MATERIAL SAFETY DATA SHEET

SECTION 1 – CHEMICAL PRODUCT(S) AND COMPANY IDENTIFICATION

Manufacturer Name: Worthington Biochemical Corporation
Address: 730 Vassar Ave
Lakewood, NJ 08701 USA
For Information Call: 1.732.942.1660
Date Prepared: March, 1986
Date Revised: May, 2013
Date Reviewed: May, 2013

Quick Identifier (In-plant Common Name): Chemical Name: Enzyme/Protein
Protein(s)/Enzyme(s): Chemical Family: Proteins
Common Name/Trade Name: See List Below (used on label)
Formula: Complex Polypeptides
CAS Number: [As Listed]

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Deoxyribonucleic Acid-Celluloses (calf thymus) [9007-49-2] N/A
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Deoxyribonucleic Acid, Lambda, BstE II (λDNA) [9007-49-2] N/A
Deoxyribonucleic Acid, Lambda, EcoR I (λDNA) [9007-49-2] N/A
Deoxyribonucleic Acid, Lambda, Hind III (λDNA) [9007-49-2] N/A
Deoxyribonucleic Acid, Lambda, gt10 (λDNA) [9007-49-2] N/A
Deoxyribonucleic Acid, Lambda, gt11 (λDNA) [9007-49-2] N/A
Deoxyribonucleic Acid, Phage M-13 (K07/E. coli IV 30) [9007-49-2] N/A
Deoxyribonucleic Acid, T7 (Bacteriophage T7, E. coli) [9007-49-2] N/A
Dextranase (Penicillium sp.) [9025-70-1] 3.2.1.11
Diaphorase (Cl. kluveri) [9001-68-7] 1.6.99.1
DNA Ligase, T4 (E. coli lysogenic NM989) [9015-85-4] 6.5.1.1
DNA Polymerase (E. coli CM5199) [9012-90-2] 2.7.7.7
DNA Polymerase, Klenow (E. coli CM5199) [9012-90-2] 2.7.7.7
DNA Polymerase, Klenow, Exo-Free (E. coli Cl 375) [9012-90-2] 2.7.7.7
DNA Polymerase, T4 (E. coli T4 gene 43) [9012-90-2] 2.7.7.7
DNA Polymerase, T4, Exo-Free (E. coli T4 gene 43 modified) [9012-90-2] 2.7.7.7
DNA Polymerase, T7 (E.coli T7 gene 5/thioredoxin) [9012-90-2] 2.7.7.7
Elastase (porcine pancreas) [9004-06-2] 3.4.21.36
Elastin (bovine ligamentum nuchae) [9007-58-3] N/A
Endonuclease V, T4 (E. coli gene denV) N/A N/A
E•RASE™ RNase A/T1 Blend (see components) N/A N/A
Galactose Oxidase (D. dendroides) [9028-79-9] 1.1.3.9
Galactosyltransferase (bovine milk) [9030-11-9] 2.4.1.22
β-Galactosidase (E. coli) [9031-11-2] 3.2.1.23
Glucose Oxidase (A. niger) [9001-37-0] 1.1.3.4
Glucose-6-Phosphate Dehydrogenase (L. mesenteroides) [9001-40-5] 1.1.1.49
β-Glucosidase (almonds) [9001-22-3] 3.2.1.21
α-Glucosidase (yeast) [9001-42-7] 3.2.1.20
β-Glucuronidase (bovine liver) [9001-45-0] 3.2.1.31
Glutamate Decarboxylase (E. coli) [9024-58-2] 4.1.1.15
Glutamic Oxaloaetic Transaminase (porcine heart) [9000-97-9] 2.6.1.1
Glyceraldehyde-3-Phosphate Dehydrogenase(rabbit muscle) [9001-50-7] 1.2.1.12
Glycerol Dehydrogenase (E. aerogenes) [9028-14-2] 1.1.1.6
Glycerol Kinase (E. coli) [9030-66-4] 2.7.1.30
Hemoglobin (bovine erythrocytes) [9008-02-0] N/A
Hepatocyte Isolation System (see components) N/A N/A
Hexokinase (yeast) [9001-51-8] 2.7.1.1
Histones (calf thymus) [37244-51-2] N/A
Hyaluronic Acid (bovine vitreous humor) [9004-61-9] N/A
Hyaluronidase (bovine testes) [37326-33-3] 3.2.1.35
Hydroxysteroid Dehydrogenase (P. testosteroni) [9028-56-2/9015-81-0] 1.1.1.50/1
α-Lactalbumin (bovine milk) [9013-90-5] N/A
L-Lactate Dehydrogenase (baker’s yeast) [9078-32-4] 1.1.2.3
Lactate Dehydrogenase (bovine heart) [9001-60-9] 1.1.1.27
Lactate Dehydrogenase (rabbit muscle) [9001-60-9] 1.1.1.27
Lactoperoxidase (bovine milk) [9031-28-1] 1.1.1.8
Leucine Aminopeptidase (porcine kidney) [9001-61-0] 3.4.11.1
