MATERAL SAFETY DATA SHEET (MSDS)

Kit Name: VitroView™ Reticulum Stain Kit
SKU #: VB-3018

Revision Date: 01-16-2017

Components:

VB-3018 -1	Silver Nitrate Solution
VB-3018 -2	Concentrated Ammonium Hydroxide
VB-3018 -3	Sodium Hydroxide Solution
VB-3018 -4	Potassium Permanganate Solution
VB-3018 -5	Potassium Metabisulfite Solution
VB-3018 -6	Ferric Ammonium Sulfate Solution
VB-3018 -7	Formaldehyde Solution
VB-3018 -8	Gold Chloride Solution
VB-3018 -9	Sodium Thiosulfate Solution
VB-3018-10	Nuclear-Fast Red Solution

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name Silver Nitrate Solution
Product number VB-3018 -1
Product Description Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214, Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition/information on ingredients

Composition:

Name	CAS #	% by Weight
Silver nitrate	7761-8	10 w/v
Water	7732-18	100 v/v

Toxicological Data on Ingredients:
Silver nitrate: ORAL (LD50): Acute: 1173 mg/kg [Rat]. 50 mg/kg [Mouse].

3. Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of ingestion. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of inhalation. Non-corrosive for skin. Non-sensitizer for skin. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath.

Potential Chronic Health Effects:

Non-corrosive for skin. Non-irritant for skin. Non-sensitizer for skin. Non-permeator by skin. Non-irritating to the eyes. Non-hazardous in case of ingestion. Non-hazardous in case of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

4. First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention..

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

5. Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: N/A

Flash Points: N/A.

Flammable Limits: N/A

Products of Combustion: N/A

Fire Hazards in Presence of Various Substances: N/A

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: N/A
Risks of explosion of the product in presence of static discharge: N/A

Fire Fighting Media and Instructions: N/A.

Special Remarks on Fire Hazards: N/A

Special Remarks on Explosion Hazards: N/A

6. Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Corrosive liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, p. 3 basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

7. Handling and Storage

Precautions:

Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Avoid contact with skin Never add water to this product Wear suitable protective clothing If ingested, seek medical advice immediately and show the container or the label.

Storage:
Corrosive materials should be stored in a separate safety storage cabinet or room.

8. Exposure Controls / Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Face shield. Full suit. Gloves. Boots

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Silver nitrate TWA: 0.01 (mg/m3) from ACGIH [1995] Consult local authorities for acceptable exposure limits.

9. Physical and Chemical Properties

Physical State	Liquid
Odor	N/A
Test	N/A
pH (1% soultion/water)	Neutral
Melting Point	N/A
Boiling Point	The lowest known value is 100°C (212°F) (Water).
Specific Gravity:	Weighted average: 1.08 (Water = 1)
Vapor Pressure (Water)	The highest known value is 17.535 mm of Hg (@ 20°C)
Vapor Density (Water)	The highest known value is 0.62 (Air = 1)
Volatility:	N/A
Odor Threshold:	N/A
Water/Oil Dist. Coeff.:	N/A
Ionicity (in Water):	N/A
Dispersion Properties:	See solubility in water.
Solubility:	Easily soluble in cold water. Soluble in hot water.

10. Stability and Reactivity Data

Stability:	The product is stable.

Instability Temperature: N/A

Conditions of Instability: N/A

Incompatibility with various substances: N/A

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: N/A

Special Remarks on Corrosivity: N/ANot available.

Polymerization: No.

11. Toxicological Information

Routes of Entry: Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 500 mg/kg (Mouse)
(Calculated value for the mixture).

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion. Slightly hazardous in case of skin contact (permeator), of inhalation. Non-corrosive for skin. Non-sensitizer for skin.

Special Remarks on Toxicity to Animals: N/A

Special Remarks on Chronic Effects on Humans: N/A

Special Remarks on other Toxic Effects on Humans: N/A

12. Ecological Information

Ecotoxicity N/A

BOD5 and COD N/A

Products of Biodegradation Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: N/A

13. Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

DOT Classification: CLASS 8: Corrosive liquid

Identification: Corrosive liquid, n.o.s. (Silver nitrate, solution) : UN1760 PG: III
Special Provisions for Transport: Marine Pollutant

15. Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Silver nitrate Massachusetts RTK: Silver nitrate TSCA 8(b) inventory: Silver nitrate; Water SARA 313 toxic chemical notification and release reporting: Silver nitrate CERCLA: Hazardous substances.: Silver nitrate;

Other Regulations: OSHA:

Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

HMIS (U.S.A.):

Health Hazard: 3 Fire Hazard: 0 Reactivity: 0 Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3 Flammability: 0 Reactivity: 0 Specific hazard:

Protective Equipment:

Gloves. Full suit. Wear appropriate respirator when ventilation is inadequate. Face shield.

16. Other Information

This information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of the material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent

VB-3018-2 Concentrated Ammonium Hydroxide MSDS

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name Concentrated Ammonium Hydroxide
Product number VB 3018-2
Product Description Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214, Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition/information on ingredients

Composition:

Component	CAS #
Ammonia, anhydrous	7664-41-7
Water	7732-18-5

Toxicological Data on Ingredients: Ammonia, anhydrous: GAS (LC50): Acute: 2000 ppm 4 hours [Rat]. 4230 ppm 1 hours [Mouse].

3. Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant), of ingestion, . Non-corrosive to the eyes. Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Carcinogenicity effects: N/A. Teratogenic effects: N/A. Developmental effects: N/A

Mutagenic effects: Mutagenic for bacteria and/or yeast. [Ammonia, anhydrous].

The substance is toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

4. First Aid Measures

Eye Contact :
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Skin Contact:
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation Exposure:
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

5. Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: N/A

Flash Points: N/A

Flammable Limits: N/A

Products of Combustion: Hazardous decomposition include Nitric oxide, and ammonia fumes

Fire Hazards in Presence of Various Substances:
N/A

Explosion Hazards in Presence of Various Substances:
Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: N/A

Special Remarks on Fire Hazards: N/A

Special Remarks on Explosion Hazards: Forms explosive compounds with many heavy metals such as silver, lead, zinc and their halide salts. It can form shock sensitive compounds with halogens, mercury oxide, and siliver oxide.

6. Accidental Release Measures

Small spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

7. Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as metals, acids

Storage:
Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

8. Exposure Controls, Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 25 (ppm) from ACGIH (TLV) [United States] TWA: 50 STEL: 35 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 35 from NIOSH Consult local authorities for acceptable exposure limits.

