

2,4-D Tube Kit - Cat# ABRA-001

Intended Use

The Abraxis 2,4-D Tube Kit is an immunological laboratory test for the quantitation of 2,4-D residues in water in the range of 2.0 to 100 ng/mL (parts per billion or ppb). Samples containing higher concentrations can be measured by pre-dilution of the sample.

Test Principles

The Abraxis 2,4-D Tube Kit uses polyclonal antibodies that bind both 2,4-D and a 2,4-D -enzyme conjugate. 2,4-D in the sample competes with 2,4-D -enzyme conjugate for a limited number of antibody binding sites. Antibodies, which bind 2,4-D, are immobilized to the inside of the test tubes. In the assay procedure you will:

- Add a sample or calibrator containing 2,4-D to a test tube.
- Incubate this sample for 10 minutes.
- Add 2,4-D/enzyme conjugate. The conjugate competes with any 2,4-D in the sample for the same antibody binding sites.
- Wash away any unbound molecules, after you incubate this mixture for 10 minutes.
- Add clear substrate solution to each test tube. In the presence of bound 2,4-D -enzyme conjugate, the substrate is converted to a blue compound. One enzyme molecule can convert many substrate molecules.

Since the same number of antibody binding sites are available in every test tube, and each tube receives the same number of 2,4-D -enzyme conjugate molecules, a sample containing a low concentration of 2,4-D allows the antibody to bind many 2,4-D -enzyme conjugate molecules. The result is a dark blue solution. Conversely, a high concentration of 2,4-D allows fewer 2,4-D -enzyme conjugate molecules to be bound by the antibodies, resulting in a lighter blue solution.

NOTE: Color is inversely proportional to 2,4-D concentration.

Darker color = Lower concentration
Lighter color = Higher concentration

Specificity

The Abraxis 2,4-D Tube Kit is specific for 2,4-D and closely related compounds. The following table shows the concentration required for 50% Bo and the % cross-reactivity versus 2,4-D acid (used in calibrators). Concentrations are in parts per billion (ppb).

<u>Compound</u>	<u>50% Bo conc.</u>	<u>% Cross Reactivity</u>
2,4-D acid	8.0	100
2,4-D methyl ester	2.0	400
2,4-DB	8.0	100
2,4-D isopropyl ester	12	67
2,4-DB butyl ester	15	53

2,4,5-T	84	9.5
MCPA	86	9.3
Dichlorprop	300	2.7
2,4,5-TP	360	2.2

The following list shows the compounds tested and found non-reactive at concentrations of 1,000 ppb (<0.1% cross-reactivity):

Alachlor	Aldicarb	Atrazine
Azinphos	Bromophos	Terbutylazine
Carbofuran	Chlorpyrifos	Carbendazim
Metolachlor	Parathion	Simazine

Endothall Dicamba

Precautions

- Store all kit components at 4°C to 8°C (39°F to 46°F) when not in use.
- Do not freeze kit components or expose them to temperatures greater than 37°C (99°F).
- Allow all reagents and samples to reach ambient temperature before you begin the test.
- Do not use kit components after the expiration date.
- Do not mix reagents from kits with different lot numbers.
- Use approved methodologies to confirm any positive results.

Materials Provided in the Abraxis 2,4-D Tube Kit

2 bags each containing 20 test tubes coated with rabbit anti-2,4-D antibodies and desiccant

1 vial each of 2,4-D calibrators corresponding to 0, 2.0, 10 and 100 ppb.