Lipase (porcine pancreas) [9001-62-1] 3.1.1.3
Luciferase (P. fischerii) [9014-00-0] 1.14.14.3
Lysozyme (egg white) [12650-88-3] 3.2.1.17
Malate Dehydrogenase (porcine heart) [9001-64-3] 1.1.1.37
Maltase (yeast) [9001-42-7] 3.2.1.20
Maltodextrin Phosphorylase (E. coli) N/A 2.4.1.1
Micrococcus lysodeikticus cells (M. lysodeikticus) N/A N/A
Mucin (bovine submaxillary gland) [84195-52-8] N/A
Myoglobin (bovine muscle) [11080-17-4] N/A
NADase (N. crassa) [9032-65-9] 3.2.2.5
Neonatal Cardiomyocyte Isolation System (see components) N/A N/A
Neuraminidase (Cl. perfringens) [9001-67-6] 3.2.1.18
Neutral Protease (Dispase®) (B. polymyxa) [9080-56-2] 3.4.24.28
Nick Translation Kit (see components) N/A N/A
Nitrate Reductase (E. coli) [9029-42-9] 1.9.6.1
Nuclease, Micrococal (S7) (S. aureus) [9013-53-0] 3.1.31.1
Nuclease, SI (A. oryzae) [37288-25-8] 3.1.30.1
Nucleohistone (calf thymus) [37244-51-2] N/A
Oligo (dT)-Cellulose (oligo (dT)) N/A N/A
Ovalbumin (egg white) [9006-59-1] N/A
Papain (papaya latex) [9001-73-4] 3.4.22.2
Papain Dissociation System (see components) N/A N/A
Papain, Mercuri- (papaya latex) [9001-73-4] 3.4.22.2
Pectinase (A. niger) [9003-35-6] 4.2.2.10
Pepsin (porcine stomach) [9001-75-6] 3.4.23.1
Pepsinogen (porcine stomach) [9001-75-6] N/A
Peroxidase (horseradish roots) [9003-99-0] 1.11.1.7
Phage DNA, M13 (Phage M-13-KO7 E. coli JV30) [9007-49-2] N/A
Phosphatase, Acid (wheat germ) [9001-77-8] 3.1.3.2
Phosphatase, Alkaline (calf intestine) [9001-78-9] 3.1.3.1
Phosphatase, Alkaline (chicken intestine) [9001-78-9] 3.1.3.1
Phosphatase, Alkaline (E. coli) [9001-78-9] 3.1.3.1
Phosphodiesterase I (Crotalus adamanteus venom) [9025-82-5] 3.1.4.1
Phosphodiesterase II (bovine spleen) [9068-54-6] 3.1.16.1
Phosphoenolpyruvate Carboxylase (E. coli) [9067-77-0] 4.1.1.31
Phosphoglucomutase (rabbit muscle) [9001-81-4] 5.4.2.2
Phospholipase A2 (Crotalus adamanteus venom) [9001-84-7] 3.1.1.4
Phospholipase C (Cl. perfringens) [9001-86-9] 3.1.4.3
Plasmid Amine Oxidase (bovine plasma) [9001-53-0] 1.4.3.6
Plasmid DNA, pBR322 (E. coli RLM430) [9007-49-2] N/A
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Plasmid DNA, pT7-7 (E. coli DH5-α) [9007-49-2] N/A
Plasmid DNA, pT7-SC (E. coli DH5-α) [9007-49-2] N/A
Plasmid DNA, pT7-SCII (E. coli DH5-α) [9007-49-2] N/A
Plasmid DNA, pTZ18U (E. coli DH5-α) [9007-49-2] N/A
Plasmid DNA, pTZ19U (E. coli DH5-α) [9007-49-2] N/A
Plasmid DNA, pUC 18 (E. coli DHPl-α) [9007-49-2] N/A
Plasmid DNA, pUC 19 (E. coli DHPl-α) [9007-49-2] N/A
Plasmid DNA, pUC 118 (E. coli DHPl-α) [9007-49-2] N/A
Plasmid DNA, pUC 119 (E. coli DHPl-α) [9007-49-2] N/A
Pokeweed Antiviral Protein (Phytolacca americana(pokeweed)) [63231-57-2] N/A
Polynucleotide Kinase, T4 (E. coli T4) [37211-65-7] 2.7.1.78
Polyphenol Oxidase(Tyrosinase) (mushroom) [9002-10-2] 1.14.18.1
Protease, Neutral (Dispase) (B. polymyxa) [9001-92-7] 3.4.24.28
Protease, V8 (S. aureus) [137010-42-5] 3.4.21.19
Proteinase K (T. album) [39450-01-6] 3.4.21.64
Pyruvate Kinase (rabbit muscle) [9001-59-6] 2.7.1.40
Random Primers N/A N/A N/A
Reverse Transcriptase, HIV, Recombinant (E. coli plasmid pRC-RT) [9068-38-6] 2.7.7.49
Ribonucleic Acid (baker's yeast) [63231-63-0] N/A
Ribonucleic Acid, Core (brewer's yeast) [63231-63-0] N/A
Ribonucleic Acid, Qβ Phage (Phage Qβ) [63231-63-0] N/A
SECTION 1 – CHEMICAL PRODUCT(S) AND COMPANY IDENTIFICATION (cont’d)