9. Physical and Chemical Properties

Physical state and appearance:	Liquid.
Odor:	Ammonia-like (Strong.)
Taste:	Acrid.
Molecular Weight:	35.05
Color:	Colorless.
pH (1% soln/water):	11.6 [Basic.] This is the actual pH in a 1 N solution.
Boiling Point:	N/A
Melting Point:	-69.2°C (-92.6°F)
Critical Temperature:	Not available.
Specific Gravity:	0.898 (Water = 1)
Vapor Pressure:	287.9 kPa (@ 20°C)
Vapor Density:	N/A
Volatility:	N/A
Odor Threshold:	5-50 ppm as ammonia
Water/Oil Dist. Coeff.:	N/A

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water

Solubility: Easily soluble in cold water.

10. Stability and Reactivity

Chemical Stability:
Stable under normal temperatures and pressures.

Conditions to Avoid:
Incompatible materials, high temperatures.

Incompatibilities with Other Materials:
Highly reactive with metals. Reactive with acids. Slightly reactive to reactive with oxidizing agents.

Corrosivity:
Extremely corrosive in presence of zinc, of copper. Corrosive in presence of aluminum. Non-corrosive in presence of glass, of stainless steel(304), of stainless steel(316).

Special Remarks on Reactivity:
Incompatible with the following: Organic acids, amides, organic anhydrides, isocyanates, vinyl acetate, epichlorhydrin, aldehydes, Acrolein, Acrylic acid, chlorosulfonic acid, dimethyl sulfate, fluorine, gold + aqua regia, hydrochloric acid, hydrofluoric acid, hydrogen peroxide, iodine, nitric acid, olelum, propiolactone, propylene oxide, silver nitrate, silver oxide, silver oxide + ethyl alcohol, nitromethane, silver permanganate, sulfuric acid, halogens. Forms explosive compounds with many heavy metals (silver, lead, zinc) and halide salts.

Special Remarks on Corrosivity:
Dissolves copper and zinc. Corrosive to aluminum and its alloys. Corrosive to galvanized surfaces. Severe corrosive effect on brass and bronze

Polymerization: Will not occur.

11. Toxicological Information

Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 350 mg/kg [Rat].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. [Ammonium hydroxide]. May cause damage to the following organs: mucous membranes, skin, eyes.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, . Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals:
Highly toxic to aquatic organisms

Special Remarks on Chronic Effects on Humans:
May affect genetic material based on tests with microorganisms and animals. May cause cancer (tumorigenic) based on animal data. No human data found at this time. (Ammonia, anhydrous)
Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: Causes severe irritation. Causes skin burns. May cause deep, penetrating ulcers of the skin. Contact with skin may cause staining, inflammation, and thickening of the skin.

Eye: Contact with liquid or vapor causes severe burns and possible irreversible eye damage including corneal injury and cataracts.

Inhalation: Causes severe irritation of the upper respiratory tract with coughing, burns, breathing difficulty. May cause acute pulmonary edema, pneumoconiosis, fibrosis, and even coma. It is a respiratory stimulant when inhaled at lower concentrations. It may also affect behavior central nervous system (convulsions, seizures, ataxia, tremor), cardiovascular system (increase in blood pressure and pulse rate).

Ingestion: Harmful if swallowed. Affects the Gastrointestinal tract (burns, swelling of the lips, mouth, and larynx, throat constriction, nausea, vomiting, convulsions, shock, and may cause severe and permanent damage), liver, and urinary system (kidneys) May affect behavior (convulsions, seizures, ataxia, excitement).

Chronic Potential Health Effects:

Ingestion: May cause effects similar to those of acute ingestion.

Inhalation: Repeated exposure to low concentrations may cause bronchitis with cough, phlegm, and/or shortness of breath. May also cause liver and kidney damage, and affect the brain, and blood.

Eye: May cause corneal damage and the development of cataracts and glaucoma.

Skin: Repeated skin contact to low concentrations may cause dryness, itching, and redness (dermatitis)

12. Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 0.1 ppm 24 hours [Rainbow trout]. 8.2mg/l 96 hours [Fathead minnow]. 0.1 ppm 48 hours [Bluegill].

BOD5 and COD: Not available

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation:
The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

13. Disposal Information

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

DOT Classification: Class 8: Corrosive material

Identification: Ammonia Solution UNNA: 2672 PG: III
Special Provisions for Transport: Not available.

15. Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ammonium hydroxide Illinois toxic substances disclosure to employee act: Ammonium hydroxide Illinois chemical safety act: Ammonium hydroxide New York release reporting list: Ammonium hydroxide Pennsylvania RTK: Ammonium hydroxide Massachusetts RTK: Ammonium hydroxide Massachusetts spill list: Ammonium hydroxide New Jersey: Ammonium hydroxide New Jersey spill list: Ammonium hydroxide New Jersey toxic catastrophe prevention act: Ammonium hydroxide Louisiana spill reporting: Ammonium hydroxide California Director's List of Hazardous Substances (8 CCR 339): Ammonium hydroxide TSCA 8(b) inventory: Ammonium hydroxide CERCLA: Hazardous substances.: Ammonium hydroxide: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

DSCL (EEC):

HMIS (USA):

Health Hazard: 3 Fire Hazard: 0 Reactivity: 0 Personal Protection:

National Fire Protection Association (USA):

Health: 2 Flammability: 0 Reactivity: 0 Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

16. Other Information

This information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of the material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name	Sodium Hydroxide Solution
Product number	VB-3018-3
Product Description	Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214, Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition/information on ingredients

Composition:

Component	**CAS** No
Sodium hydroxide	1310-73-2
Water	7732-18-5

3. Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion. Slightly hazardous in case of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath.

Potential Chronic Health Effects:

Non-corrosive for skin. Non-irritant for skin. Non-sensitizer for skin. Non-permeator by skin. Non-irritating to the eyes. Non-hazardous in case of ingestion. Non-hazardous in case of inhalation.

Carcinogenic effects: N/A

Mutagenic effects: N/A

Teratogenic effects: N/A

Developmental toxicity: N/A

The substance is toxic to lungs, mucous membranes.

Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

4. First Aid Measures

Eyes:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Finish by rinsing thoroughly with running water to avoid a possible infection. Cold water may be used.

Skin:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as

possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention. Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Inhailation:
Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

5. Fire Fighting Measures

Flammability of the Product:	Non-flammable.
Auto-Ignition Temperature:	N/A
Flash Points:	N/A
Flammable Limits:	N/A
Products of Combustion:	N/A
Fire Hazards in Presence of Various Substances:	N/A
Explosion Hazards in Presence of Various Substances:	
Risks of explosion of the product in presence of mechanical impact:	N/A.
Risks of explosion of the product in presence of static discharge:	N/A
Fire Fighting Media and Instructions:	N/A
Special Remarks on Fire Hazards:	N/A
Special Remarks on Explosion Hazards:	N/A

6. Accidental Release Measures

Small spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large spill:
Corrosive liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material.

Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, p. 3 basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

7. Handling and Storage

Precautions:
Keep container dry. Do not breathe gas/fumes/ vapour/spray. Never add water to this product If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes Keep away from incompatibles such as acids.

Storage:
Alkalis may be stored in heavy duty gauge steel containers. Corrosive materials should be stored in a separate safety storage cabinet or room.

8. Exposure Controls / Personal Protection

Engineering Controls:
Keep container dry. Do not breathe gas/fumes/ vapour/spray. Never add water to this product If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes Keep away from incompatibles such as acids.

Storage:
Alkalis may be stored in heavy duty gauge steel containers. Corrosive materials should be stored in a separate safety storage cabinet or room.

9. Physical and Chemical Properties

Physical state and appearance:	Liquid.
Odor:	Odorless.
Taste:	Alkaline. Bitter. (Strong.)
Color:	Clear Colorless.
Molecular Weight:	N/A
pH (1% soln/water):	Basic
Boiling Point:	The lowest known value is 100°C (212°F) (Water).
Melting Point:	N/A
Critical Temperature:	N/A
Specific Gravity:	Weighted average: 1.01 (Water = 1)
Vapor Pressure:	The highest known value is 17.535 mm of Hg (@ 20°C) (Water).
Vapor Density:	The highest known value is 0.62 (Air = 1) (Water).
Volatility:	N/A
Odor Threshold:	N/A
Water/Oil Dist. Coeff.:	N/A

Ionicity (in Water):	N/A
Dispersion Properties:	See solubility in water.
Solubility:	Easily soluble in cold water

10. Stability and Reactivity Data

Stability:	The product is stable.
Instability Temperature:	N/A
Conditions of Instability:	N/A
Incompatibility with various substances:	Extremely reactive or incompatible with acids.
Corrosivity:	Highly corrosive in presence of aluminum. Slightly corrosive to corrosive in presence of glass.
Special Remarks on Reactivity:	N/A
Special Remarks on Corrosivity:	N/A
Polymerization:	No.

11. Toxicological Information

Routes of Entry:	Eye contact. Ingestion.
Toxicity to Animals: LD50: Not available. LC50:	N/A
Chronic Effects on Humans:	The substance is toxic to lungs, mucous membranes.
Other Toxic Effects on Humans:	Hazardous in case of skin contact , ingestion. Slightly hazardous in case of inhalation.
Special Remarks on Toxicity to Animals:	N/A
Special Remarks on Chronic Effects on Humans:	N/A
Special Remarks on other Toxic Effects on Humans:	N/A

12. Ecological Information

Ecotoxicity:	N/A
BOD5 and COD:	N/A

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation:	The product itself and its products of degradation are not toxic.
Special Remarks on the Products of Biodegradation:	N/A

13. Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

DOT Classification: CLASS 8: Corrosive liquid.

Identification: Sodium hydroxide, solution (Sodium hydroxide) : UN1824 PG: III

Special Provisions for Transport: N/A

15. Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Sodium hydroxide Massachusetts RTK: Sodium hydroxide TSCA 8(b) inventory: Sodium hydroxide; Water

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

DSCL (EEC):

HMIS (U.S.A):

Health Hazard: 1 Fire Hazard: 0 Reactivity: 0 Personal Protection:

National Fire Protection Association (U.S.A):

Health: 1 Flammability: 0 Reactivity: 0 Specific hazard:

Protective Equipment:
Gloves. Full suit. Wear appropriate respirator when ventilation is inadequate. Face shield.

16. Other Information

This information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of the material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent

VB-3018-4 Potassium Permanganate Solution MSDS

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name	Potassium Permanganate Solution, 1%
Product Number	VB-3018-4
Product Description	Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214, Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition/information on ingredients

Composition	CAS #
Potassium permanganate	7722-64-7
Water	7732-18-5

3. Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available.

4. First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti- bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

5. Fire Fighting and Explosion Measures

Flammability of the Product:	Non-flammable
Products of Combustion:	N/A
Fire Hazards:	N/A in Presence of Various Substances.

Explosion Hazards : N/A in presence of open flames and sparks, of shocks

Special Remarks on Fire Hazards:
Spontaneously flammable on contact with ethylene glycol. Potassium Permanganate being conveyed throughpropylene tube ignited the tube. When solid hydroxylamine is brought into contact with solid potassium
permanganate, there is produced immediately a with flame. Potassium permanganate decomposes hydrogen trisulfide so rapidly that sufficient heat is liberated to ignite the trisulfide. When Antimony or arsenic and solid potassium permanganate are ground together, the metals ignite. (Potassium Permanganate crystal)

Take care in handling as explosions may occur if it is brought in contact with organic or other readily oxidizable substances, either in solution or in dry state. Explosive in contact with sulfuric acid or hydrogen peroxide. Potassium permanganate + acetic acid or acetic anhydride can explode if permanganate is not kept cold. Explosions can occur when permanganates come on contact with benzene, ether, ethyl alcohol, petroleum, or oganic matter. Contact with glycerol may produce explosion. Crystals of potassium permanganate explode vigorously when ground with phosphorous. A mixture of .5% potassium permanganate + ammonium nitrate explosive caused an explosion 7 hrs. later. Addition of permanganate + dimethylformamide to give a 20% solution led to an explosion after 5 min. During a preparation of chlorine by addition of the concentrated acid (Hydrochloric acid) to solid potassium permanganate, a sharp explosion occurred on one occasion. (Potassium permanganate crystal)

6. Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

7. Handling and Storage

Precautions:
Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes.

Storage:
Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure Controls / Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection: Splash goggles. Lab coat. Gloves

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available

9. Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: N/A

Taste: N/A

Molecular Weight: N/A

Color: Purple (Dark.)

pH (1% soln/water): Neutral.

Boiling Point: The lowest known value is 100°C (212°F) (Water).

Melting Point: N/A

Critical Temperature: N/A

Specific Gravity: The only known value is 1 (Water = 1) (Water).

Vapor Pressure: The highest known value is 2.3 kPa (@ 20°C) (Water).

Vapor Density: The highest known value is 0.62 (Air = 1) (Water).

Volatility: N/A

Odor Threshold: N/A

Water/Oil Dist. Coeff.: N/A

Ionicity (in Water): N/A

Dispersion Properties: See solubility in water, methanol, acetone.

