Are Flavored E-Cigarettes Harmful?

Teacher Information

science take·out
just add students™

Summary

People who vape flavored e-cigarettes are exposed to chemical flavorings. These flavorings may be safe to eat, but are they safe to inhale?

- Explore the importance of flavors in promoting e-cigarette use.
- Conduct simulated tests to determine the effect of flavoring chemicals on lung cells.
- Consider issues regarding regulation of e-cigarette use and advertising.

Core Concepts

- Although some flavoring chemicals are safe to eat, scientific research suggests flavoring chemicals may not be safe to inhale.
- E-cigarette use (vaping) may cause short and long-term damage to the respiratory system.
- To protect people's health, e-cigarette research and regulation is needed.

Time Required

- Part 1 — 15 minutes
- Part 2 — 20 minutes
- Part 3 — 40 minutes

Kit Contains

- **Teens and E-Cigarettes**
- **Instructions for Cell Health Test**
- Cell Health Test Sheet
- Cell Health Test Solution (simulated)
- 4 Lung tissue disks (simulated)
- Control and 3 flavoring chemicals (simulated)
- Labeled droppers for Cell Health Test Solution, 3 flavoring chemicals, and Control
- Set of 4 cards (**Labels**, **Scientific Testing**, **Warnings and Ingredients**, **Marketing**)

Teacher Provides

- Paper towels for clean-up
- Poster paper and markers

Warnings

- **Choking Hazard –** This Science Take-Out kit contains small parts. Do not allow children under the age of seven to have access to any kit components.
- **The chemical solutions in the kit should <u>not</u> be sniffed or tasted!** Avoid contact with skin or eyes. Read the Safety Data Sheets for specific information.

Teacher Suggestions

General Suggestions:

- It is recommended that this kit be used as a "conversation starter" to introduce students to the risks of e-cigarette use. The kit is designed to encourage discussions and questions related to exposure to potentially harmful chemicals from use of e-cigarettes (vaping). Encourage students to discuss their opinions, questions, and concerns.
- Teens are particularly attracted to the wide range of e-cigarette flavors (including candy, mint, fruit, etc.). Although some of the chemicals that create these flavors are safe to eat, they may not be safe to inhale. In fact, research suggests that many of these flavoring chemicals can cause damage lung cells.
- This kit is based on the following research publication. Selected data from this paper has been simplified to be appropriate for average middle/high school students.

  Inflammatory and Oxidative Responses Induced by Exposure to Commonly Used E-Cigarette Flavoring Chemicals and Flavored E-liquids Without Nicotine
  https://www.frontiersin.org/articles/10.3389/fphys.2017.01130/full
- Be aware that your students, their friends, and their family members may use e-cigarettes.
- If you would like to know more about e-cigarettes and vaping before you use this kit with your students, see the **Teacher Background Information** below.

Part 1 Suggestions:

- Ideally, students should work in pairs in order to encourage discussions. Each kit includes one copy of the **Are Flavored E-Cigarettes Harmful** student instructions. Make additional copies, as needed, so that each student has a copy of the student instructions.
- Distribute one copy of the **Teens and E-Cigarettes** sheet per pair. Part 1 is typically completed in 15 minutes. Consider asking students to share their answers to questions 3 and 4.
- The graph at the bottom of the **Teens and E-Cigarettes** sheet goes up to 2018. If you would like current information, use the online search term "National Youth Tobacco Survey", along with the current year.

Part 2 Suggestions:

- Students will need the **Cell Health Test Kit**. Part 2 is typically completed in 20 minutes.
- Encourage partners to share the testing specific liquids. For example, one student could test the control and cinnamaldehyde and the other student could test the pentanedione and vanillin. Consider having students share their answers to questions 5 and 6.

Part 3 Suggestions:

- Distribute one set of 4 "Do you think…" cards (**Labels**, **Scientific Testing**, **Warnings and Ingredients**, and **Marketing**) to each pair of students. Part 3 is typically completed in 40 minutes. Consider doing this as a Think-Pair-Share activity. Students could answer the questions on the "Do you think…" cards individually, and then share their answer with their partner. This would prepare them to share in the poster activity described below.
- To encourage sharing of different perspectives, consider using a poster discussion strategy. Make four posters—each poster should have one of the "Do you think…" questions with related information attached to it. Place posters in four corners of the room. Divide the class randomly into four groups and assign each group to develop an answer or multiple answers that they write on the poster. Encourage multiple perspectives. Then allow about 5 minutes for each group to report to the class. Or, you may encourage students to show what they learned through songs, memes, jingles, social media, etc.
- Consider showing a video as a wrap-up to the kit activities. One possibility is a video from **Protect Kids: Fight Flavored E-Cigs** – https://fightflavoredecigs.org/stories-from-the-frontlines/ Preview the video to be certain it is appropriate for your students.