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STEMzyme™ Collagenase/Neutral Protease (see components) | [9001-12-1/9080-56-2] | Enzymes, Proteins | Refer to Section 1 |

SECTION 2 - COMPOSITION AND INFORMATION ON INGREDIENTS

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SECTION 3 – HAZARDS IDENTIFICATION

Threshold Limit Value: None Known or Reported

Signs and Symptoms of Exposure:
1. Acute Overexposure: May cause skin, eye or respiratory irritation upon contact
2. Chronic Overexposure: Allergic reactions may develop in certain sensitive individuals

Medical Conditions Generally Aggravated by Exposure: Allergy-prone and asthmatic individuals should be particularly cautious with enzymes and other materials of biologic origin

Chemical Listed as Carcinogen or Potential Carcinogen: No
National Toxicology Program: No
OSHA: No
OSHA Permissible Exposure Limit: N/A
ACGIH Threshold Limit Value: N/A

SECTION 4 – FIRST AID MEASURES

Emergency and First Aid Procedures (Enzymes/Proteins may cause allergic reactions in certain sensitive individuals):
1. Inhalation: Remove person from source then obtain necessary medical attention
2. Eyes: Check for contact lenses and remove if present. Flush thoroughly with water while opening eyelids. If symptoms such as redness and irritation persist, obtain medical attention.
3. Skin: Remove contaminated clothing. Wash material from skin with soap and water and rinse thoroughly with clean water. Obtain medical attention as needed or if irritation develops. Clean contaminated clothing before reuse.
4. Ingestion: May be harmful if swallowed. Obtain medical attention as needed.

