-1	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

Engineering controls	Use in well ventilated areas. If handling large quantities or there is a potential for dust or aerosol generation, use local exhaust ventilation. Facilities storing or using this preparation should be equipped with an eyewash fountain.

Personal protective equipment:

Eye / face protection	Wear appropriate protective chemical safety glasses.
Skin protection	Wear lab coat or other protective garments. Remove contaminated clothing promptly.
Hand protection	Wear chemical resistant protective gloves.
Respiratory protection	A respirator is not required under normal conditions of use.
General	Follow company-specific safety procedures.

Section 9: Physical and Chemical Properties

Appearance	Light yellow to light blue powder
Odor	Not available
pH	Not applicable
Melting point/Freezing point	Not available / Not applicable
Boiling point	Not applicable
Evaporation rate	Not applicable
Flash point	Not applicable
Flammability/explosivity limits in air, upper	Not applicable
Flammability/explosivity limits in air, lower	Not applicable
Vapor pressure	Not available
Density	Not available
Solubility	Water-soluble
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	Not available

Section 10: Chemical Stability and Reactivity Information

Possibility of hazardous reactions	Hazardous polymerization will not occur.
Chemical stability	Stable under ordinary conditions of use and storage. See Section 7.
Conditions to avoid	Unknown.

Incompatible materials:

Physical Properties - Chemical Incompatibilities

Ammonium sulfate	7783-20-2	Aqueous solution is a strong acid; reacts with bases forming ammonia. Attacks metals. Hot material reacts with nitrates, nitrites, chlorates.

Hazardous decomposition products	Thermal decomposition may lead to release of irritating gases and vapors.

Section 11: Toxicological Information

Acute effects:

Toxicological data - Selected LD50s and LC50s

Ammonium sulfate	7783-20-2	Oral LD50 Rat: 2000 mg/kg
Potassium phosphate, monobasic	7778-77-0	Dermal LD50 Rabbit: >4640 mg/kg
Sucrose	57-50-1	Oral LD50 Rat: 29700 mg/kg

Local effects	No data available.
Chronic effects	No data available.
Sensitization	No data available.

Carcinogenicity:

ACGIH - Threshold Limits Values - Carcinogens

Sucrose	57-50-1	A4 - Not Classifiable as a Human Carcinogen

Mutagenicity	No data available.
Reproductive effects	No data available.
Teratogenicity	No data available.

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity - Freshwater Fish Species Data

Ammonium sulfate	7783-20-2	96 Hr LC50 Leuciscus idus: 460-1000 mg/L [static]; 96 Hr LC50 Brachydanio rerio: 250 mg/L; 96 Hr LC50 Cyprinus carpio: 18 mg/L; 96 Hr LC50 Pimephales promelas: >100 mg/L

Ecotoxicity - Water Flea Data

Ammonium sulfate	7783-20-2	24 Hr EC50 water flea: 423 mg/L; 48 Hr EC50 Daphnia magna: 14 mg/L

Persistence and degradability	No data available.
Bioaccumulation potential	No data available.
Mobility in environmental media	No data available.

Section 13: Disposal Considerations

Methods of disposal Dispose of unused product, spilled material and waste in accordance with all applicable federal, state, local and provincial environmental and hazardous waste regulations.

Section 14: Transport Information

Basic shipping description Not classified as dangerous goods. Not regulated per IATA and DOT regulations.

Section 15: Regulatory Information

US Federal Regulations:

Inventory - United States - Section 8(b) Inventory (TSCA):

Ammonium sulfate	7783-20-2	Present
Potassium phosphate, monobasic	7778-77-0	Present
Sucrose	57-50-1	Present

International Regulations:

Canada - WHMIS - Classifications of Substances

Ammonium sulfate	7783-20-2	Uncontrolled product according to WHMIS classification criteria
Potassium phosphate, monobasic	7778-77-0	Uncontrolled product according to WHMIS classification criteria
Sucrose	57-50-1	Uncontrolled product according to WHMIS classification criteria

Canada - WHMIS - Ingredient Disclosure List

Ammonium sulfate	7783-20-2	1 %

Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes

Ammonium sulfate	7783-20-2	ID Number 296, hazard class 1 - low hazard to waters

Inventory - Australia - Inventory of Chemical Substances (AICS)

Ammonium sulfate	7783-20-2	Present
Potassium phosphate, monobasic	7778-77-0	Present
Sucrose	57-50-1	Present

Inventory - Canada - Domestic Substances List (DSL)

Ammonium sulfate	7783-20-2	Present
Potassium phosphate, monobasic	7778-77-0	Present
Sucrose	57-50-1	Present

Inventory - Canada - Organisms on the Domestic Substances List (DSL)

Bilirubin oxidase	80619-01-8	IUB #1.3.3.5

Inventory - China

Ammonium sulfate	7783-20-2	Present
Potassium phosphate, monobasic	7778-77-0	Present
Sucrose	57-50-1	Present

Inventory - European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

Ammonium sulfate	7783-20-2	231-984-1
Potassium phosphate, monobasic	7778-77-0	231-913-4
Sucrose	57-50-1	200-334-9

Inventory - Japan Existing and New Chemical Substances (ENCS)

Ammonium sulfate	7783-20-2	1-400
Potassium phosphate, monobasic	7778-77-0	1-452

Inventory - Korea - Existing and Evaluated Chemical Substances

Ammonium sulfate	7783-20-2	KE-01743
Potassium phosphate, monobasic	7778-77-0	KE-28622
Sucrose	57-50-1	KE-17258

Canadian Hazardous Products

WHMIS Status	Non-controlled

European Communities Dangerous Substances/Preparations

EC Hazard Class	None
Risk Phrases	None
Safety Phrases	None

Section 16: Other Information

Further Information:
This MSDS has been prepared in accordance with the ANSI Z400.1 format. Every effort has been made to adhere to the hazard criteria and content requirements of the U.S. OSHA Hazard Communication Standard, Canadian Controlled Products Regulation (CPR), UK Chemical Hazard Information and Packaging Regulations, European Communities REACH Regulation, and UN Globally Harmonized System of Classification and Labelling of Chemicals.

MATERIAL SAFETY DATA SHEET
Bilirubin Oxidase

MSDS Origination Date: 12 September, 2005
Version #: 3
Revision Date: 22 November, 2012

Disclaimer:
The information above is provided in good faith. It is believed to be accurate and represents the best information currently available to us. HOWEVER, WE MAKE NO WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER TYPE, EXPRESSED OR IMPLIED, WITH RESPECT TO PRODUCTS DESCRIBED OR DATA OR INFORMATION PROVIDED, AND WE ASSUME NO LIABILITY RESULTING FROM THE USE OF SUCH PRODUCTS, DATA OR INFORMATION. Users should make their own investigations to determine the suitability of the information for their particular purposes, and the user assumes all risk arising from their use of the material. The user is required to comply with all laws and regulations relating to the purchase, use, storage and disposal of the material, and must be familiar with and follow generally accepted safe handling procedures. In no event shall Sekisui be liable for any claims, losses, or damages of any individual or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Sekisui has been advised of the possibility of such damages.