Teacher Background Information

The claim that "e-cigarettes are safer than cigarettes and can help smokers to quit" ignores some important facts*:

- Most e-cigarettes contain nicotine. E-cigarette users may become addicted to nicotine.
- E-cigarette liquids contain a variety of potentially harmful substances such as flavorings and other chemicals.
- E-cigarette vapor may include metals such as nickel, tin and lead from the device itself. Inhaling these metals is hazardous.
- It is easy to manufacture "homemade" vaping fluids, so users may not know what chemicals they are vaping. Some homemade vaping fluids contain THC from marijuana.
- Not much is known about the safety of inhaling combinations of different chemical mixtures, and new devices and vaping fluids are being marketed all the time. Regulators are working on policies to make sure e-cigarettes are safe, but the rapid changes in the e-cigarette market have outpaced regulation.

*Source: https://www.cdc.gov/vitalsigns/youth-tobacco-use/index.html

The resources below can be used to help develop additional lessons and programs for teens, colleagues, and parents:

- **Centers for Disease Control and Prevention: Electronic Cigarettes**
  https://www.cdc.gov/tobacco/basic_information/e-cigarettes/index.htm

- **American Academy of Pediatricians: E-Cigarettes**
  https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Richmond-Center/Pages/Electronic-Nicotine-Delivery-Systems.aspx

- **Know the Risks: E-Cigarettes and Young People**
  https://e-cigarettes.surgeongeneral.gov/

- **U.S. Food and Drug Administration: Vaporizers, E-Cigarettes, and other Electronic Nicotine Delivery Systems (ENDS)**
  https://www.fda.gov/tobacco-products/products-ingredients-components/vaporizers-e-cigarettes-and-other-electronic-nicotine-delivery-systems-ends

- **U.S. Food and Drug Administration: Youth Tobacco Prevention Plan**
  https://www.fda.gov/tobacco-products/youth-and-tobacco/fdas-youth-tobacco-prevention-plan

- **Chemicals in Vaping Flavors Cause Widespread Damage in Lung Tissue**
  https://bit.ly/37Bk8Br

- **FDA finalizes enforcement policy on unauthorized flavored cartridge-based e-cigarettes that appeal to children, including fruit and mint**
  https://www.fda.gov/news-events/press-announcements/fda-finalizes-enforcement-policy-unauthorized-flavored-cartridge-based-e-cigarettes-appeal-children

- **Federal flavor ban goes into effect Thursday, but many flavored vape products will still be available**
  https://www.nbcnews.com/health/vaping/federal-flavor-ban-goes-effect-thursday-many-flavored-vape-products-n1130466

Reusing the Kit

Teachers will need to instruct students on how to handle clean-up and return of the re-usable kit materials. For example, teachers might provide the following information for students:

Discard	Return to kit bag
• **Cell Health Test Sheet** • Used lung tissue disks	• **Teens and E-Cigarettes** • Set of 4 cards – **Labels, Scientific Testing, Warnings and Ingredients,** and **Marketing** • **Instructions for Cell Health Test** • All tubes and droppers

Hints:

- To avoid spills or loss of kit materials, you should have students clean up after Part 2.
- It is not necessary to wash the tubes and droppers. Washing may cause the labels to be difficult to read or to fall off. Simply refill the tubes as needed.
- Consider laminating the printed parts of the kits that will be reused. Sheet protectors can be used instead of lamination.

Refills for **Are Flavored E-Cigarettes Harmful** kits are available at www.sciencetakeout.com. Allow at least 20 minutes to refill 10 kits. The **10 Kit Refill Pack** includes the following materials:

- 10 Cell Health Test Sheets
- 40 Lung tissue disks (simulated)
- 20 mL of Cell Health Test Solution (simulated)
- 10 mL each of Control, Pentanedione, Cinnamaldehyde, and Vanillin (simulated)

Next Generation Science Standards (NGSS) Correlation

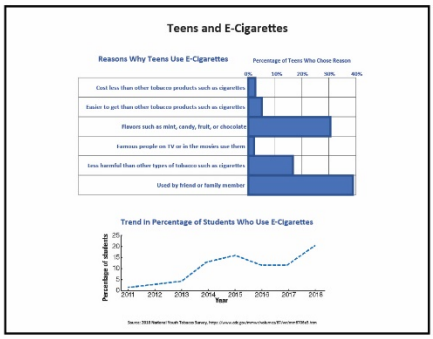
Working Towards Performance Expectations

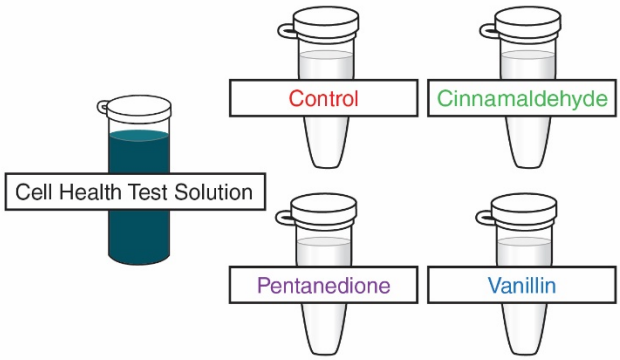
MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

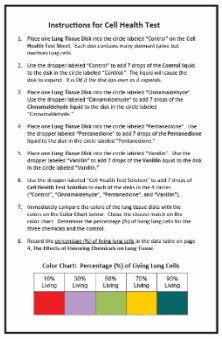
HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

