SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: L-Arginine Assay Kit

PRODUCT CODES: Cat# K749-100

MANUFACTURER: BioVision, Inc.
DIVISION: 
ADDRESS: 155 South Milpitas Blvd., Milpitas, CA 95035

EMERGENCY PHONE: 858-373-8066
CHEMTREC PHONE: 
OTHER CALLS: 408-493-1800
FAX PHONE: 408-493-1801

SECTION 2: HAZARDS IDENTIFICATION

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Volume</th>
<th>Safety Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arginine Assay Buffer</td>
<td>Liquid</td>
<td>25 ml</td>
<td>No hazards</td>
</tr>
<tr>
<td>Arginine Enzyme Mix</td>
<td>Liquid</td>
<td>1 vial</td>
<td>No hazards</td>
</tr>
<tr>
<td>Arginine Probe Mix A</td>
<td>Contains H2SO4</td>
<td>12 ml</td>
<td>See below</td>
</tr>
<tr>
<td>Arginine Probe Mix B</td>
<td>Contains Boric acid, H2SO4</td>
<td>12 ml</td>
<td>See below</td>
</tr>
<tr>
<td>Sample Cleanup Mix</td>
<td>Liquid</td>
<td>1 vial</td>
<td>No hazards</td>
</tr>
<tr>
<td>Arginine Standard</td>
<td>Liquid</td>
<td>1 vial</td>
<td>No hazards</td>
</tr>
</tbody>
</table>

Sulfuric Acid:
Emergency Overview
OSHA Hazards: Corrosive: Metals category 1, skin category 1A, eye damage category 1
Target Organs: skin, eyes

GHS Classification: corrosive liquid (Category 1)
Skin irritation (Category1A)
Eye irritation (Category 1)
Specific target organ toxicity – single exposure (Category 1)

GHS Label elements, including precautionary statements
Pictogram: 

Signal word: Danger

Hazard statement(s): H290: May be corrosive to metals
H314: Causes severe skin burns and eye damage
H335 May cause respiratory irritation.

Precautionary statement(s): P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+330+331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification
Health hazard: 3
Chronic health hazard: *
Flammability: 0
Physical hazards: 2

NFPA Rating
Health Hazard: 3
Fire: 0
Reactivity Hazard: 0

Potential Health Effects
Inhalation: harmful if inhaled. Causes respiratory tract irritation.
Skin: May be harmful if absorbed through skin. Causes skin irritation.
Eyes: Causes severe eye irritation.
Ingestion: harmful if swallowed.

Boric acid:
Emergency Overview
OSHA Hazards: Target organ effect, Teratogen, Reproductive hazard
SAFETY DATA SHEET
Cat# K749-100 L-Arginine Assay Kit
Target Organs: Testes
GHS Classification:
- Acute toxicity, Oral (Category 5)
- Reproductive toxicity (Category 1B)
GHS Label elements, including precautionary statements
Pictogram:

Signal word: warning
Hazard statement(s):
- H303 May be harmful if swallowed.
- H361 Suspected of damaging fertility or the unborn child.
Precautionary statement(s):
- P281 Use personal protective equipment as required.
- P308 + P313 IF exposed or concerned: Get medical advice/attention.

HMIS Classification
- Health hazard: 2
- Chronic health hazard: *
- Flammability: 0
- Physical hazards: 0

NFPA Rating
- Health hazard: 2
- Fire: 0
- Reactivity Hazard: 0

Potential Health Effects
- Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
- Skin: May be harmful if absorbed through skin. May cause skin irritation.
- Eyes: May cause eye irritation.
- Ingestion: May be harmful if swallowed.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS Number</th>
<th>EC-No.</th>
<th>Molecular Weight</th>
<th>Chemical Formula</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boric acid</td>
<td>10043-35-3</td>
<td>233-139-2</td>
<td>61.83</td>
<td>H3BO3</td>
<td>&lt;10%</td>
</tr>
<tr>
<td>Sulfuric Acid</td>
<td>7664-93-9</td>
<td>231-639-5</td>
<td>89.08</td>
<td>H2SO4</td>
<td>&lt;10%</td>
</tr>
</tbody>
</table>

SECTION 4: FIRST AID MEASURES

General advice: Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.
If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
In case of skin contact: Wash off with soap and plenty of water. Consult a physician.
In case of eye contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
If swallowed: Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable extinguishing media: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.
Special protective equipment for firefighters: Wear self-contained breathing apparatus for firefighting if necessary.
Hazardous combustion products: Hazardous decomposition products formed under fire conditions — see section 10.
Further information: Use water spray to cool unopened containers.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
Methods for cleaning up: Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.
Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Recommended storage temperature: -20 °C.
SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td>7664-93-9</td>
<td>TWA</td>
<td>0.2 mg/m³</td>
<td>USA, ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>1 mg/m³</td>
<td>USA, OSHA: TABLE Z-1 Limits for Air Contaminants – 1910.1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>1 mg/m³</td>
<td>USA, Occupational Exposure Limits (OSHA): Table Z-1 Limits for Air Contaminants</td>
</tr>
</tbody>
</table>

**Sulfuric acid**

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boric acid</td>
<td>10043-35-3</td>
<td>STEL</td>
<td>6 mg/m³</td>
<td>USA, ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

**Boric acid**


**Personal protective equipment**

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Boric acid</th>
<th>Sulfuric acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance:</td>
<td>Solid</td>
<td>Clear liquid</td>
</tr>
<tr>
<td>pH:</td>
<td>5.1 at 1.8 g/l</td>
<td>No data available</td>
</tr>
<tr>
<td>Water Solubility:</td>
<td>Soluble</td>
<td>Completely miscible</td>
</tr>
<tr>
<td>Other Solubility:</td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>300 °C (572 °F)</td>
<td>1.33 hPa (1.00 mmHg) at 145.8 °C (294.4 °F)</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>160 °C (320 °F)</td>
<td>3.39 · (Air = 1.0)</td>
</tr>
<tr>
<td>Ignition Temperature °C:</td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td>Density:</td>
<td>1.44 g/cm³</td>
<td>1.80-1.84 g/ml</td>
</tr>
</tbody>
</table>

SECTION 10: STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Property</th>
<th>Boric acid</th>
<th>Sulfuric acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Stability:</td>
<td>Stable under recommended storage conditions</td>
<td>Stable under recommended storage conditions</td>
</tr>
<tr>
<td>Conditions to Avoid:</td>
<td>No data available</td>
<td>Exposure to moisture</td>
</tr>
<tr>
<td>Materials to Avoid:</td>
<td>Bases, halides, organic materials, carbides, fulminates, nitrates, picrates, cyanides, chlorates, alkali halides, zinc salts, permanganates, hydrogen peroxide, azides, perchlorates, nitromethane, phosphorus. Reacts violently with: cyclopentadiene.</td>
<td>Potassium, acid anhydrides</td>
</tr>
</tbody>
</table>
Reactivity: No data available
Stability: Stable under recommended storage conditions
Possibility of hazardous reactions: No data available
Conditions to avoid: No data available
Incompatible materials: Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with: cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metals

SECTION 11: TOXICOLOGICAL INFORMATION

Sulfuric acid:
Acute toxicity: LD50 Oral – rat – 2,140 mg/kg
LC50 Inhalation – rat – 2 h – 510 mg/m³
Skin corrosion/irritation: Skin – rabbit – extremely corrosive and destructive to tissue
Serious eye damage/eye irritation: Eyes – rabbit – severe eye irritation
Respiratory or skin sensitization: no data available
Germ cell mutagenicity: no data available
Carcinogenicity: The International Agency for Research on Cancer (IARC) has determined that occupational exposure to strong-inorganic-acid mists containing sulfuric acid is carcinogenic to humans (Group 1).
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 by IARC.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Reproductive toxicity: Presumed human reproductive toxicant.
Teratogenicity: Presumed human reproductive toxicant.
Specific target organ toxicity – single exposure (GHS): no data available
Specific target organ toxicity – repeated exposure (GHS): no data available
Potential Health Effects
Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
Skin: May be harmful if absorbed through skin. May cause skin irritation.

Boric acid:
Acute toxicity: LD50 Oral – rat – 2,660 mg/kg
Skin corrosion/irritation: no data available
Serious eye damage/eye irritation: no data available
Respiratory or skin sensitization: no data available
Germ cell mutagenicity: no data available
Carcinogenicity:
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 by IARC.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Reproductive toxicity: Presumed human reproductive toxicant.
Teratogenicity: Presumed human reproductive toxicant.
Specific target organ toxicity – single exposure (GHS): no data available
Specific target organ toxicity – repeated exposure (GHS): no data available
Potential Health Effects
Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
Skin: May be harmful if absorbed through skin. May cause skin irritation.
Eyes: May cause eye irritation.
Ingestion: May be harmful if swallowed.