Solubility: Easily soluble in cold water, hot water, methanol, acetone.

10. Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: N/A

Conditions of Instability: Incompatible materials

Incompatibility with various substances: N/A

Corrosivity: N/A.

Special Remarks on Reactivity:
It is a powerful oxidizing agent. Incompatible with reducing agents, acids, formaldehyde, ammonium nitrate, dimethylformamide, glycerol, combustible materials, alcohols, arsenites, bromides, iodides, charcoal, organic substances, ferrous or mercurous salts, hypophosphites, hyposulfites, sulfites, peroxides, oxalates, ethylene glycol, Manganese salts in air oxidize the toxic sulfur dioxide to more toxic sulfur trioxide. Can react violently with most metal powders, ammonia, ammonium salts, phosphorous, many finely divided organic compounds (materials), flammable liquids, acids, sulfur. (Potassium permanganate crystal)

Special Remarks on Corrosivity: N/A

Polymerization: Will not occur.

11. Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact.

Toxicity to Animals: LD50: N/A LC50: N/A

Chronic Effects on Humans: N/A

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals: N/A

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (Male and Female fertility) based on animal data. May affect genetic material (mutagenetic) based on animal data. (Potassium permanganate)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. Eyes: Causes eye irritation. Inhalation: Inhalation of mist or vapor may cause respiratory tract irritation. Ingestion: May cause digestive / gastrointestinal tract irritation with nausea, vomiting. This solution contains Potassium Permanganate which may affect respiration (hypoxia, dyspnea), cardiovascular system (hypertension, hypotension, tachycardia), liver (hepatits, jaundice, hepatocellular necrosis), blood (methemoglobinemia), urinary system (renal failure, albuminuria, hematuria, proteinuria), behavior/central nervous system(somnolence, headache, dizziness, tremor, paresthesia, fatigue) Chronic Acute Potential Health Effects: Ingestion: It may affect the central nervous system. It may also affect the liver and kidneys. Skin: Repeated prolonged contact may cause dermatitis

12. Ecological Information

Ecotoxicity: N/A

BOD5 and COD: N/A

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: N/A

Special Remarks on the Products of Biodegradation: N/A

13. Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: N/A

Special Provisions for Transport: N/A

15. Regulatory Information

Federal and State Regulations:
Connecticut carcinogen reporting list.: Potassium permanganate Illinois toxic substances disclosure to employee act: Potassium permanganate Illinois chemical safety act: Potassium permanganate New York

release reporting list: Potassium permanganate Rhode Island RTK hazardous substances: Potassium permanganate Pennsylvania RTK: Potassium permanganate Massachusetts RTK: Potassium permanganate Massachusetts spill list: Potassium permanganate New Jersey: Potassium permanganate New Jersey spill list: Potassium permanganate Louisiana spill reporting: Potassium permanganate California Director's List of Hazardous Substances: Potassium Permanganate TSCA 8(b) inventory: Potassium permanganate; Water CERCLA: Hazardous substances.: Potassium permanganate: 100 lbs. (45.36 kg);

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

DSCL (EEC):

HMIS (U.S.A):
Health Hazard: 2 Fire Hazard: 0 Reactivity: 0 Personal Protection:

National Fire Protection Association (U.S.A):
Health: 2 Flammability: 0 Reactivity: 0 Specific hazard:

Protective Equipment:
Gloves. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles

16. Other Information

This information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of the material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent

VB-3018-5 Potassium Metabisulfite Solution MSDS

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name Potassium Metabisulfite Solution
Product number VB-3018-5
Product Description Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214, Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition/information on ingredients

Composition:

Composition	CAS #
Potassium metabisulfite	16731-55-8
Water	7732-18-5

Toxicological Data on Ingredients:
Potassium metabisulfite LD50: Not available. LC50: Not available.

3. Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation (lung irritant). Slightly hazardous in case of ingestion.

Potential Chronic Health Effects:
Carcinogenic : Not available.
Mutagenic Effects: Mutagenic for bacteria and/or yeast. [Acetic acid].
Teratogenic Effects: Not available.
Development Toxicity: Not available.
Repeated or prolonged exposure e is not known to aggravate medical condition.

4. First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband

Serious Ingestion: Not available.

5. Fire Fighting Measures

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: N/A

Flash Points: N/A

Flammable Limits: N/A

Products of Combustion: N/A.

Fire Hazards in Presence of Various Substances: N/A

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available..

Fire Fighting Media and Instructions: N/A

Special Remarks on Fire Hazards:
When heated to decomposition it emits toxic fumes of sulfur oxides and potassium sulfate. It may ignite during milling or grinding (when powdering it).

6. Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

7. Handling and Storage

Precautions:
Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure Controls / Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an certified respirator or equivalent Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: N/A

9. Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline powder. Crystals solid.)

Odor: Sulfurous. Sulffur dioxide odor

Taste: N/A

Molecular Weight: 222.31 g/mole

Color: White.

pH (1% soln/water): N/A

Boiling Point: N/A

Melting Point: Decomposition temperature: 150°C (302°F).

Critical Temperature: N/A

Specific Gravity: N/A

Density: 2.34 (Water = 1)

Vapor Pressure: N/A

Vapor Density: 2.3 (Air = 1)

Volatility: N/A

Odor Threshold: The highest known value is 0.48 ppm (Acetic acid)

Water/Oil Dist. Coeff.: N/A

Ionicity (in Water): N/A

Dispersion Properties: See solubility in water

Solubility: Easily soluble in cold water, hot water, Soluble in acids and alkaline. Insoluble in alcohol..

10. Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: N/A

Conditions of Instability: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Liberates sulfur dioxide in contact with acids. Air sensitive. Moisture sensitive. It oxidizes to in air to sulfate, more readily in presence of moisture.

Special Remarks on Corrosivity: N/A

Polymerization: Will not occur.

11. Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: LD50: N/A

Chronic Effects on Humans:
Carcinogenic effects: 3 (Not classifiable for human.) by IARC

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of inhalation (lung irritant).
Slightly hazardous in case of ingestion.

Special Remarks on Toxicity to Animals: N/A

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects based on animal test data. May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May cause skin irritation. Eyes: May cause eye irritation. Inhalation: May cause respiratory tract irritation. May cause asthmatic attacks due to allergic sensitization of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation with abdominal pain, nausea, vomiting and diarrhea. May cause allergic/hypersensitivity/ anaphylactoid reaction. Some asthmatics are said to be sensitive to minute amounts of sulfites in foods. It may cause a worsening of asthma in asthmatics. Individuals sensitive to sulfides may experience stomach upset , tightness in the chest, or wheezing. Extremely large concentrations may produce central nervous system, seizures, hypotension, tachycardia, and cardiovascular collapse.