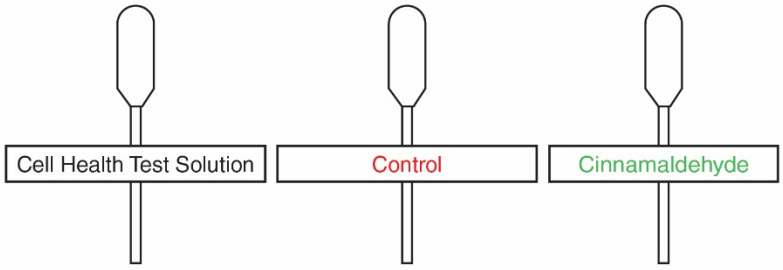
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Analyze and interpret data to provide evidence for phenomena. Apply scientific ideas, principles, and/or evidence to construct, revise and/or use an explanation for real world phenomena, examples, or events. Apply scientific reasoning to show why the data or evidence is adequate for the explanation or conclusion Apply scientific reasoning, theory, and/or models to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion.	LS1.A: Structure and Function • In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3) • Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2)	Systems and System Models • Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. Cause and Effect • Use cause and effect relationships to predict phenomena in natural or designed systems.

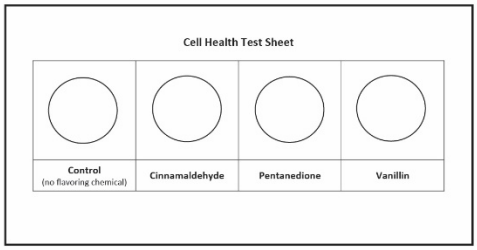
Kit Contents Quick Guide

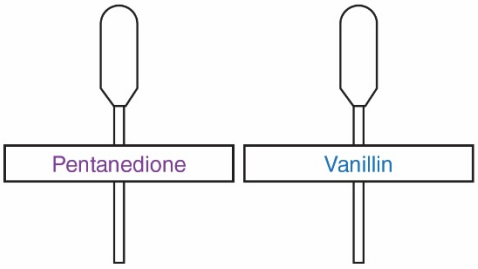


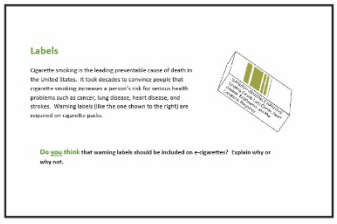


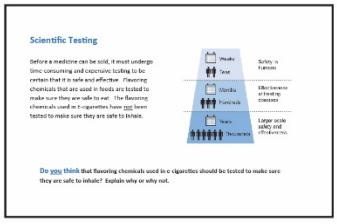


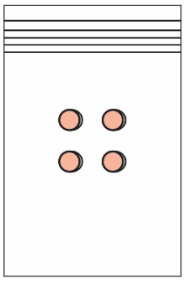




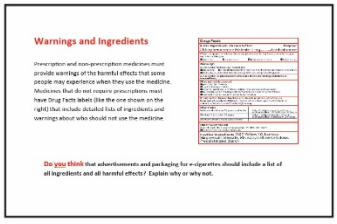








Lung Tissue Disks



Read these instructions before using Science Take-Out kits

Parental or Adult Supervision Required

This kit should be used only under the supervision of an adult who is committed to ensuring that the safety precautions below, and in the specific laboratory activity, are followed.

Chemicals Used in Science Take-Out Kits

Every effort has been made to reduce the use of hazardous chemicals in Science Take-Out kits. Most kits contain common household chemicals or chemicals that pose little or no risk. Safety Data Sheets (SDS) provide specific safety information regarding the chemical contents of the kits. SDS information for each kit is provided in the accompanying teacher instructions. We encourage students to adopt safe laboratory practices when using chemicals.

Warning: Choking and Chemical Hazard

Science Take-Out kits contain small parts that could pose a choking hazard and chemicals that could be hazardous if ingested. Do not allow children under the age of seven to have access to any kit components.

No blood or body fluids from humans or animals are used in Science Take-Out kits. Chemical mixtures are substituted as simulations of these substances.

General Safety Precautions

1. Never taste, smell, or ingest any chemicals provided in the kit - they may be hazardous.
2. Chemicals used in Science Take-Out experiments may stain or damage skin, clothing or work surfaces. If spills occur, wash the area immediately and thoroughly.
3. Report any chemical spills or contact with chemicals to your teacher.
4. Work in a clean, uncluttered area. Cover the work area to protect the work surface.
5. Read and follow all instructions carefully.
6. Pay particular attention to following the specific safety precautions provided by your teacher or included in the kit activity instructions.
7. Do not use the contents of this kit for any other purpose beyond those described in the kit instructions.
8. Do not leave experiment parts or kits where they could be used inappropriately by others.
9. Do not eat, drink, or apply make-up or contact lenses while performing experiments.
10. Wash your hands before and after performing experiments.

Are Flavored E-Cigarettes Harmful?

Teacher Answer Key

Part 1: Why Do Teens Use E-Cigarettes?

E-cigarettes used for "vaping" are small devices that use electricity from batteries to heat up a liquid mixture to make an aerosol (a mixture of gases and tiny particles) that is inhaled by the user. E-cigarettes come in many shapes and sizes.

1. The pictures above show a few different kinds of e-cigarettes. Circle the pictures that are similar to e-cigarettes you have seen.