1 vial of 2,4-D -HRP Enzyme Conjugate

1 vial of Substrate

1 vial of Stop Solution

You also need these items:

- Photometer for reading absorbance at 450nm in 12mm x 75mm tubes.
- Watch or timer
- Clean running water or a wash bottle containing tap or deionized water.
- Pipet with disposable tips capable of delivering 500 µL

Assay Procedure

1. Bring all kit reagents and samples to be run to room temperature.
2. Remove the required number of antibody coated tubes from the zip lock bag. Be sure to re-seal the bag with the desiccant to limit exposure of the tubes to moisture.
3. Pipet **500 µL of calibrators, control and samples** into the appropriate tubes. Be sure to use a clean pipet tip for each solution to avoid cross contamination.
4. Incubate for **10 minutes** at room temperature.
4. Add **500 µL of Enzyme Conjugate** to each tube.
5. Swirl the tubes rapidly to mix the contents.
6. Incubate for **10 minutes**.
7. After incubation vigorously shake the contents of the tubes into a sink. Flood the tubes completely with cool running tap water, then shake to empty. Repeat this wash step four times for a total of five washes. Invert the tubes on absorbent paper and tap out as much water as possible.
8. Add **500 µL of Substrate** to each tube.
9. Incubate for **10 minutes**.
10. Add **500 µL of Stop Solution** to each tube in the same order of addition as the Substrate.
11. Read the tubes in a photometer at 450nm. If the photometer has dual wavelength capability, read at 450nm minus 605 or 650nm.
12. If the photometer has data reduction capabilities, use either a semi-log linear or 4 parameter curve fit. If manual data reduction is required, proceed with next section.

Calculate Results

1. After you read all of the tubes, average the OD of each set of calibrators, controls and samples, and calculate the %Bo as follows:
$$\%B^{\circ} = (\text{average OD of calibrator, control or sample} \times 100) \div \text{average OD of negative control}$$
2. Graph the %Bo of each calibrator on the Y (linear) axis against its diazinon concentration on the X (log) axis using semi-log graph paper. Draw the best fit line through the calibrator points.
3. Determine the 2,4-D concentration of each sample by finding its %Bo value and the corresponding concentration level on the graph.

Calculation of sample concentration is only valid if the %Bo of the sample falls within the range of the %Bo's set by the calibrators. If the sample falls outside of that range, the results must be reported as less than the lowest calibrator value or greater than the highest calibrator value.

Sample Calculations

Tube Contents	OD	Average OD ± SD**	%RSD	%Bo
Negative Control	1.504 1.525	1.515 ± 0.015	0.98	100.0
2.0 ppb Calibrator	1.356 1.378	1.367 ± 0.016	1.1	90.2
10 ppb Calibrator	0.887 0.892	0.890 ± 0.0035	0.40	58.7
100 ppb Calibrator	0.333 0.341	0.337 ± 0.0057	1.7	22.2

Quality Control

- The %Bo ranges for the calibrators should fall within the following ranges:

<u>2,4-D Calibrator (ppb)</u>	<u>%Bo Range</u>
2.0	83 - 94
10	48 - 63
100	16 - 28

Technical Assistance

For questions regarding this kit or for additional information about Abraxis products, call (215) 357-3911.

Safety

To receive complete safety information on this product, contact Abraxis, LLC. and request Material Safety Data Sheets.

India Contact:

Life Technologies (India) Pvt. Ltd.

306, Aggarwal City Mall, Road No. 44, Pitampura, Delhi – 110034, India

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Email: customerservice@lifetechindia.com, www.atzlabs.com ; www.lifetechindia.com

2,4-D DETAILED FLOWCHART

1.

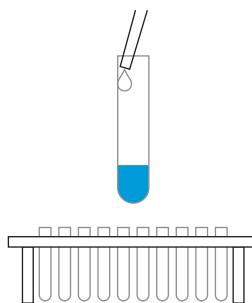


Label test tubes for Standards (Calibrators), Control, and Samples.

Tube #	Content
1, 2	Diluent/Zero Standard 0 ppb
3, 4	Standard 1, 2.0 ppb
5, 6	Standard 2, 10 ppb
7, 8	Standard 3, 100 ppb
9	Sample 1
10	Sample 2
11	Sample 3

Add 500 µL of either Standards, Control or Samples down the inside wall of each test tube by aiming the pipet tip 1/4" to 1/2" below the tube rim without touching the rim or tube wall with the pipet tip; deliver liquid gently.