12. Ecological Information

Ecotoxicity: N/A

BOD5 and COD: N/A

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely.
However, long term degradation products may arise.

Toxicity of the Products of Biodegradation:
The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: N/A

13. Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations

14. Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: N/A

Special Provisions for Transport: N/A

15. Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Potassium metabisulfite.

Other Regulations:
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

DSCL (EEC):
R31- Contact with acids liberates toxic gas.
R36/37/38- Irritating to eyes, respiratory system and skin.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36- Wear suitable protective clothing.

HMIS (U.S.A.):
Health Hazard: 2 Fire Hazard: 0 Reactivity: 0 Personal Protection: j

National Fire Protection Association (U.S.A.):
Health: 2 Flammability: 0 Reactivity: 0 Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles

16. Other Information

This information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of the material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent

VB-3018-6 Ferric Ammonium Sulfate Solution MSDS

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name	Ferric Ammonium Sulfate Solution, 2%
Product number	VB-3018-6
Product Description	Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214, Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition/information on ingredients

Composition:

Composition	CAS #
Ferric ammonium sulfate	7783-83-7
Water	7732-18-5

Toxicological Data on Ingredients:
Ferric ammonium sulfate dodecahydrate LD50: Not available. LC50: Not available.

3. Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Noncorrosive for skin. Non-sensitizer for skin. Non-permeator by skin. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

4. First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: N/A

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not

breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: N/A

5. Fire Fighting Measures

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: N/A

Flash Points: N/A

Flammable Limits: N/A

Products of Combustion: N/A

Fire Hazards in Presence of Various Substances: N/A

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: N/A
Risks of explosion of the product in presence of static discharge: N/A

Fire Fighting Media and Instructions: N/A

Special Remarks on Fire Hazards:
When heated to decomposition it emits toxic fumes of sulfur oxides and potassium sulfate.
It may ignite during milling or grinding (when powdering it).

6. Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Neutralize the residue with a dilute solution of sodium carbonate. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

7. Handling and Storage

Precautions:
Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes.

Storage:
No specific storage is required. Use shelves or cabinets sturdy enough to bear the weight of the chemicals. Be sure that it is not necessary to strain to reach materials, and that shelves are not overloaded.

8. Exposure Controls / Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Ferric ammonium sulfate dodecahydrate TWA: 1 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

9. Physical and Chemical Properties

Physical state and appearance:	Liquid.
Odor:	N/A
Taste: :	N/A
Molecular Weight:	N/A
Color:	N/A
pH (1% soln/water):	Acidic.
Boiling Point:	The lowest known value is 100°C (212°F) (Water).
Melting Point:	N/A
Critical Temperature:	N/A
Specific Gravity:	Weighted average: 1.38 (Water = 1)
Vapor Pressure:	The highest known value is 17.535 mm of Hg (@ 20°C) (Water).
Vapor Density:	The highest known value is 0.62 (Air = 1) (Water).
Volatility:	N/A
Odor Threshold:	N/A
Water/Oil Dist. Coeff.:	N/A
Ionicity (in Water):	N/A
Dispersion Properties:	See solubility in water
Solubility:	Easily soluble in cold water.

10. Stability and Reactivity Data

Stability:	The product is stable.
Instability Temperature:	N/A
Conditions of Instability:	N/A
Corrosivity:	Non-corrosive in presence of glass.
Special Remarks on Reactivity:	N/A
Special Remarks on Corrosivity:	N/A
Polymerization:	No

11. Toxicological Information

Routes of Entry:
Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: LD50: N/A

Chronic Effects on Humans:
The substance is toxic to kidneys, liver.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Non-corrosive for skin. Non sensitizer for skin. Non-permeator by skin..

Special Remarks on Toxicity to Animals: N/A

Special Remarks on Chronic Effects on Humans: N/A

Special Remarks on other Toxic Effects on Human: N/A

12. Ecological Information

Ecotoxicity: N/A

BOD5 and COD: N/A

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely.
However, long term degradation products may arise.

Toxicity of the Products of Biodegradation:
The product itself and its products of degradation are not toxic

Special Remarks on the Products of Biodegradation: N/A

13. Disposal Considerations

Waste Disposal:

14. Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: N/A

15. Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Water

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

DSCL (EEC):
R38- Irritating to skin.
R41- Risk of serious damage to eyes.

HMIS (U.S.A.):
Health Hazard: 2 Fire Hazard: 0 Reactivity: 0 Personal Protection: h

National Fire Protection Association (U.S.A.):
Health: 2 Flammability: 0 Reactivity: 0 Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent.
Splash goggles

16. Other Information

This information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances

of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of the material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent

VB-3018-7 Formaldehyde Solution MSDS

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name	Formaldehyde Solution , 10%
Product number	VB-3018-7
Product Description	Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214, Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition/information on ingredients

Composition:

Name	CAS #
Formaldehyde	50-00-0
Water	7732-18-5

3. Hazards Identification

Potential Health Effects:

Eye:
May cause eye irritation. Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. Vapors may cause eye irritation. Lachrymator (substance which increases the flow of tears).

Skin:
Causes severe skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Exposure may cause irritation characterized by redness, dryness, and inflammation. May be absorbed through the skin. Causes irritation with burning pain, itching, and redness. Causes blistering of the skin.

Ingestion:
Harmful if swallowed. May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns.

Inhalation:
Harmful if inhaled. Effects may be delayed. May cause severe allergic respiratory reaction. May cause asthmatic attacks due to allergic sensitization of the respiratory tract. May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema.

Potential Chronic Health Effects:
Contains formaldehyde which can cause cancer in humans. There is sufficient evidence that formaldehyde causes nasopharyngeal cancer in humans, a rare cancer in developed countries. There is limited evidence that formaldehyde causes cancer of the nasal cavity and paranasal sinuses and strong but not sufficient evidence for leukemia.

4. First Aid Measures

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin Contact:
Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing

contaminated clothing and shoes.

Inhalation:
Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Ingestion:
If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Notes to Physician: Treat symptomatically and supportively.

5. Fire Fighting Measures

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.