2. Hundreds of teens who used e-cigarettes were asked this question: "Which of these are reasons why you use e-cigarettes?" Put an X in front of the <u>three</u> reasons below that you think were the most common answers.

   a) _____ E-cigarettes cost less than other tobacco products such as cigarettes.

   b) _____ E-cigarettes are easier to get than other tobacco products such as cigarettes.

   c) _____ E-cigarettes come in flavors such as mint, candy, fruit, or chocolate.

   d) _____ Famous people on TV or in the movies use e-cigarettes.

   e) _____ E-cigarettes are less harmful than other forms of tobacco such as **<u>cigarettes</u>**.

   f) _____ E-cigarettes are used by a friend or a family member.

3. Check your answers by using the bar graph on the **Teens and E-Cigarettes** sheet in your kit. Did you select the three most common reasons why teens use e-cigarettes?

4. Make a list of other reasons why teens might use e-cigarettes.

5. Describe the trend in student use of e-cigarettes shown in the line graph on the **Teens and E-Cigarettes** sheet. Is the percentage of students who use e-cigarettes increasing, decreasing, or remaining the same?

Part 2: Are Flavoring Chemicals in E-Cigarette Liquids Harmful?

The flavor of an e-cigarette is made by mixing different types of flavoring chemicals.

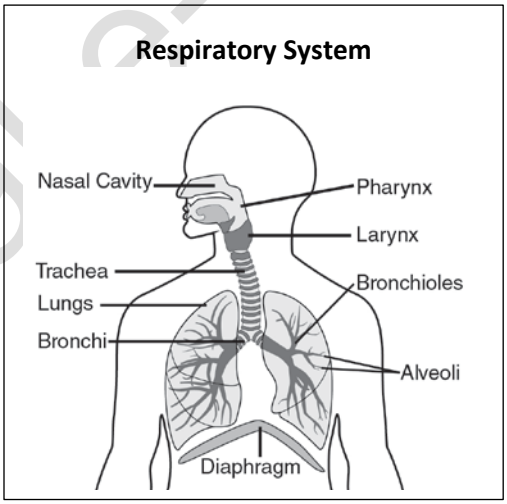
For example, the strawberry flavor of an e-cigarette liquid (e-liquid) is not made from strawberries. It is produced by flavoring chemicals that give it a strawberry flavor. Flavors like mango, mint, tobacco, fruit, and cream are complex mixtures of several flavoring chemicals.

The US Food and Drug Administration (FDA), a government agency, tests flavoring chemicals to be sure they are safe to eat. Even if flavoring chemicals are safe to eat, they might be harmful to the respiratory system if they are inhaled (breathed in).

Are flavoring chemicals safe to inhale? Most flavoring chemicals used in e-cigarettes have **not** been tested to see if they damage the respiratory system (airways and lungs).

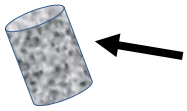
Flavor: The taste of an e-cigarette such as mint, candy, fruit, or chocolate.

Flavoring Chemicals: Chemicals that are added to the e-liquid to give an e-cigarette a particular flavor. Most e-liquid flavors are created using a mixture of several different flavoring chemicals.



1. Based on the information above, give two reasons why people might be concerned about the use of flavoring chemicals in e-cigarettes.

You will do lab tests called cell health tests to determine if flavoring chemicals are harmful to cells in the lungs. You will use samples of lung tissue which are made of many lung cells. You will determine the percentage of lung cells in the lung tissue that are alive after they are treated with the flavoring chemicals.



Sample of lung tissue made of many lung cells

You will test these three flavoring chemicals that are used in e-cigarette liquids:

- **Cinnamaldehyde** *(sin-a-**mal**-duh-hide)* – a chemical that tastes like cinnamon
- **Pentanedione** *(pen-tan-**die**-own)* – a chemical that tastes like butter or caramel
- **Vanillin** *(va-**ni**-lin)* – a chemical that tastes like vanilla

You will also test a control, which is a chemical used to dissolve flavorings in e-cigarette liquids. The control does not contain flavoring chemicals.

2. Use the instructions and materials in the **Cell Health Test Kit** bag. Follow the **Instructions for Cell Health Test** to determine how the control and flavoring chemicals affect the cells in the lung tissue.

3. For the control and each flavoring chemical, record the percentage (%) of lung cells that are alive after the treatments in the "% Living Lung Cells" column on the data table below.

4. Calculate the percentage (%) of lung cells that are dead after the treatment. Record this in the "% Dead Lung Cells" column on the data table below. *Hint: 100% – % Living = % Dead*.

Data Table: The Effects of Flavoring Chemicals on Lung Tissue

Flavoring Chemical	% Living Lung Cells	% Dead Lung Cells
Control (no flavoring chemical)		
Cinnamaldehyde		
Pentanedione		
Vanillin		

5. Which two flavoring chemicals kill the most lung cells? Support your answer with evidence from the data table above.

6. Which flavoring chemical kills the fewest lung cells? Do you think vaping this chemical is safe? Explain why or why not.

7. The control was simply a liquid used dissolve the flavorings to make an e-liquid. It did not contain any flavoring chemicals. What did you learn by testing the control?

8. How can the evidence from the cell health tests be used to support the claim that e-cigarette flavorings cause damage to the respiratory system?

