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MATERIAL SAFETY DATA SHEET (MSDS)

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NEB #C2984

SECTION 1—CHEMICAL INFORMATION

Product Name: NEB Turbo Competent *E. coli* (High Efficiency)

Cas.# None

SECTION 2—COMPOSITION/INFORMATION ON INGREDIENT

1. Dimethyl Sulfoxide 1–10% Cas.# 67-68-5

The ingredients listed in this section include only those items that have more than 1% of a component classified as hazardous and 0.1% of a component classified as carcinogenic. If you have any questions, please contact info@neb.com.

SECTION 3—HAZARDOUS IDENTIFICATION

Emergency Overview: Warning: May cause irritation to skin, eyes, and respiratory tract, may affect kidneys, blood and liver.

HMIS and NFPA Ratings: 0 – Minimal or None, 1 – Slight, 2 – Moderate, 3 – Serious, and 4 – Severe

Health: 1
Flammability: 1
Reactivity: 0

SECTION 4—FIRST AID MEASURES

Eyes: Flush eyes with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating eyelids. Call a physician.

Skin: Wash skin with soap and copious amount of water.

Ingestion: If the person is conscious, wash out mouth with water. Call a physician.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SECTION 5—FIRE FIGHTING MEASURES

Extinguishing Media: Water spray. Carbon dioxide, dry chemical powder or appropriate foam.

Special Fire Fighting Procedures: Wear self contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Fire and Explosion Hazards: Combustible liquid. Emits toxic fumes under fire conditions.

SECTION 6—ACCIDENTAL RELEASE MEASURES

Personal Precautions: Avoid breathing or contact with vapors, mist or gas.

Procedure of Personal Precaution: Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves and chemical safety goggles. Use non-sparking tools and equipment. Ventilate and evacuate area of leak or spill.

Environmental Precautions: Do not let product enter drains.

Methods For Cleaning Up: Cover with dry lime, sand, or soda ash. Sweep up and shovel. Place in covered container for disposal.

SECTION 7—HANDLING AND STORAGE

Handling: Provide appropriate exhaust ventilation.

User Exposure: Avoid inhalation. Avoid contact with DMSO solutions containing toxic materials or material with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body. Avoid prolonged or repeated exposure.

Storage: Keep tightly closed in a dry and well ventilated place. Store at -20°C . Protect from light and heat.

SECTION 8—EXPOSURE CONTROLS/PPE

Engineering Controls: Safety shower and eye wash. Mechanical exhaust.

Personal Protective Equipment

Eye Protection: Safety goggles.

Hand Protection: Compatible resistant gloves.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respirator should be worn.

Hygiene Measure: General practice, wash (hands and skin) thoroughly after handling. Remove and wash contaminated clothing.

SECTION 9—PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Form: Liquid Color: Clear or colorless Odor: No Data Available

<u>Property</u>	<u>Value</u>	<u>Temperature or Pressure</u>	
Boiling Point Range:		>189°C	
Melting Point Range:		>18.4°C	
Flash Point:		>87°C	Method: Closed cup
Auto Ignition Temp:		>215°C	
Vapor Pressure:	.42 mmHg	20°C	
Vapor Density:	No Data Available		
Specific Gravity:	1.1		
Solubility in Water:	Soluble		

SECTION 10—STABILITY AND REACTIVITY

Stability: Stable under recommended storage conditions.

Conditions to Avoid: Moisture, heat and light.

Materials to Avoid: Acid chlorides, Phosphorus halides, strong oxidizing agents, strong acids, strong reducing agents.

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Sulfur Monoxide and Sulfur dioxides.

Hazardous Polymerization: Will not occur.

Hazardous Exothermic Reactions: Hazardous Exothermic Reactions: Methyl sulfoxide (DMSO) undergoes a violent exothermic reaction on mixing with copper wool and trichloroacetic acid. On mixing with potassium permanganate it will flash instantaneously. It reacts violently with: acid halides, cyanuric chloride, silicon tetrachloride, phosphorus trichloride and trioxide, thionyl chloride, magnesium perchlorate, silver fluoride, methyl bromide, iodine pentafluoride, nitrogen periodate, diborane, sodium hydride and perchloric and periodic acids. When heated above its boiling point methyl sulfoxide degrades giving off formaldehyde, methyl mercaptan and sulfur dioxide.

SECTION 11—TOXICOLOGICAL INFORMATION

Acute and Chronic Affects Based On Routes Of Exposure

Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Specific Developmental Abnormalities: Musculoskeletal System

Eye Contact: May cause irritation.

Skin Contact: May cause irritation.

Ingestion: May cause nausea, coughing, headache or diarrhea.

Inhalation: Unlikely at room temperature, inhalation of mist may cause irritation of respiratory tract.

Chronic Exposure

Effects: No known effect based on info supplied.

Target Organ(s): None known.

Aggravation of Pre-existing Conditions: None known.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen.

IARC: No component of this product present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen.

ACGIH: No component of this product present at levels greater than or equal to 0.1 % is identified as a known or suspected human carcinogen or confirmed animal with unknown relevance humans.

Route of Exposure**Skin Absorption:** May be harmful if absorbed.**Contact:** May cause skin irritation.**Eye Contact:** May cause eye irritation.**Inhalation:** May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.**Ingestion:** May be harmful if swallowed.**Conditions Aggravated By Exposure:** Avoid contact with DMSO solutions containing toxic materials or material with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body. Avoid prolonged or repeated exposure.**Target Organ (s) or System (s):** Eyes and Skin**Toxicity Data****Inhalation**

Rat

40,250 ppm

LC50

Oral

Rat

3,300 mg/kg

LD50

Oral

Rat

14,500 mg/kg

LD50

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear and Taste): Eye: Hemorrhage. Sense Organs and Special Senses (Nose, Eye, Ear and Taste): Eye: Conjunctive irritation.

Skin

Rat

40,000 mg/kg

LD50

Intraperitoneal

Rat

8,200 mg/kg

LD50

Subcutaneous

Rat

12 gg/kg

LD50

Remarks: Behavioral: Change in motor activity (specific assay), Lungs, Thorax, or Respiration: Dyspnea.

Intravenous

Rat

5,360 mg /kg

LD50

Remarks: Behavioral: Tremor, Muscle weakness. Lungs, Thorax or Respiration: Dyspnea.

Chronic Exposure - Carcinogen

Species: Rat

Route of Application: Oral

Dose: 59 gm/kg

Exposure Time: 81W

Frequency: I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria, Skin and Appendages: Other: Tumors.

Species: Rat

Route of Application: Subcutaneous

Dose: 220 gm/kg

Exposure Time: 82W

Frequency I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria, Skin and Appendages: Other: Tumors.

Chronic Exposure - Mutagen

Species: Rat

Route: Intraperitoneal

Dose: 25 gm/kg

Exposure Time: 5D

Mutation Test: Cytogenetic analysis.

Chronic Exposure - Reproductive Hazard

Species: Rat

Dose: 56 gm/kg

Route of Application: Intraperitoneal

Exposure Time: (6–12D PREG)

Result: Effects on Fertility: Abortion

Species: Rat

Dose: 6,600 mg/kg

Route of Application: Intraperitoneal

Exposure Time: (7–15D PREG)

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species : Rat

Dose: 30,750 mg/kg

Route of Application: Subcutaneous

Exposure Time: (8–10D PREG)

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

SECTION 12—ECOLOGICAL INFORMATION

Elimination Information (persistence and degradability): No data available.

Ecotoxicity Effects

Toxicity to fish	LC50-Pimephales promelas (fathead minnow) - 34,000 mg/l - 96 h LC50-Oncorhynchus mykiss (rainbow trout) - 35,000 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50-Daphnia pulex (water flea) - 27,500 mg/l
Toxicity to algae	EC50 - Lepomis macrochirus (Blue Gill) - > 400,000 mg/l - 96 h

Further Information On Ecology: No data available.

SECTION 13—DISPOSAL CONSIDERATIONS

Dispose of container, unused contents and contaminated packaging in accordance with federal, state and local requirement. Contract with a licensed Chemical Waste Disposal Service.

SECTION 14—TRANSPORT INFORMATION

This product is not dangerous and no special precautions are needed according to DOT, ADR/RID (cross border), IMDG and IATA/ICAO.

SECTION 15—REGULATORY INFORMATION

OSHA Hazards: None known.

US Classification and Label Test

US Statements: Combustible. Readily absorbed through skin. Target Organ (s): Eyes and skin. Caution. Avoid contact and inhalation.

United States Regulatory Information:

Sara Listed: No

TSCA Inventory Item: Yes

Canada Regulatory Information

WHMIS Classification: Not determined.

DSL: Yes

NDSL: No

EU Additional Classification

S: 23 24/25

Safety Statements: Do not breath vapor. Avoid contact with skin and eyes.

SECTION 16—OTHER INFORMATION

DISCLAIMER

The information provided on the MSDS is furnished in good faith and based on our present knowledge. However, this MSDS shall not constitute a guarantee of any kind. Personnel handling this material must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of this material and the safety and health of employees and customers. NEB assumes no additional liability or responsibility resulting from the use of, or reliance on this information. This product is for R&D use only. Not for drug, household or other uses.

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