SECTION 5 – FIRE & EXPLOSION HAZARDS

Special Fire Fighting Procedures: None
Auto-Ignition Temperature: N/A

Flash Point: N/A Flammable Limits in Air (% by Volume): N/A
Unusual Fire and Explosion Hazards: None
Extinguisher Media: N/A
Stability: Degradation products are not hazardous
Precautions to be Taken in Handling and Storage: Wear appropriate protective equipment
Other Precautions: None

Steps to be Taken in Case Material is Released or Spilled: Wear approved respirator and protective gloves. Vacuum or collect powdered spill into appropriate waste container for disposal. Avoid physical contact and dust during removal. Use normal clean-up procedures for liquid spillage and wash thoroughly with water. Wash contaminated clothing before reuse.

Waste Disposal Method: Dispose of waste in accordance with all applicable Federal, State and local regulations. Refer to Section 13.

Storage: Refer to specific product label for storage conditions. Lyophilized proteins will absorb moisture under high humidity and/or moisture conditions. Keep containers tightly closed when not in use and store in a cool, dry area according to label conditions. Long-term storage temperatures should not exceed 25°C for maximum stability.

Handling: Enzymes/Proteins may cause allergic reactions in certain sensitive individuals. Minimize dust and/or aerosol generation during use. Dry powders can build static electricity caused by excessive handling. Wear appropriate protective equipment as per Section 8.

Respiratory Protection (Specify Type): A protective dust mask is advisable to avoid breathing particulates when a powdered form of the product is being handled. Wear an approved respirator.

Mechanical (General): Vent Fan Ventilation: Advisable Local Exhaust: As Required Special: None

Protective Gloves: Wear gloves to prevent skin contact Eye Protection: Either safety glasses or goggles should be worn

Other Protective Clothing or Equipment: Sensitive individuals should wear dust masks/respirators, protective gloves, eye protection, lab coat, apron or other protective clothing to minimize contact.

Appearance and Odor: Powders - White to tan, typical enzyme odor Liquids - White to brown, typical enzyme odor

Solubility in Water: Powders - Applicable Liquids - Readily miscible in water

Boiling Point: Decomposes

Specific Gravity(H₂O=1): Varies

Vapor Pressure (mmHg): N/A

Percent Volatile by Volume: N/A Vapor Density(Air=1): N/A Evaporation Rate: N/A

Hazardous Decomposition Products: None Known Hazardous Polymerization: Will Not Occur

Incompatibility(Materials to Avoid): None Known

Refer to Section 3 for health effects information. The toxicological properties of this material have not been fully investigated. Always follow Good Laboratory and Industrial Hygiene Practices and wear proper personal protective equipment when handling chemicals. May cause irritation and/or allergic reaction(s).

LD50: No oral LD50 is available
Mutagenic/Teratogenic Effects: Unknown
No data available. No environmental hazard is known.

Dispose of waste in accordance with all applicable Federal, State and local regulations. Chemical residues are generally classified as special waste and, as such, the transportation, storage, treatment and disposal of this waste material must be conducted in compliance with all applicable Federal, State and local regulations. Rinse empty containers thoroughly before disposal and/or recycling.

Department of Transportation Requirements:  
Proper Shipping Name: Not Regulated  
Hazard Class: N/A  
Packaging group: N/A  
Reportable Quantity: N/A  
Labels Required: N/A

International Transportation Regulations: Not Regulated  
UN/NA Code: N/A

US Federal Regulations: Material(s) listed are exempt from the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory when supplied for research and development purposes or used under the supervision of a technically qualified individual as defined by 40CFR720.3. The health risks have not been fully determined.

State Regulations: Based upon available information, material(s) listed are not known to be regulated by any state or listed on the New Jersey Right To Know Hazardous Substance List.

International Regulations: EC: Harmful; R42/43, May cause sensitization by inhalation and skin contact.  
S36, Wear suitable protective clothing.

Disclaimer
The information contained in this MSDS relates only to the material(s) designated and does not relate to use(s) in combination with any other material, process(es) and/or chemical reaction(s). Worthington Biochemical, Inc. provides this information in good faith, from sources believed to be accurate, however, assumes no liability for its accuracy or completeness.

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Worthington Biochemical Corporation  
730 Vassar Ave  
Lakewood, New Jersey 08701 USA  
Phone: 800.445.9603/732.942.1660 • Fax: 800.368.3108/732.942.9270  
www.worthington-biochem.com