9. Companies that make e-cigarette liquids are <u>not</u> required to list the flavoring chemicals that they use to create the flavors in their products. Why is this dangerous for e-cigarette users, even if they read the label on the e-cigarette liquid they are using?

Part 3: What Do You Think?

Vaping e-cigarettes may be harmful to people's health. It is important to think about what actions or regulations may be needed to protect your health and the health of others.

Your lab kit contains four cards (**Labels**, **Scientific Testing**, **Warnings and Ingredients**, and **Marketing**) with information about the topic and a question.

1. Read the information and the question on each of the cards.

2. Write your answers to the "Do you think…" in the spaces below.

Labels
Scientific Testing
Warning and Ingredients
Marketing

Section 1 Chemical Product and Company Information

Science Take-Out
80 Office Park Way
Pittsford, NY 14534
(585)764-5400

CHEMTREC 24 Hour Emergency
Phone Number (800) 424-9300
For laboratory use only. Not for drug, food or household use

.

Product	Buffer Solution pH10
Synonyms	"Control" (simulated)

Section 2 Hazards Identification

This substance or mixture has not been classified at this time according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Signal word: WARNING
Pictograms: None required
Target organs: None known

GHS Classification:
Skin irritation (Category 3)
Eye irritation (Category 2B)

GHS Label information: **Hazard statement(s):**
H316: Causes mild skin irritation.
H320: Causes eye irritation.

Precautionary statement(s):

P264: Wash hands thoroughly after handling.

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

P332+P313: If skin irritation occurs: Get medical attention.

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

Ca Prop 65 - This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

Section 3 Composition / Information on Ingredients

Chemical Name	CAS #	%	EINECS
Water	7732-18-5	99.77%	231-791-2
Potassium chloride	7447-40-7	0.10%	231-211-8
Boric acid	10043-35-3	0.08%	233-139-2
Sodium hydroxide	1310-73-2	0.05%	215-185-5

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN ABSORPTION: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

Suitable Extinguishing Media: Use any media suitable for extinguishing supporting fire.

Protective Actions for Fire-fighters: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.

Specific Hazards: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Section 6 Accidental Release Measures

Personal Precautions: Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

Environmental Precautions: Avoid runoff into storm sewers and ditches which lead to waterways.

Containment and Cleanup: Absorb with inert dry material, sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 7 Handling and Storage

Precautions for Safe Handling: Read label on container before using. Do not wear contact lenses when working with chemicals. Keep out of reach of children. Avoid contact with eyes, skin and clothing. Do not inhale vapors, spray or mist. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse.

Conditions for Safe Storage: Store in a cool, well-ventilated area away from incompatible substances.

Section 8 Exposure controls / Personal Protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
Potassium chloride	None established	None established	None established

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None should be needed in normal laboratory handling at room temperatures. If misty conditions prevail, work in fume hood or wear a NIOSH/MSHA approved respirator.

Section 9 Physical and Chemical Properties

Appearance: Clear, colorless liquid.
Odor: No odor.
Odor threshold: Data not available.
pH: 10.0
Melting/Freezing point: Approx. 0°C (32°F) (water)
Boiling point: Approx. 100°C (212°F) (water)
Flash point: Data not available

Evaporation rate (Water = 1): <1
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Data not available
Vapor pressure (mm Hg): 14 (water)
Vapor density (Air = 1): 0.7 (water)
Relative density (Specific gravity): Approx. 1.0 (water)
Solubility(ies): Complete in water.

Partition coefficient: Data not available
Auto-ignition temp.: Data not available
Decomposition temp.: Data not available
Viscosity: Data not available.
Molecular formula: Mixture
Molecular weight: Mixture

Section 10 Stability and Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.

Conditions to avoid: Excessive temperatures which cause evaporation.
Incompatibilities with other materials: Acids, alkalies, and air will change the buffer's ability.
Hazardous decomposition products: Boron oxide and chlorine gas.

Section 11 Toxicological Information

Acute toxicity: Data not available
Skin corrosion/irritation: Data not available
Serious eye damage/irritation: Data not available
Respiratory or skin sensitization: Data not available
Germ cell mutagenicity: Data not available
Carcinogenity: Data not available

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.
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.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: Data not available
STOT-single exposure: Data not available
Aspiration hazard: Data not available
STOT-repeated exposure: Data not available

Potential health effects:
Inhalation: May be harmful if inhaled.
Ingestion: May be harmful if swallowed.
Skin: May cause mild irritation.
Eyes: May cause mild irritation.

Signs and symptoms of exposure: To the best of our knowledge the chemical, physical and toxicological properties have not been thoroughly investigated. Specific data is not available. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: Data not available

Section 12 Ecological Information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: No data available
Toxicity to algae: No data available
Persistence and degradability: No data available
Bioaccumulative potential: No data available
Mobility in soil: No data available
PBT and vPvB assessment: No data available
Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: Not applicable
Shipping name: Not Regulated
Hazard class: Not applicable
Packing group: Not applicable
Reportable Quantity: No
Marine pollutant: No
Exceptions: Not applicable
2012 ERG Guide # Not applicable

Section 15 Regulatory Information

A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.

Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	WHMIS Classification
Potassium Chloride	Listed	Not Listed	Not Listed	Listed	Not Listed	Uncontrolled Product
Sodium hydroxide	Listed	1,000 lbs (454 kg)	D002	Listed	Not Listed	E

Section 16 Additional Information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees.
NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.

Revision Date: December 13, 2020 Supercedes:

SAFETY DATA SHEET

GENERAL STORAGE CODE GREEN

Section 1 Chemical Product and Company Information

Science Take-Out
80 Office Park Way
Pittsford, NY 14534
(585)764-5400

CHEMTREC 24 Hour Emergency
Phone Number (800) 424-9300
For laboratory use only. Not for drug, food or household use

Product	Buffer Solution pH5
Synonyms	“Cinnamaldehyde” (simulated); “Vanillin” (simulated)

Section 2 Hazards Identification

This substance or mixture has not been classified at this time according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Signal word: WARNING
Pictograms: None required
Target organs: None known

GHS Classification:
Skin Irritation (Category 3)
Eye irritation (Category 2B)

GHS Label information: **Hazard statement(s):**
H316: Causes minor skin irritation.
H320: Causes eye irritation.

Precautionary statement(s):

P264: Wash hands thoroughly after handling.

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

P332+P313: If skin irritation occurs: Get medical attention.

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

Ca Prop 65 - This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

Section 3 Composition / Information on Ingredients

Chemical Name	CAS #	%	EINECS
Water	7732-18-5	99.82%	231-791-2
Potassium bipthalate	877-24-7	1.08%	212-889-4
Sodium hydroxide	1310-73-2	0.1%	215-185-5

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN ABSORPTION: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

Suitable Extinguishing Media: Use any media suitable for extinguishing supporting fire.

Protective Actions for Fire-fighters: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.

Specific Hazards: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Section 6 Accidental Release Measures

Personal Precautions: Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

Environmental Precautions: Avoid runoff into storm sewers and ditches which lead to waterways.

Containment and Cleanup: Absorb with inert dry material, sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 7 Handling and Storage

Precautions for Safe Handling: Read label on container before using. Do not wear contact lenses when working with chemicals. Keep out of reach of children. Avoid contact with eyes, skin and clothing. Do not inhale vapors, spray or mist. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse.

Conditions for Safe Storage: Store in a cool, well-ventilated area away from incompatible substances.

Section 8 Exposure controls / Personal Protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
None	None established	None established	None established

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None should be needed in normal laboratory handling at room temperatures. If misty conditions prevail, work in fume hood or wear a NIOSH/MSHA approved respirator.

Section 9 Physical and Chemical Properties

Appearance: Clear, colorless liquid.
Odor: No odor.
Odor threshold: Data not available.
pH: 5.0
Melting/Freezing point: Approx. 0°C (32°F) (water)
Boiling point: Approx. 100°C (212°F) (water)
Flash point: Data not available

Evaporation rate (Water = 1): <1
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Data not available
Vapor pressure (mm Hg): 14 (water)
Vapor density (Air = 1): 0.7 (water)
Relative density (Specific gravity): Approx. 1.0 (water)
Solubility(ies): Complete in water.

Partition coefficient: Data not available
Auto-ignition temp.: Data not available
Decomposition temp.: Data not available
Viscosity: Data not available.
Molecular formula: Mixture
Molecular weight: Mixture

Section 10 Stability and Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.

Conditions to avoid: Excessive temperatures which cause evaporation.
Incompatibilities with other materials: Acids, alkalies, and air will change the buffer's ability.
Hazardous decomposition products: Thermal decomposition will yield carbon oxides.

Section 11 Toxicological Information

Acute toxicity: Data not available
Serious eye damage/irritation: Data not available
Germ cell mutagenicity: Data not available
Skin corrosion/irritation: Data not available
Respiratory or skin sensitization: Data not available
Carcinogenity: Data not available

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.
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.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: Data not available
Aspiration hazard: Data not available
STOT-single exposure: Data not available
STOT-repeated exposure: Data not available

Potential health effects:
Inhalation: May be harmful if inhaled.
Ingestion: May be harmful if swallowed.
Skin: May cause mild irritation.
Eyes: May cause mild irritation.

Signs and symptoms of exposure: To the best of our knowledge the chemical, physical and toxicological properties have not been thoroughly investigated. Specific data is not available. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: Data not available

Section 12 Ecological Information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: No data available
Toxicity to algae: No data available
Persistence and degradability: No data available
Bioaccumulative potential: No data available
Mobility in soil: No data available
PBT and vPvB assessment: No data available
Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: Not applicable
Shipping name: Not Regulated
Hazard class: Not applicable
Packing group: Not applicable
Reportable Quantity: No
Marine pollutant: No
Exceptions: Not applicable
2012 ERG Guide # Not applicable

Section 15 Regulatory Information

A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.

Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	WHMIS Classification
Potassium bipthalate	Listed	Not Listed	Not Listed	Listed	Not Listed	Not listed
Sodium hydroxide	Listed	1,000 lbs (454 kg)	D002	Listed	Not Listed	E

Section 16 Additional Information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees.
NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.