Signs and Symptoms of Exposure: Toxicity reported for borates in humans: ingestion or absorption may cause nausea, vomiting, diarrhea, abdominal cramps, and erythematous lesions on the skin and mucous membranes. Other symptoms include: circulatory collapse, tachycardia, cyanosis, delirium, convulsions, and coma. Death has been reported to occur in infants from less than 5 grams and in adults from 5 to 20 grams.

Additional information: RTECS: ED4550000

SECTION 12: ECOLOGICAL INFORMATION

Sulfuric acid:
Persistence and degradability: no data available
Toxicity: Toxicity to fish: LC50 – Gambusia affinis (Mosquito fish) – 42 mg/l – 96 h
Bioaccumulative potential: no data available
Mobility in soil: no data available
PBT and vPvB assessment: no data available
Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

Boric acid:
Persistence and degradability: no data available
Toxicity: Toxicity to fish: LC50 – Ptychocheilus lucius – 279 mg/l – 96 h
LC50 – Lepomis macrochirus (Bluegill) – >1,021 mg/l – 96 h
Toxicity to daphnia and other aquatic invertebrates: LC50 – Daphnia magna (Water flea) – 53.2 mg/l – 21 d
EC50 – Daphnia magna (Water flea) – 133 mg/l – 48 h
Bioaccumulative potential: no data available
Mobility in soil: no data available
PBT and vPvB assessment: no data available
Other adverse effects: no data available

SECTION 13: DISPOSAL CONSIDERATIONS

Product: Observe all federal, state, and local environmental regulations.
Contaminated packaging: Dispose of as unused product.

SECTION 14: TRANSPORT INFORMATION

Sulfuric acid:
DOT (US) UN number: 2796 Class: 8 Packing group: II
Proper shipping name: Sulfuric acid
Reportable Quantity (RQ): 2000 lbs
Poison Inhalation Hazard: No
IMDG UN number: 2796 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: SULPHURIC ACID
IATA UN number: 2796 Class: 8 Packing group: II
Proper shipping name: Sulphuric acid

Boric acid:
DOT (US): Not dangerous goods.
IMDG: Not dangerous goods.
IATA: Not dangerous goods

SECTION 15: REGULATORY INFORMATION

OSHA Hazards: Sulfuric acid: Target organ effect, Corrosive
Boric acid: Target organ effect, Teratogen, Reproductive hazard
SARA 302 Components: SARA 302: The following components are subject to reporting levels established by SARA Title III, Section 302: Sulfuric acid CAS-No.7664-93-9 Revision Date 2007-07-01
SARA 313 Components: The following components are subject to reporting levels established by SARA Title III, Section 313: Sulfuric acid CAS-No. 7664-93-9 Revision Date 2007-07-01
SARA 311/312 Hazards Boric acid: Chronic Health Hazard
Sulfuric acid: Acute Health Hazard, Chronic Health Hazard
Massachusetts Right To Know Components Sulfuric acid CAS-No.7664-93-9 Revision Date 2007-07-01
Pennsylvania Right To Know Components: Sulfuric acid CAS-No.7664-93-9 Revision Date 2007-07-01
Boric acid CAS-No.10043-35-3; Revision Date: 2009-07-17
New Jersey Right To Know Components: Sulfuric acid CAS-No.7664-93-9 Revision Date 2007-07-01
Boric acid CAS-No.10043-35-3; Revision Date: 2009-07-17
California Prop. 65 Components: WARNING! This product contains a chemical known to the State of California to cause cancer.

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EU regulations

<table>
<thead>
<tr>
<th>Component</th>
<th>Risk Phrases</th>
<th>Safety Phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td>R35</td>
<td>S26, S30, S45</td>
</tr>
<tr>
<td>Boric acid</td>
<td>R60, R61</td>
<td>S45, S53</td>
</tr>
</tbody>
</table>

SECTION 16: OTHER INFORMATION

DISCLAIMER:
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. BioVision, Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.