5.



Add 500 µL of Color Reagent down the inside wall of each tube by using the technique described in Box 2.

2.



Add 200 µL of 2,4-D Enzyme Conjugate down the inside wall of each tube by using the technique described in Box 2. Vortex or swirl for 5 to 10 seconds

6.



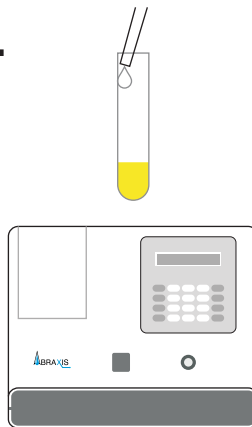
React for 20 minutes at room Temperature (15°- 30° C). During this period, add 1 mL of Washing Solution into a clean tube for use as an instrument blank in Step 8.

3.



React 20 minutes at room temperature (15 °- 30°C).

7.



Add 500 µL of Stopping Solution down the inside wall of each tube by using the technique previously Described. Read results at 450 nm within 15 minutes after adding the Stopping Solution. Multiply results of samples by the appropriate dilution factor (if any).

[Safety Caution: Stopping Solution contains diluted sulfuric acid.]

4.



Add 4 mL of Washing Solution to each tube (alternatively flood the tubes completely with wash solution then invert to empty tubes). Using a smooth motion, invert tubes over a sink and pour out the tube contents: keep inverted and blot the test tube rims on several layers of paper toweling. Repeat this step 4 times.

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2,4-D Tube Kit Part # 54004B, 40 Test

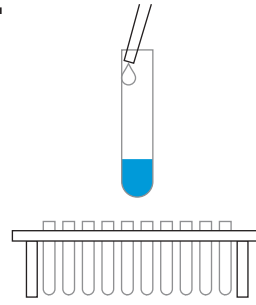
2,4-D CONCISE FLOWCHART

1.



Add 500 µL of either Standards (calibrators), Control or Samples to the bottom of each test tube.

5.



Add 500 µL of Color Reagent down the inside wall of each test tube.

2.



Add 200 µL of 2,4-D Enzyme Conjugate to each test tube.
Vortex or swirl.

6.



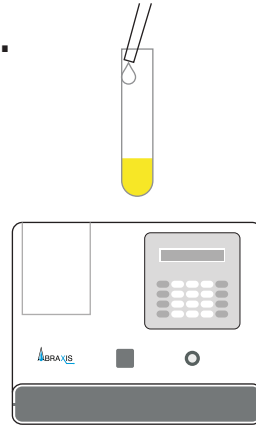
Incubate for 20 minutes.
Prepare blank.

3.



Incubate for 20 minutes.

7.



Add 500 µL of Stopping Solution to each test tube.
Read OD 450

4.



Add 4 mL of Washing Solution (alternatively flood the tubes).

Invert the tube and blot.
Repeat this step 4 times.

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2,4-D Tube Kit Part # 54004B, 40 Test

Safety Data Sheet

Section 1: Product and Company Identification

1.1 Product Identifiers:

Product Name: 2,4-D Coated Tube Kit

Product Code: 54004B

1.2 Identified Use: Determination of 2,4-D in samples. **Restrictions on Use:** For research use only.

1.3 Company: Abraxis, Inc., 124 Railroad Drive, Warminster, PA 18974 USA, info@abraxiskits.com +1(215) 357-3911, FAX +1(215) 357-5232

1.4 Emergency Telephone Number: +1(215) 357-3911

Section 2: Hazard(s) Identification

2.1 Classification of the mixture:

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226 Flammable liquid and vapor

Acute toxicity, Inhalation (Category 4), H332 Harmful if inhaled

Acute toxicity, Dermal (Category 4), H312 Harmful in contact with skin

Eye irritation (Category 2A), H319 Causes serious eye irritation

Reproductive toxicity (Category 1B), H360 May damage fertility or the unborn child

Corrosive to metals (Category 1), H290 May be corrosive to metals

Skin corrosion (Category 1B), H314 Causes severe skin burns and eye damage

Serious eye damage (Category 1), H318 Causes serious eye damage

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335 May cause respiratory irritation

HMIS Rating: N,N-Dimethylformamide, CAS No. 68-12-2: Health hazard: 2, Chronic Health Hazard: *, Flammability: 2, Physical Hazard 0;

Hydrochloric acid, CAS No. 7647-01-0: Health hazard: 3, Chronic Health Hazard: , Flammability: 0, Physical Hazard 0

NFPA Rating: N,N-Dimethylformamide, CAS No. 68-12-2: Health hazard: 2, Fire Hazard: 2, Reactivity Hazard: 0; Hydrochloric acid, CAS No. 7647-

01-0: Health hazard: 3, Fire Hazard: 0, Reactivity Hazard: 0

2.2 GHS Label elements, including precautionary statements:

Pictogram(s)



Signal word(s): Danger

Hazard statement(s):

H226 Flammable liquid and vapor.

H290 May be corrosive to metals.

H312 + H332 Harmful in contact with skin or if inhaled

H314 + H318 Causes severe skin burns and eye damage.

H319 Causes serious eye irritation.

H335 May cause respiratory irritation.

H360 May damage fertility or the unborn child.

Precautionary statement(s):

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233 Keep container tightly closed.

P234 Keep only in original container.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ventilating/lighting/equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

P261 Avoid breathing dust/fume/gas/mist/vapors/spray.

P264 Wash skin thoroughly after handling.

P271 Use only outdoors or in a well-ventilated area.

P280 Wear protective gloves/eye protection/ face protection.

P281 Use personal protective equipment as required.

P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304 + P340 + P312 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313 IF exposed or concerned: Get medical advice/attention.

P310 Immediately call a POISON CENTER or doctor/physician.

P337 + P313 If eye irritation persists: Get medical advice/attention.

P363 Wash contaminated clothing before reuse.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

P390 Absorb spillage to prevent material damage.

P403 + P235 Store in a well-ventilated place. Keep cool.

P405 Store locked up.

P406 Store in corrosive resistant stainless steel container with a resistant inner liner.

P501 Dispose of contents/container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS: Readily absorbed through skin (DMSO)

2.4 Unknown acute toxicity: None known.

Section 3: Composition / Information on Ingredients

3.2 Mixtures: Mixture(s) of the hazardous substance(s) listed below, with nonhazardous additions.

Hazardous component(s):

Name and Synonym(s): N,N-Dimethylformamide, DMF Formula: C₃H₇NO Molecular weight: 73.09 g/mol

CAS No.: 68-12-2 EC-No.: 200-679-5

Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)

Classification: Flammable Liquid 3; Acute Toxicity 4; Eye Irritation 2A; Reproductive Toxicity 1B; H226, H312 + H332, H319, H360

Percentage in Mixture: 1.56 %

Name and Synonym(s): Hydrochloric acid, HCl Formula: HCl Molecular weight: 36.46 g/mol

CAS No.: 7647-01-0 EC-No.: 231-595-7

Classification: Met. Corrosion 1; Skin Corrosion 1B; Eye Damage 1; STOT SE 3; H290, H314, H335

Percentage in Mixture: 0.62-1.25 %

For full text of H-Statements mentioned in this Section, see Section 2.

Section 4: First Aid Measures

4.1 Description of first aid measures: Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed: The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed: No data available. Treat symptomatically.

Section 5: Fire-fighting Measures

5.1 Suitable extinguishing media: Water spray, alcohol-resistant foam, dry chemical or carbon dioxide

5.2 Special hazards arising from the substance or mixture: Carbon oxides, Nitrogen oxides; Hydrogen chloride gas

5.3 Advice for firefighters: Wear self-contained breathing apparatus for fire-fighting if necessary.

5.4 Further information: Use water spray to cool unopened containers.

Section 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures: Use personal protective equipment, including respiratory protection (see section 8). Avoid breathing vapors, mist, dust, or gas. Ensure adequate ventilation. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Remove all sources of ignition. Evacuate personnel to safe areas.

6.2 Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up: Contain spillage. Absorb with non-combustible liquid-binding material. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections: For information on safe handling see section 7. For information on personal protection see section 8. For information on disposal see section 13.

Section 7: Handling and Storage

7.1 Precautions for safe handling: See section 2. Avoid inhalation of vapors or mist, and avoid contact with skin and eyes. Wear appropriate personal protective equipment. Use explosion-proof equipment. Keep away from sources of ignition. Do not eat, drink, or smoke in work area. Take measures to prevent the buildup of electrostatic charge.

7.2 Precautions for safe storage: Keep container(s) tightly closed in a dry, well-ventilated place. Protect from physical damage. Opened containers must be carefully resealed and kept upright to prevent leakage. See label or product insert for appropriate storage temperature and additional specific information. Storage class (TRGS 510): Flammable liquids.

7.3 Specific end use(s): Other than use(s) specified in section 1, no other uses are stipulated.

Section 8: Exposure Controls / Personal Protection

8.1 Control parameters:

Component(s) with workplace control parameters

N,N-Dimethylformamide, CAS No. 68-12-2

Value	Control parameters	Basis
TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
Liver damage Substances for which there is a Biological Exposure Index or Indices (see BEI section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
TWA	10 ppm; 30 mg/m ³	USA. Occupational Exposure Limits; (OSHA) - Table Z-1 Limits for Air Contaminants
Skin designation The value in mg/m ³ is approximate.		
TWA	10 ppm; 30 mg/m ³	USA. NIOSH Recommended Exposure Limits
Potential for dermal absorption		

Hydrochloric acid, CAS No. 7647-01-0

Value	Control parameters	Basis
C	2 ppm	USA. ACGIH Threshold Limit Values (TLV)
Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
C	5 ppm; 7 mg/m ³	USA. NIOSH Recommended Exposure Limits
Often used in an aqueous solution		
C	5 ppm; 7 mg/m ³	USA. Occupational Exposure Limits; (OSHA) - Table Z-1 Limits for Air Contaminants
The value in mg/m ³ is approximate. Ceiling limit is to be determined from breathing-zone air samples.		

Biological occupational exposure limits

N,N-Dimethylformamide, CAS No. 68-12-2

Parameters	Value	Biological specimen	Basis
N-Methylformamide	15.0000 mg/l	Urine	ACGIH – Biological Exposure Indices (BEI)
End of shift (As soon as possible after exposure ceases)			
N-Acetyl-S-(N-methylcarbamoyl) cysteine	40.0000 mg/l	Urine	ACGIH – Biological Exposure Indices (BEI)
Prior to last shift of workweek			

Derived No Effect Level (DNEL)

N,N-Dimethylformamide, CAS No. 68-12-2

Application area	Exposure routes	Health effect	Value
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Workers	Skin contact	Acute systemic effects	26.3mg/kg BW/d
Workers	Skin contact	Long-term systemic effects	3.31mg/kg BW/d
Workers	Inhalation	Acute systemic effects, Acute local effects	30 mg/m ³
Workers	Inhalation	Long-term systemic effects, Long-term local effects	15 mg/m ³

Predicted No Effect Concentration (PNEC)

N,N-Dimethylformamide, CAS No. 68-12-2

Compartment	Value
Water	30 mg/l
Soil	16.235 mg/kg
Marine water	3 mg/kg
Fresh water	30 mg/l
Fresh water sediment	25.05 mg/kg
Onsite sewage treatment plant	123 mg/l

8.2 Exposure controls:

Appropriate engineering controls: Provide adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Keep away from food and beverages.

Personal protective equipment

Eye protection: Use equipment for eye protection with side shields (8 inch minimum) tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

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

Respiratory protection: Do not breathe vapors. Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Body protection: For N,N-Dimethylformamide and Hydrochloric acid, 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.

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties of mixture

Appearance: Multiple	Odor: Characteristic	Odor Threshold: No data available	pH: Multiple
Melting point/freezing point: No data available	Initial boiling point and boiling range: No data available		
Flash point: No data available	Evaporation rate: No data available	Flammability (solid, gas): No data available	
Upper/lower flammability or explosive limits: No data available	Vapor pressure: No data available		
Vapor density: No data available	Relative density: No data available	Water solubility: Various	
Partition coefficient: n-octanol/water: No data available	Auto-ignition temperature: Not applicable		
Decomposition temperature: No data available	Viscosity: No data available		
Explosive properties: No data available	Oxidizing properties: No data available		

9.2 Other information: No data available

Section 10: Stability and Reactivity

10.1 Reactivity: No data available

10.2 Chemical stability: Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions: No data available

10.4 Conditions to avoid: Keep away from open flame, hot surfaces, heat sources, and sources of ignition.

10.5 Incompatible materials: Strong oxidizing agents, alkali metals, metals, bases, amines, permanganates, fluorine, metal acetylides, hexalithium disilicide

10.6 Hazardous decomposition products: No data available. In the event of fire: see section 5.

Section 11: Toxicological Information

11.1 Information on toxicological effects

To the best of our knowledge, the chemical, physical, and toxicological properties of this product have not been thoroughly investigated.

Acute toxicity (N,N-Dimethylformamide, CAS No. 68-12-2):

Inhalation LC50 Inhalation - Rat - 4 h - 9 - 15 mg/l **Ingestion** LD50 Oral - Rat - 2,800 mg/kg

Skin contact LD50 Dermal - Rabbit - 1,500 mg/kg; Human—mild skin irritation 24h

Eye contact Rabbit eye—moderate irritation
Aspiration hazard No data available
Acute toxicity (*Hydrochloric acid*, CAS No. 7647-01-0):
Inhalation No data available
Skin contact Rabbit—causes burns
Respiratory or skin sensitization No data available
Mutagenicity (*N,N-Dimethylformamide*, CAS No. 68-12-2): Mouse lymphocyte: mutation in somatic cells; (*Hydrochloric acid*, CAS No. 7647-01-0): No data available
Carcinogenicity:
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Teratogenicity: No data available
Reproductive/fertility toxicity: (*N,N-Dimethylformamide*, CAS No. 68-12-2): May cause congenital malformation of the fetus; (*Hydrochloric acid*, CAS No. 7647-01-0): No data available
Specific target organ toxicity, single exposure: No data available
Specific target organ toxicity, repeated exposure: No data available
Additional information (*N,N-Dimethylformamide*, CAS No. 68-12-2): RTECS: LQ2100000 Warning: intolerance for alcohol can occur up to 4 days after dimethylformamide exposure. N,N-dimethylformamide is considered to be a potent liver toxin. Vomiting, diarrhea, abdominal pain (*Hydrochloric acid*, CAS No. 7647-01-0): RTECS: MW4025000 Burning sensation, cough, wheezing, laryngitis, shortness of breath, spasm, inflammation and edema of the larynx and bronchi, pneumonitis, pulmonary edema. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Section 12: Ecological Information

12.1 Toxicity: *N,N-Dimethylformamide*, CAS No. 68-12-2: Toxicity to fish LC50 - *Oncorhynchus mykiss* (rainbow trout) - 9,000 - 13,000 mg/l - 96h; LC50 - *Lepomis macrochirus* (bluegill) - 6,700 - 7,500 mg/l - 96h; LC50 - *Pimephales promelas* (fathead minnow) - 10,400 - 10,800 mg/l - 96h; Toxicity to daphnia and other aquatic invertebrates EC50 - *Daphnia magna* (water flea) - 9,600 - 15,700 mg/l - 48h; Toxicity to algae LC50 - *Desmodesmus subspicatus* (green algae) - > 500 mg/l - 96h. *Hydrochloric acid*, CAS No. 7647-01-0: Toxicity to fish LC50 - *Gambusia affinis* (mosquito fish) - 282 mg/l - 96h
12.2 Persistence and degradability: N,N-Dimethylformamide is readily biodegradable (>90%). Hydrochloric acid, no data available
12.3 Bioaccumulative potential: No data available
12.4 Mobility in soil: No data available
12.5 Results of PBT and vPvB assessment: No data available
12.6 Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13: Disposal Considerations

13.1 Waste treatment methods

Product: All waste must be handled and disposed according to local, state, and federal regulations. Avoid disposing large volumes in sewer.
Contaminated packaging: All waste must be handled and disposed according to local, state, and federal regulations. Refer to sections 7 and 8 for safe handling guidance.

Section 14: Transport Information

DOT, Land Transport ADR/RID (cross-border), Maritime Transport IMDG, Air Transport ICAO-TI and IATA-DGR
UN Number: 3316
UN Proper shipping name: Chemical Kit, (contains N,N-Dimethylformamide and Hydrochloric acid)
Transport hazard class(es): 9
Packing group: III
Environmental hazard: See section 12
Bulk transport: Reportable quantities--N,N-Dimethylformamide (100 lbs); Hydrochloric acid (13514 lbs)
Special considerations: See section 7 for handling

Section 15: Regulatory Information

EU Regulations, Hazard Symbol(s): N,N-Dimethylformamide: T (Toxic); Hydrochloric acid: C (Corrosive)

Safety and Risk Phrases:

N,N-Dimethylformamide: R 61 / 20/21 / 36 May cause harm to the unborn child. Harmful by inhalation and in contact with skin. Irritating to eyes. S 53 / 45 Avoid exposure--obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

Hydrochloric acid: R 20 / 34 Harmful by inhalation. Causes burns. S 26 / 45 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

SARA Title III, Section 302 Components: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA Title III, Section 313 Components: N,N-Dimethylformamide, CAS No. 68-12-2, Hydrochloric acid, CAS No. 7647-01-0

SARA 311/312 Hazards: N,N-Dimethylformamide, CAS No. 68-12-2: Fire Hazard, Acute Health Hazard, Chronic Health Hazard. Hydrochloric acid, CAS No. 7647-01-0: Acute Health Hazard

State Right-to-Know

Massachusetts: N,N-Dimethylformamide, CAS No. 68-12-2, Hydrochloric acid, CAS No. 7647-01-0

Pennsylvania: N,N-Dimethylformamide, CAS No. 68-12-2, Hydrochloric acid, CAS No. 7647-01-0

New Jersey: N,N-Dimethylformamide, CAS No. 68-12-2, Hydrochloric acid, CAS No. 7647-01-0

Section 16: Other information

This information is based on our present knowledge. While Abraxis , Inc. believes that the data contained herein are factual and the opinions expressed represent a best effort to present accurate information, the data are not to be taken as a warranty or representation for which Abraxis , Inc. assumes legal responsibility. The information shall not be taken as being all-inclusive and is to be used only as a guide. The data are offered solely for the user's consideration, investigation, and verification. These suggestions should not be confused with either state, municipal, or insurance requirements, or with national safety codes and constitute no warranty. Any use of these data and information must be determined by the user to be in accordance with applicable federal, state, and local regulations.

All materials and mixtures may present unknown hazards and should be used with caution. Since Abraxis , Inc. cannot control the methods, volumes, or conditions of use of this product, Abraxis , Inc. shall not be held liable for any damages or losses resulting from the handling or from contact with the product as described herein. An individual technically qualified to handle potentially hazardous chemicals must supervise the use of this material. This product is sold for research use only. It is not for any human or animal therapeutic or clinical diagnostic use.

Date this SDS was prepared: 5/20/2016

Version: 2

Changes from previous version: Abraxis, LLC changed to Abraxis, Inc.