Revision Date: December 13, 2020 Supercedes:

SAFETY DATA SHEET

GENERAL STORAGE CODE GREEN

Section 1 Chemical Product and Company Information

Science Take-Out
80 Office Park Way
Pittsford, NY 14534
(585)764-5400

CHEMTREC 24 Hour Emergency
Phone Number (800) 424-9300
For laboratory use only. Not for drug, food or household use

Product	Buffer Solution pH7
Synonyms	“Pentanedione” (simulated)

Section 2 Hazards Identification

This substance or mixture has not been classified at this time according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Signal word: WARNING
Pictograms: None required
Target organs: None known

GHS Classification:
Skin Irritation (Category 3)
Eye irritation (Category 2B)

GHS Label information: **Hazard statement(s):**
H316: Causes minor skin irritation.
H320: Causes eye irritation.

Precautionary statement(s):

P264: Wash hands thoroughly after handling.

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

P332+P313: If skin irritation occurs: Get medical attention.

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

Ca Prop 65 - This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

Section 3 Composition / Information on Ingredients

Chemical Name	CAS #	%	EINECS
Water	7732-18-5	99.15%	231-791-2
Potassium phosphate, monobasic	7778-77-0	0.72%	231-913-4
Sodium hydroxide	1310-73-2	0.13%	215-185-5

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN ABSORPTION: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

Suitable Extinguishing Media: Use any media suitable for extinguishing supporting fire.

Protective Actions for Fire-fighters: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.

Specific Hazards: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Section 6 Accidental Release Measures

Personal Precautions: Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

Environmental Precautions: Avoid runoff into storm sewers and ditches which lead to waterways.

Containment and Cleanup: Absorb with inert dry material, sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 7 Handling and Storage

Precautions for Safe Handling: Read label on container before using. Do not wear contact lenses when working with chemicals. Keep out of reach of children. Avoid contact with eyes, skin and clothing. Do not inhale vapors, spray or mist. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse.

Conditions for Safe Storage: Store in a cool, well-ventilated area away from incompatible substances.

Section 8 Exposure controls / Personal Protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
Potassium phosphate	None established	None established	None established

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None should be needed in normal laboratory handling at room temperatures. If misty conditions prevail, work in fume hood or wear a NIOSH/MSHA approved respirator.

Section 9 Physical and Chemical Properties

Appearance: Clear, colorless liquid.
Odor: No odor.
Odor threshold: Data not available.
pH: 7.0
Melting/Freezing point: Approx. 0°C (32°F) (water)
Boiling point: Approx. 100°C (212°F) (water)
Flash point: Data not available

Evaporation rate (Water = 1): <1
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Data not available
Vapor pressure (mm Hg): 14 (water)
Vapor density (Air = 1): 0.7 (water)
Relative density (Specific gravity): Approx. 1.0 (water)
Solubility(ies): Complete in water.

Partition coefficient: Data not available
Auto-ignition temp.: Data not available
Decomposition temp.: Data not available
Viscosity: Data not available.
Molecular formula: Mixture
Molecular weight: Mixture

Section 10 Stability and Reactivity

Chemical stability: Stable

Hazardous polymerization: Will not occur.

Conditions to avoid: Excessive temperatures which cause evaporation.
Incompatibilities with other materials: Acids, alkalies, and air will change the buffer's ability.
Hazardous decomposition products: Thermal decomposition will yield phosphates and sodium oxide and/or hydroxides.

Section 11 Toxicological Information

Acute toxicity: Oral-rat LD50: 3,200 mg/kg [Potassium phosphate]
Serious eye damage/irritation: Data not available
Germ cell mutagenicity: Data not available

Skin corrosion/irritation: Data not available
Respiratory or skin sensitization: Data not available
Carcinogenity: Data not available

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.
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.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: Data not available
Aspiration hazard: Data not available

STOT-single exposure: Data not available
STOT-repeated exposure: Data not available

Potential health effects:
Inhalation: May be harmful if inhaled.
Ingestion: May be harmful if swallowed.
Skin: May cause mild irritation.
Eyes: May cause mild irritation.

Signs and symptoms of exposure: To the best of our knowledge the chemical, physical and toxicological properties have not been thoroughly investigated. Specific data is not available. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: TC661500 [Potassium phosphate]

Section 12 Ecological Information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: No data available
Toxicity to algae: No data available
Persistence and degradability: No data available
Mobility in soil: No data available
Bioaccumulative potential: No data available
PBT and vPvB assessment: No data available
Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: Not applicable
Hazard class: Not applicable
Exceptions: Not applicable
Shipping name: Not Regulated
Packing group: Not applicable
2012 ERG Guide # Not applicable
Reportable Quantity: No
Marine pollutant: No

Section 15 Regulatory Information

A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.

Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	WHMIS Classification
Potassium phosphate	Listed	Not Listed	Not Listed	Listed	Not Listed	Uncontrolled Product
Sodium hydroxide	Listed	1,000 lbs (454 kg)	D002	Listed	Not Listed	E

Section 16 Additional Information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees.
NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.

Revision Date: December 13, 2020 Supercedes:

SAFETY DATA SHEET

GENERAL STORAGE CODE GREEN

Section 1 Chemical Product and Company Information

Science Take-Out
80 Office Park Way
Pittsford, NY 14534
(585)764-5400

CHEMTREC 24 Hour Emergency
Phone Number (800) 424-9300
For laboratory use only. Not for drug, food or household use

.