Flash Point: >200^{o}F / 93.3^{o}C

Autoignition Temperature: 795^{o}F / 423^{o}C

NFPA Hazard Clasiffication:
Health: 2; Flammability: 1; Reactivity: 0

HMIS Hazard Clasiffication:
Health: 2; Flammability: 1; Reactivity: 0

Hazardous Decomposition Products:
Strong vapors and irritatnts, carbon monoxide, carbon dioxide

6. Accidental Release Measures

Accidental Release :

Small spill and leak:
Dilute with waterand mop, or absorb with an inert dry material and place in appropriate waste disposal container.

Large spill and leak:
Keep away from heat and ignition sources. Stop leak if without risk. Absorb with DRY earth, sand, or other non-combustible material. Avoid skin and eye contact. Prevent entry into sewers, basements or confined areas; dike if needed. Ensure airborne concentrations of formaldehyde do not exceed published exposure limits. Additional protective equipment such as full-face respirator, full body suit and boots may be required. If airport concentrations of formaldehyde exceed 7.5 ppm, only use SCBA or supplied air respirators.

7. Handling and Storage

Handling:
Wash thoroughly after handling. Wash hands before eating. Use only in a well-ventilated area. Avoid prolonged or repeated contact with skin. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Do not ingest or inhale.

Storage:
Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

8. Exposure Controls / Personal Protection

Engineering Controls:

Use exhaust ventilation or laboratory hood. Ensure that eyewash stations and quick drench showers are proximal to the workstation or tissue processor.

Personal Protective Equipment:

Eyes:
Wear chemical goggles.

Skin:
Wear appropriate protective gloves to prevent skin exposure.

Clothing:
Wear appropriate protective clothing to prevent skin exposure.

Respirators:
Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary..

9. Physical and Chemical Properties

Physical state:	Liquid.
Appearance:	colorless
Odor:	Pungent odor
pH :	Neutral
Vapor Pressure:	2.7mmHg @ F: 68° F / 20°C
Vapor Density:	Y (AIR = 1): 1.04
Boiling Point:	212° F / 100° C
Melting Point:	N/A
Freezing Point:	-133° F / -92° C
Specific Gravity:	Weighted average: 1.38 (Water = 1)
Molecular Weight:	Mixture

10. Stability and Reactivity Data

Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Excess heat, confined spaces.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Irritating and toxic gases, oxides of carbon.

Hazardous Polymerization: Will not occur.

11. Toxicological Information

Routes of Entry:
Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Acute Health Hazards:

Eyes:
Hazardous in case of eye contact (irritant). May cause burns. May cause chemical conjunctivitis or corneal damage.

Skin:
Hazardous in case of skin contact (irritant, corrosive, sensitizer). Skin contact may produce burns. May cause skin sensitization which becomes evident upon re-exposure. Skin inflammation is characterized by itching, scaling, reddening or occasionally blistering.

Ingestion:
May be fatal if swallowed. May cause burns to mouth, throat and stomach.

Chronic Effects on Humans:
Effects may be delayed. Formaldehyde has been associated with nasopharyngeal cancers. Repeated exposure may cause skin discoloration and nail decay. Inhalation may worsen conditions such as emphysema or bronchitis. Repeated skin exposure may cause defatting of the skin.

Carcinogenicity

Formaldehyde **NIOSH:** Classified proven **ACGIH:** Classified A2(suspected for human)
NTP: Classified 2 **IARC:** Classified A2

Methanol Not classified as a human carcinogen

12. Ecological Information

Ecological Information:

Toxicity:
Formaldehyde: LC50 Pimephales promelas (Fathead minnow) 24.1 mg/L/96 hr
Methanol: LC50 fathead minnows 29,400 mg/L/96hr; EC50 daphnia magna >10,000 mg/L/24 hr.

13. Disposal Considerations

Waste Disposal:
Unused product: dispose as a regulatd hazardous waste. Spent product or spill clean upfollow all provincial, local, state, and federal regulations.

RCRA Hazard Class: U122

14. Transport Information

DOT Classification: Not regulated for ground transportation (U.S.).

Identification: N/A

Air Transport: Not regulated.

15. Regulatory Information

U.S. Federal Regulations:

TSCA (Toxic Substance Control): All of the components are listed on the TSCA inventory
CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT):

The RQ for the product (based on the RQ for Formaldehyde (6% maximum)) of 100 lbs, is 1,666 lbs. Report spills required under federal, state, and local regulations.

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT):
This product contains the following chemicals regulated under SARA Section 302: Formaldehyde

311/312 HAZARD CATEGORIES: Acute Health, Chronic Health

313 REPORTABLE INGREDIENTS: Listed (Methanol, Formaldehyde)

RTK States: PA, MA, NJ Methanol CAS# 67-56-1 Formaldehyde CAS# 50-00-0

CALIFORNIA PROPOSITION 65: This product contains the following chemicals which are known to the State of California to cause cancer, reproductive toxicity or birth defects (developmental toxicity): Formaldehyde (cancer)

16. Other Information

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NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent

VB-3018-8 Gold Chloride Solution MSDS

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name	Gold Chloride Solution
Product number	VB-3018-8
Product Description	Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214 Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition/information on ingredients

Composition:

Name	CAS #	% by Weight
Gold Chloride	16961-25-4	0.1
Water	7732-18-5	Balance

3. Hazards Identification

Emergency Overview:
May cause irritation to areas of contact. Wash areas of contact with water for at least 15 minutes. Avoid ingestion or contact with skin, eyes, or clothing. If ingested, dilute with large quantity of water and call a physician. Do not induce vomiting.

Potential Health Effects

Eye Contact:
May cause irritation, redness, pain, and tearing. Inhalation: May cause slight irritation.

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

Ingestion: May cause nausea, vomiting and diarrhea.

Chronic Effects/Carcinogenicity: None (**IARC** - No. **NTP** - No. **OSHA** - No).

Reproductive Information:
Reproductive effects cited in 'Registry of Toxic Effects of Chemical Substances' for Gold Chloride (Tetrachloroauric (III) Acid Trihydrate.

Teratology (Birth Defect) Information:
Mutation data cited in 'Registry of Toxic Effects of Chemical Substances' for Gold Chloride(Tetrachloroauric (III) Acid Trihydrate.

4. First Aid Measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

Eye Contact:
Irrigate immediately with large quantity of water for at least 15 minutes. Call a physician if irritation develops.

Skin Contact:
Flush with plenty of water for at least 15 minutes. Call a physician if irritation develops.

Inhalation:
Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.

Ingestion:
Dilute with water or milk. Do not induce vomiting. Call a physician if necessary.

5. Fire Fighting Data

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Decomposes on heating to chlorine gas, hydrogen chloride and metallic gold

Further information
The product itself does not burn.

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
Do not let product enter drains. Aldrich - 520918 Page 3 of 7

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

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.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.
Moisture sensitive. Light sensitive.

