

SAFETY DATA SHEET

Cat# K567-100 Arginase I (ARG1) Inhibitor Screening Kit

SDS DATE: Nov 21, 2017

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Arginase I (ARG1) Inhibitor Screening Kit
PRODUCT CODES: Cat# K567-100
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

Component	Description	Volume	Safety Information
Assay Buffer	Liquid	25 ml	No hazards
ARG1 Substrate	--	1 vial	No hazards
ARG1 Probe Mix A	Contains H2SO4	12 ml	See below
ARG1 Probe Mix B	Contains Boric acid, H2SO4	12 ml	See below
Human ARG1	--	1 vial	No hazards
ABH (in DMSO)	In DMSO	20 µl	See below

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 (Category 1A)
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

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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.

DMSO:

Emergency Overview

OSHA Hazards: Combustible liquid, Target organ effect

Target Organs: Eyes, Skin

GHS Classification: Flammable liquids (Category 4)

GHS Label elements, including precautionary statements

Pictogram: none

Signal word: Warning

Hazard statement(s): H227 Combustible liquid

Precautionary statement(s): none

HMIS Classification

Health hazard: 0

Chronic Health Hazard: *

Flammability: 2

Physical hazards: 0

NFPA Rating

Health hazard: 0

Fire: 2

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.

Aggravated Medical Condition: Avoid contact w/DMSO solutions containing toxic materials or materials with unknown toxicological properties. DMSO is readily absorbed through skin and may carry such materials into the body.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	EC-No.	Molecular Weight	Chemical Formula
Boric acid	10043-35-3	233-139-2	61.83	H ₃ BO ₃
Sulfuric Acid	7664-93-9	231-639-5	89.08	H ₂ SO ₄
DMSO	67-68-5	200-664-3	78.13	C ₂ H ₆ O _S

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.

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SECTION 5: FIRE-FIGHTING MEASURES

DMSO:

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 combustion products formed under fire conditions – no data available.

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

DMSO:

Components	CAS-No.	Value	Control parameters	Basis
Dimethyl sulfoxide	67-68-5	TWA	250 ppm	USA. Workplace Environmental Exposure Levels (WEEL)

Sulfuric acid:

Components	CAS-No.	Value	Control parameters	Basis
Sulfuric acid	7664-93-9	TWA	0.2 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
		TWA	1 mg/m ³	USA. OSHA: TABLE Z-1 Limits for Air Contaminants – 1910.1000
		TWA	1 mg/m ³	USA. Occupational Exposure Limits (OSHA): Table Z-1 Limits for Air Contaminants

Boric acid:

Components	CAS-No.	Value	Control parameters	Basis
Boric acid	10043-35-3	STEL	6 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
Remarks:	Upper respiratory tract irritation. Not classifiable as a human carcinogen varies.			
		TWA	2 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
	Not classifiable as a human carcinogen.			
		STEL	6 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
	Not classifiable as a human carcinogen.			
		TWA	2 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
	Upper respiratory tract irritation. Not classifiable as a human carcinogen varies.			
		TWA	2 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
	Upper respiratory tract irritation. Not classifiable as a human carcinogen varies.			
		STEL	6 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
	Upper respiratory tract irritation. Not classifiable as a human carcinogen varies.			

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

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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

Property	Boric acid	Sulfuric acid	DMSO
Appearance:	Solid	Clear liquid	Clear liquid
pH:	5.1 at 1.8 g/l	No data available	No data available
Water Solubility:	Soluble	Completely miscible	Completely miscible
Other Solubility:	No data available	No data available	No data available
Vapor Pressure	300 °C (572 °F)	1.33 hPa (1.00 mmHg) at 145.8 °C (294.4 °F)	189 °C (372 °F)
Vapor Density	160 °C (320 °F)	3.39 - (Air = 1.0)	16-19 °C (61-66 °F)
Flash Point (°C):	No data available	No data available	87 °C (189 °F)
Ignition Temperature (°C):	No data available	No data available	301 °C (574 °F)
Density:	1.44 g/cm ³	1.80-1.84 g/ml	1.1 g/ml

SECTION 10: STABILITY AND REACTIVITY

Property	Sulfuric acid	Boric acid	DMSO
Chemical Stability:	Stable under recommended storage conditions		
Conditions to Avoid:	No data available	Exposure to moisture	Heat, Flames, Sparks
Materials to Avoid:	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, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorus (III) oxides, powdered metals	Potassium, acid anhydrides	Acid chlorides, Phosphorus halides, Strong acids, Strong oxidizing agents, Strong reducing agents
Hazardous decomposition products:	Sodium oxides	Borane/boron oxides	Carbon oxides, sulfur oxides

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: no data available

Teratogenicity: no data available

Aspiration hazard: no data available

Potential Health Effects

Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

Skin: May be harmful if absorbed through skin. Causes skin burns.