Product	Methyl red 0.025% solution; Bromothymol Blue 0.025% solution
Synonyms	"Cell Health Test Solution" (simulated)

Section 2 Hazards Identification

This substance or mixture has not been classified at this time according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Signal word: Not classified
Pictograms: Not classified
Target organs: None known

GHS Classification: Not classified
GHS Label information: Not classified
Precautionary Statement: Not classified

Supplementary information:
Do not breathe vapors, spray or mist. Do not get in eyes, on skin, or on clothing. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Get medical attention if you feel unwell.

Ca Prop 65 - This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

Section 3 Composition / Information on Ingredients

Chemical Name	CAS #	%	EINECS
Water	7732-18-5	99.95%	231-791-2
Methyl red, sodium salt	845-10-3	0.025%	212-682-9
Bromothymol blue, sodium salt	34722-90-2	0.025%	252-169-7

Section 4 First Aid Measures

INGESTION: MAY BE HARMFUL IF SWALLOWED. Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: MAY BE HARMFUL IF INHALED. MAY CAUSE RESPIRATORY TRACT IRRITATION. Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: MAY CAUSE EYE IRRITATION. Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN ABSORPTION: MAY CAUSE SKIN IRRITATION. Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

Suitable Extinguishing Media: Carbon dioxide, dry chemical, dry sand, alcohol foam.

Protective Actions for Fire-fighters: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.

Specific Hazards: In fire conditions, water may evaporate from this solution which may cause hazardous decomposition products to be formed as dust or fume.

Section 6 Accidental Release Measures

Personal Precautions: Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

Environmental Precautions: Avoid runoff into storm sewers and ditches which lead to waterways.

Containment and Cleanup: Absorb with inert dry material, sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 7 Handling and Storage

Precautions for Safe Handling: Read label on container before using. Do not wear contact lenses when working with chemicals. Keep out of reach of children. Avoid contact with eyes, skin and clothing. Do not inhale vapors, spray or mist. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse.

Conditions for Safe Storage: Store in a cool, well-ventilated area away from incompatible substances. Protect from light.

Section 8 Exposure controls / Personal Protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
Methyl red	None established	None established	None established
Bromothymol Blue	None established	None established	None established

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None should be needed in normal laboratory handling at room temperatures. If misty conditions prevail, work in fume hood or wear a NIOSH/MSHA approved respirator.

Section 9 Physical and Chemical Properties

Appearance: Liquid, clear, blue-green.
Odor: No odor.
Odor threshold: Data not available.
pH: Data not available
Melting/Freezing point: Approx. 0°C (32°F) (water)
Boiling point: Approx. 100°C (212°F) (water)
Flash point: Data not available

Evaporation rate (Water = 1): <1
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Data not available
Vapor pressure (mm Hg): 14 (water)
Vapor density (Air = 1): 0.7 (water)
Relative density (Specific gravity): Approx. 1.0 (water)
Solubility(ies): Complete in water.

Partition coefficient: Data not available
Auto-ignition temp.: Data not available
Decomposition temp.: Data not available
Viscosity: Data not available.
Molecular formula: Mixture
Molecular weight: Mixture

Section 10 Stability and Reactivity

Chemical stability: Stable

Hazardous polymerization: Will not occur.

Conditions to avoid: Excessive temperatures which cause evaporation. Protect from light.
Incompatibilities with other materials: Strong oxidizers, reducing agents.
Hazardous decomposition products: Carbon oxides, nitrogen oxides and sodium oxides.

Section 11 Toxicological Information

Acute toxicity: Oral-rat TDLo: 12000 mg/kg [Methyl red]
Serious eye damage/irritation: Data not available
Germ cell mutagenicity: Data not available

Skin corrosion/irritation: Data not available
Respiratory or skin sensitization: Data not available
Carcinogenity: Data not available

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.
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.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: Data not available
Aspiration hazard: Data not available

STOT-single exposure: Data not available
STOT-repeated exposure: Data not available

Potential health effects:
Inhalation: May be harmful if inhaled.
Ingestion: May be harmful if swallowed.
Skin: May cause irritation.
Eyes: May cause irritation.

Signs and symptoms of exposure: To the best of our knowledge the chemical, physical and toxicological properties have not been thoroughly investigated. Specific data is not available. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: DG8960000 [Methyl red]

Section 12 Ecological Information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: No data available
Toxicity to algae: No data available
Persistence and degradability: No data available
Mobility in soil: No data available

Bioaccumulative potential: No data available
PBT and vPvB assessment: No data available

Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: Not applicable
Hazard class: Not applicable
Exceptions: Not applicable

Shipping name: Not Regulated
Packing group: Not applicable
2012 ERG Guide # Not applicable

Reportable Quantity: No

Marine pollutant: No

Section 15 Regulatory Information

A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.

Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	WHMIS Classification
Methyl red, sodium salt	Listed	Not Listed	Not Listed	Listed	Not Listed	Not Listed
Bromothymol blue, sodium salt	Listed	Not Listed	Not Listed	Listed	Not Listed	Not Listed

Section 16 Additional Information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees.
NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.

Revision Date: December 13, 2020 Supercedes: