MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT(S) AND COMPANY IDENTIFICATION

Manufacturer Name: Biaffin GmbH & Co KG
Address: Heinrich-Plett-Strasse 40
D-34132 Kassel
Germany
For Information Call: +49 (0) 561 804 4668

Quick Identifier (In-plant Common Name): ERK2/MAPK1, active
Chemical Name: recombinant protein kinase ERK2 (Extracellular signal-regulated kinase 2), MAPK1, active
Chemical Family: Protein
Formula: Complex Polypeptide

SECTION 2 - COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredient Name: ERK2/MAPK1, active
CAS Number(s): N/A
Principal Hazardous Component(s): N/A
Biologic Activity: Varies(%)

Exposure Limit(s): Not established (Enzymes/Proteins may cause allergic reactions in certain sensitive individuals)

Ingredients:
Product name | CAS no. | EC no. | Hazard information (GHS)
--------------|---------|--------|------------------------
ERK2, active | N/A | 2.7.11.24 | not classified
HEPES | 7365-45-9 | N/A | not classified
NaCl | 7647-14-5 | N/A | H302, H315, H319, H335, P261, P305, P351, P338 (GHS07)
DTT (1,4-Dithiothreitol) | 3483-12-3 | N/A | H302, H315, H319, H335, P261, P305, P351, P338 (GHS07)
Glycerol | 56-81-5 | N/A | not classified

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

Chemicals Listed as Carcinogen or Potential Carcinogen: No
National Toxicology Program: No
I.A.R.C. Monographs: No
OSHA: No
OSHA Permissible Exposure Limit: No
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 AND EXPLOSION HAZARDS

Special Fire Fighting Procedures: None
Auto-Ignition Temperature: N/A
Flash Point: N/A
Flammable Limits in Air (% by Volume): N/A
Extinguisher Media: N/A
Unusual Fire and Explosion Hazards: None
Stability: Degradation products are not hazardous

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Precautions to be Taken in Handling and Storage: Wear appropriate protective equipment
Other Precautions: None
Steps to be Taken in Case Material in Release 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 Methods: Dispose of waste in accordance with all applicable Federal, State and local regulations. Refer to Section 13.

SECTION 7 - HANDLING & STORAGE

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 6 degrees C for maximum stability.
Handling: Minimize dust and/or aerosol generation during use. Dry powders can build static electricity cause by excessive handling. Wear appropriate protective equipment as per Section 8.

SECTION 8 - EXPOSURE CONTROLS & PERSONAL PROTECTION

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 appropriate 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.

SECTION 9 - PHYSICAL & CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance and Odor</td>
<td>Liquid - Clear, typical enzyme odor</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Liquid - readily miscible in water</td>
</tr>
<tr>
<td>Specific Gravity(H₂O=1):</td>
<td>Varies</td>
</tr>
<tr>
<td>Percent Volatile by Volume:</td>
<td>N/A</td>
</tr>
<tr>
<td>Vapor Density(Air=1):</td>
<td>N/A</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>Decomposes</td>
</tr>
<tr>
<td>Vapor Pressure (mmHg):</td>
<td>N/A</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>N/A</td>
</tr>
</tbody>
</table>

SECTION 10 - STABILITY & REACTIVITY

Hazardous Decomposition Products: None known
Hazardous Polymerization: Will not occur
Incompatibility (Materials to Avoid): None known

SECTION 11 - TOXICOLOGICAL INFORMATION

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).
Routes of Exposure: Inhalation, ingestion, skin and eye contact.
LD₅₀: No oral LD₅₀ is available
Carcinogenicity: Unknown
Mutagenic/Teratogenic Effects: Unknown

SECTION 12 - ECOLOGICAL INFORMATION

No data available. No environmental hazard is known.

SECTION 13 - DISPOSAL CONSIDERATIONS

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.

SECTION 14 - TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Transportation Requirements:</td>
<td>Proper Shipping Name: Not regulated</td>
</tr>
<tr>
<td>Hazard Class:</td>
<td>N/A</td>
</tr>
<tr>
<td>Packaging Group:</td>
<td>N/A</td>
</tr>
<tr>
<td>Reportable Quantity:</td>
<td>N/A</td>
</tr>
<tr>
<td>Labels Required:</td>
<td>N/A</td>
</tr>
<tr>
<td>International Transportation Regulations:</td>
<td>Not regulated</td>
</tr>
<tr>
<td>UN/NA Code:</td>
<td>N/A</td>
</tr>
</tbody>
</table>
SECTION 15 - REGULATORY INFORMATION

GHS label Pictogram

Signal word: Warning (GHS07)

Hazard statement(s)

H302: Harmful if swallowed
H315: Causes skin irritation
H319: Causes serious eye irritation
H335: May cause respiratory irritation

Precautionary statement(s)

P261: Avoid breathing dust/fume/gas/mist/vapours/spray
P305, P351, P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

SECTION 16 - OTHER USEFUL INFORMATION

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). The Biaffin GmbH & Co KG 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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