8. Exposure Controls / Personal Protection

Engineering Controls:
No specific controls are needed. Normal room ventilation is adequate.

Personal Protection equipment

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).

Respiratory Protection:
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type

N100 (US) or type P3 (EN 143) 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). .

Skin 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.

9. Physical and Chemical Properties

Appearance:	Clear, yellow liquid
pH:	N/A
Odor:	odorless
Boiling Point:	100°C
Solubility in Water:	Infinite
Melting Point:	0^{o}C
Specific Gravity:	1
Vapor Pressure:	N/A

10. Stability and Reactivity Data

Chemical Stability:
Stable under normal conditions of use and storage.

Incompatibility:
Most metals, Alkalis, active metals, Cyanides, Sulfides, Sulfites, Metal Oxides, Formaldehyde.

Hazardous Decomposition Products:
Hazardous decomposition products formed under fire conditions. - Decomposes on heating to chlorine gas, hydrogen chloride and metallic gold

Hazardous Polymerization: Will not occur.

11. Toxicological Information

Acute toxicity

Oral LD50	N/A
Inhalation LC50	N/A
Skin corrosion/irritation	N/A
Serious eye damage/eye irritation	N/A
Respiratory or skin sensitization	May cause allergic skin reaction.
Germ cell mutagenicity	N/A

Potential health effects

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

Ingestion May be harmful if swallowed.

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

Eyes Causes eye burns.

Synergistic effects N/A

Additional Information RTECS: MD5428000

12. Ecological Information

Ecotoxicological Information: N/A

Chemical Fate Information: N/A

13. Disposal Considerations

Waste Disposal :
Cover the spill with Sodium Carbonate or a soda ash-slaked lime mixture (50:50). Mix and add water to form slurry. Decant the liquid to the drain with excess water. Treat the solid residue as normal refuse. Always dispose of in accordance with local, state and federal regulations.

14. Transport Information

DOT (U.S.)
UN number: 3260 Class: 8 Packing group: II
Proper shipping name: Corrosive solid, acidic, inorganic, n.o.s. (Tetrachloroauric acid trihydrate)
Marine pollutant: No
Poison Inhalation Hazard: No

15. Regulatory Information

Federal and State Regulations: selected regulation represented

NFPA Ratings:

Health: 1 Flammability: 0 Reactivity: 0 Special Notice Key: None

HMIS (U.S.):

Health: 1 Flammability: 0 Reactivity: 0 Protective

Equipment: B (Eyewear, Gloves)

OSHA Status:
The above items either do not contain any specifically hazardous material or the potentially hazardous material is present in such low concentration that the items do not present any immediate threat to health and safety. These items do not meet the OSHA Hazard Communication Standard (29 CFR 1910.1200) definition of a hazardous material.

TSCA Status:
All components of this solution are listed on the TSCA Inventory or are mixtures (hydrates) of items listed

on the TSCA Inventory.

16. Other Information

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NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent

VB-3018-9 Sodium Thiosulfate Solution MSDS

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name Sodium Thiosulfate Solution
Product number VB-3018-9
Product Description Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214, Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition/information on ingredients

Composition:

Name	CAS #
Sodium Thiosulfate	10102-17-7
Water	7732-18-5

3. Hazards Identification

Emergency Overview

Appearance: colorless liquid.
Caution! May cause respiratory tract irritation. May cause skin irritation. May cause eye irritation. This is expected to be a low hazard for usual industrial handling.
Target Organs: None.

Potential Health Effects

Eye: May cause mild eye irritation.
Skin: May cause skin irritation.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation.
Inhalation: Low hazard for usual industrial handling. May cause respiratory tract irritation.
Chronic: No information found.

4. First Aid Measures

Eye Contact:
Irrigate immediately with large quantity of water for at least 15 minutes. Call a physician if irritation develops.

Skin Contact:
Flush with plenty of water for at least 15 minutes. Call a physician if irritation develops.

Inhalation:
Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.

Ingestion:
Dilute with water or milk. Do not induce vomiting. Call a physician if necessary.

5. Fire Fighting Data

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media:
For small fires, use water spray, dry chemical, carbon dioxide or chemical foam.

Flash Point: Not applicable.

Autoignition Temperature: Not applicable.

Explosion Limits
Lower:Not available.
Upper: Not available.

NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

6. Accidental Release Measures

General Information:
Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:
Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

7. Handling and Storage

Handling:
Avoid prolonged or repeated contact with skin. Avoid ingestion and inhalation. Use with adequate ventilation.

Storage:
Store in a cool, dry place. Store in a tightly closed container.

8. Exposure Controls / Personal Protection

Engineering Controls:
Use adequate ventilation to keep airborne concentrations low.

OSHA Vacated PELs:
Water: No OSHA Vacated PELs are listed for this chemical. Sodium thiosulfate, pentahydrate: No OSHA Vacated PELs are listed for this chemical.

Personal Protection:

Eye Protection: Safety glasses or goggles.

Respiratory Protection: Normal room ventilation is adequate.

Skin Protection: Chemical resistant gloves.

9. Physical and Chemical Properties

Appearance: Colorless liquid

pH: N/A

Odor: odorless

Boiling Point: 212^{o} F

Freezing/Melting Point:	32 ^{o} F
Decomposition Temperature:	N/A
Vapor Pressure:	14 mm Hg
Vapor Density:	N/A
Evaporation Rate:	>1 (ether=1)
Viscosity:	N/A
Solubility in Water:	Completely soluble in water.
Melting Point:	0^{o}C
Specific Gravity / Density:	1.0-1.
Molecular Formula:	Mixture

10. Stability and Reactivity Data

Chemical Stability:	Stable under normal conditions of use and storage.
Conditions to Avoid:	Excess heat.
Incompatibilities with Other Materials:	Sodium thiosulfate violently reacts with sodium nitrite. It is also incompatible with strong oxidizers, acid
Hazardous Decomposition Products:	Hydrogen sulfide, sodium oxide
Hazardous Polymerization:	Has not been reported.

11. Toxicological Information

RTECS#:	
CAS# 7732-18-5:	ZC0110000
CAS# 10102-17-7:	WE6660000
LD50/LC50:	
CAS# 7732-18-5:	Orat: LD50 = >90 mL/kg;
Carcinogenicity:	
CAS# 7732-18-5:	Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 10102-17-7:	Not listed by ACGIH, IARC, NTP, or CA Prop 65.
Epidemiology:	N/A
Teratogenicity:	N/A
Reproductive Effects:	N/A
Mutagenicity:	N/A
Neurotoxicity:	N/A
Other Studies:	

12. Ecological Information

Ecotoxicological Information: N/A

13. Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.
RCRA U-Series: None listed.