Eyes: Causes eye burns. Causes severe eye burns.

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Ingestion: May be harmful if swallowed.

Signs and Symptoms of Exposure: Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, cough, wheezing, laryngitis, shortness of breath, headache, nausea, vomiting, pulmonary edema. Effects may be delayed. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects: no data available

Additional information: RTECS: WS5600000

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: Fetotoxicity. 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

DMSO:

Acute toxicity: LD50 Oral – rat – 14,500 mg/kg

LC50 Inhalation – rat – 4 h – 40250 ppm

LD50 Dermal – rabbit – >5,000 mg/kg

Skin corrosion/irritation: Skin – rabbit – no skin irritation – 4h

Serious eye damage/eye irritation: Eyes – rabbit – mild eye irritation

Respiratory or skin sensitization: no data available

Germ cell mutagenicity: Genotoxicity in vitro – mouse – lymphocyte: Cytogenetic analysis

Genotoxicity in vitro – mouse – lymphocyte: Mutation in mammalian somatic cells

Genotoxicity in vivo – rat – Intraperitoneal: Cytogenetic analysis

Genotoxicity in vivo – mouse – Intraperitoneal: DNA damage

Carcinogenicity: Carcinogenicity – rat – Oral → Tumorigenic: equivocal tumorigenic agent by RTECS criteria. Skin and appendages: other: tumors.

Carcinogenicity – mouse – Oral → Tumorigenic: equivocal tumorigenic agent by RTECS criteria. Leukemia skin and appendages: other: tumors.

- 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: Reproductive toxicity – rat – Intraperitoneal → Effects on fertility: abortion

Reproductive toxicity – rat – Intraperitoneal → Effects on fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)

Reproductive toxicity – rat – Subcutaneous → 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)

Reproductive toxicity – mouse – Oral → Effects on fertility: post-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea). Effects on embryo/fetus: Fetotoxicity (except death, e.g. stunted fetus). Specific developmental abnormalities: musculoskeletal system.

Teratogenicity: Developmental toxicity – mouse – Intraperitoneal: Effects on embryo/fetus: Fetotoxicity (except death, e.g. stunted fetus).

Specific developmental abnormalities: musculoskeletal system

Specific target organ toxicity – single exposure (GHS): no data available

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Specific target organ toxicity – repeated exposure (GHS): no data available

Aspiration hazard: 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.

Aggravated Medical Condition: Avoid contact w/DMSO solutions containing toxic materials or materials with unknown toxicological properties. DMSO is readily absorbed through skin and may carry such materials into the body.

Signs and Symptoms of Exposure: Effects due to ingestion may include: nausea, fatigue, and/or headache.

Additional information: RTECS: PV6210000

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

DMSO:

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 (Bluegill) - > 400,000 mg/l - 96 h

Further information on ecology: 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

DMSO:

DOT (US): UN-Number: 1993 Class: CBL Packing group: III; Proper shipping name: Combustible liquid, n.o.s. (Dimethyl sulfoxide); Marine pollutant: No; Poison Inhalation Hazard: No

IMDG: Not dangerous goods.

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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

Dimethyl sulfoxide: Fire 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

Dimethyl sulfoxide CAS-No. 67-68-5; Revision Date: 2007-03-01

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

Dimethyl sulfoxide CAS-No. 67-68-5; Revision Date: 2007-03-01

California Prop. 65 Components: WARNING! This product contains a chemical known to the State of California to cause cancer.

Sulfuric acid CAS-No.7664-93-9 Revision Date 2007-09-28

EU regulations

Component	Risk Phrases	Safety Phrases
Sulfuric acid	R35	S26, S30, S45
Boric acid	R60, R61	S45, S53
DMSO	R10, R36/37/38	S24/25, S36/37/39, S45

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.