14. Transport Information

This product is not regulated.

15. Regulatory Information

US Federal Regulation

TSCA
CAS# 7732-18-5 is listed on the TSCA inventory.
CAS# 10102-17-7 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2))

Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.

TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.

OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.

State

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
CAS# 10102-17-7 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

Safety Phrases:
S 24/25 Avoid contact with skin and eyes.

16. Other Information

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IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent

VB-3018-10 Nuclear Fast Red Solution MSDS

1. Identification of the Substance/Mixture and Company

Identification of the substance or mixture

Product Name Nuclear Fast Red Solution
Product number VB-3018-10
Product Description Kit Component

Manufacturer/Supplier

VitroVivo Biotech, LLC. 405 E Gude Dr， Suite 214, Rockville, MD 20850
Phone: 301-500-0499 Toll free: 1-800-260-9817 Fax: 844-248-6208

2. Composition /Information on Ingredients

Chemical Description: Mixture

Name	CAS #.
Aluminum Sufate Hydrate	7784-31-8
Nuclear Fast Red	6409-77-4
Sodium Azide	26628-22-8
Water	7732-18-5

May contain additional non-hazardous proprietary ingredients.
May contain additional active ingredients at concentrations

3. Hazards Identification

GHS CLASSIFICATION: Skin Irritation Category 2; Eye Irritation Category 1; Chronic Aquatic Toxicity Category 3

Hazard Phrases	
H318	Causes serious eye damage.
H315	Causes skin irritation
H411	Toxic to aquatic life with long lasting effects.

Precautionary Phrases	
P302+P352	IF ON SKIN: Wash with plenty of soap and water
P305+p351 338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing.
P337+P315	If eye irritation persists: Get medical advice/attention.
P273	Avoid release to the environment.

4. First Aid Measures

Eyes :
Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention if irritation persists.

Skin:
In case of contact, flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention

if irritation develops.

Ingestion:
Call medical doctor or poison control center immediately. Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Inhalation:
Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms worsen.

5. Firefighting Measures

Flammability of the product:

Flash point: Not Available

Autoignition temperature: Not Available

NFPA Hazard classification:

Health: 2 Flammability: 0 Reactivity: 0 Other:

HMIS Hazard classification:

Health: 2 Flammability: 0 Reactivity: 0 Protection: B

Extinguish media: Use dry chemical, CO2, water spray (fog) or foam.

Not suitable: Do not use water jet.

Special fire fighting procedures:
Fire-fighters should wear appropriate protective equipment self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental Release Measures

Small spill and leak:
Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Do not allow product to enter drains.

Large spill and leak:
Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and Storage

Handing :
Avoid contact with skin and eyes. Wash thoroughly after handling. Avoid breathing vapor.

Storage:
Store in accordance with local regulations. Store in a segregated and approved area. Store in a well ventilated area. Store at 2-8°C

8. Exposure Controls/Personal Protection

Engineering controls:
Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipme

Respiratory protection:
Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Eye protection:
Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Recommended: splash goggles

Skin protection:
Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Work hygienic practices:
Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eye wash stations and safety showers are close to the workstation location.

Notes:
Avoid releasing large quantities into the environment.

9. Physical and Chemical Properties

Appearance:	Red liquid
Odor:	Unknown
Physical state:	Liquid.
pH as supplied:	N/A
Boiling point:	N/A
Melting point:	N/A
Freezing point:	N/A
Vapor pressure (mmHg):	N/A
Vapor density (Air = 1):	N/A
Evaporation rate:	N/A
Solubility in water:	Soluble in water
Molecular weight:	Mixture
Viscosity:	N/A

10. Stability and Reactivity

Stability:	Product is stable under normal conditions of use.
Condition to avoid (stability):	Excessive heat, static electricity, direct sunlight.
Incompatibility (Material to avoid):	Oxidizers, alkalis, antimony salts, arsenates, carbonates, and phosphates.
Hazardous decomposition:	Carbon oxides, Nitrogen oxides, oxides of silver.
Hazardous polymerization:	No hazardous polymerization.

11. Toxicological Information

Acute toxicity

Oral LD50	N/A
Inhalation LC50	N/A
Dermal LD50	N/A
Other information on acute toxicity	N/A
Skin corrosion/irritation	Irritating to skin and mucous membranes.
Serious eye damage/eye irritation	Seriously irritating to the eye.
Respiratory or skin sensitization	N/A
Germ cell mutagenicity:	N/A

International Agency for Research on Cancer (IARC).
None of the components are listed.

National Toxicology Program (NTP).
Although not listed above, this stain is suspected of causing cancer.

Specific target organ toxicity

Single exposure (Globally Harmonized System)	N/A
Repeated exposure (Globally Harmonized System)	N/A

Aspiration hazard	N/A

Potential health effects

Inhalation:	May cause respiratory tract irritation.
Ingestion:	Toxic if swallowed.
Skin:	Causes skin irritation.
Eyes:	Causes eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated

Routes if entry:	Skin/eye contact, inhalation, and ingestion.
Acute health hazard:	See above, potential health effects.

12. Ecological Information

Toxicity:	
Fish:	N/A
Crustacea:	N/A
Algae/Aquatic Plants:	N/A
Other Organisms:	N/A
Persistence and degradability	N/A
Bioaccumulative potential	N/A
Mobility in soil	N/A
PBT and vPvB assessment	N/A
Other adverse effects	N/A

13. Disposal Considerations

Waste disposal methord:
Unused product: dispose as a regulated hazardous waste. Spent product or spill clean upfollow all provincial, local, state, and federal regulations.

14. Transport Information

DOT (U.S.)

Proper shipping name::	Environmentally hazardous substance, (Liquid) N.O.S. (Silver Nitrate)
Hazard class:	9
ID number:	UN3082
Packing group:	III
Air transportation	(IATA)
Proper shipping name:	Environmentally hazardous substance, Liquid . N.O.S.(Silver Nitrate)
Environmental Hazards:	Yes

15. Regulatory Information

United States
HCS Classification: Aquatic toxicity:

U.S. Federal regulations
United States inventory (TSCA 8b):
TSCA 8(d) H and S data reporting:
TSCA (Toxic Substance Control Act): All components are listed on the TSCA Inventory.

States RTK:
California Prop. 65
This product does not contain any chemicals known to the State of California to cause birth defects or other reproductive harm: None

16. Other Information

This information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of the material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent