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**MATERIAL SAFETY DATA SHEET**


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**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

Product name: <i>Prefer</i>
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**Catalog number:** 402, 414, 415, 419, 424, 426, 429, 632, 636, 639

**General use:** Fixative in histology and surgical pathology.

**Product description:** Aqueous solution of glyoxal, buffer and alcohol.

**Manufacturer**

Anatech Ltd.  
1020 Harts Lake Road  
Battle Creek, MI 49037  
USA

**Emergency contact information**

Health:	Anatech Ltd.	800-262-8324	8 am - 5 pm ET, M-F
Transportation:	CHEMTREC	800-424-9300	24 hours

**2. COMPOSITION AND INFORMATION ON INGREDIENTS**

(Note: Percentage composition is withheld as a trade secret.)

<b><u>Component</u></b>	<b><u>CAS #</u></b>	<b><u>Exposure limits</u></b>
Glyoxal	107-22-2	0.1 mg/m <sup>3</sup> (ACGIH 8 hr TWA) for aerosol
Ethanol	64-17-5	1000 ppm (OSHA, ACGIH 8 hr TWA)
Buffer	Proprietary	Not established; generally considered not hazardous.

**3. HAZARDS IDENTIFICATION**

<b>Emergency Overview</b>
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Clear liquid; colorless to very slightly pale yellow; mild, acidic/alcohol odor.

Irritant to eyes and skin. Prolonged or extensive unprotected skin contact may cause allergic skin responses in sensitive individuals. Not likely to pose an inhalation threat under normal conditions of use. Ingestion is likely to cause adverse effects on gastrointestinal tract.

**Potential health effects**

(Human health effects only; animal effects in Section 11: Toxicological Information.)

**Primary route(s) of exposure:** Eyes and skin.

**Inhalation:** Inhalation of vapors during normal conditions of use are not likely to present a health hazard because glyoxal exhibits almost no vapor pressure. No respiratory irritation has been reported due to inhalation of concentrated glyoxal in an industrial setting.

**Eye:** Contact of liquid with eyes may cause irritation.

### 3. HAZARDS IDENTIFICATION (continued)

**Skin:** Contact of liquid with skin may cause irritation.

**Ingestion:** Ingestion of liquid is likely to produce adverse effects on the gastrointestinal system.

**Chronic effects:** No chronic effects reported. Glyoxal is not considered to be a carcinogen or potential carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or OSHA (USA).

**Signs and symptoms:** Affected skin will appear dry, tough and perhaps cracked. Affected corneas may appear cloudy; eyes may water and become reddened. Effects on the gastrointestinal tract are unknown, but presumably may include nausea and/or vomiting. Effects on the respiratory system are unknown, but presumably may include coughing and difficulty in breathing. There are no pre-existing medical conditions known to be aggravated by exposure to this solution.

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### 4. FIRST AID MEASURES

**Inhalation:** Remove victim to fresh air if coughing or difficulty in breathing is experienced. Consult a physician if symptoms persist or worsen. Administer oxygen or artificial respiration as needed.

**Eye:** Flush eyes for at least 15 minutes in an eyewash station. If symptoms persist after washing, consult a physician.

**Skin:** Remove contaminated clothing, including footwear; wash before reuse or discard. For minor exposure, wash affected area with water and mild soap, rinsing thoroughly; apply a good quality skin lotion. In cases of prolonged, repeated or extensive exposure, rinse affected area or entire body for at least 15 minutes. For severe conditions, consult a physician.

**Ingestion:** Call a poison control center immediately. If victim is conscious, have him/her drink several glasses of water to dilute the solution. Induce vomiting only upon the advice of a physician or poison control authority.

**Note to physician:** *Prefer* is a histological fixative. If ingested, it will fix lining cells of the gastrointestinal tract. The solution loses its efficacy as a fixative if the pH is raised to neutrality. In cases of accidental ingestion, neutralization could reduce the risk of damage to the lining; furthermore, neutralization might reduce the risk of damage to the respiratory tract if aspiration occurs during vomiting.

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### 5. FIRE FIGHTING MEASURES

#### Flammable properties

**Flash point:** 102°F (38.9°C), closed-cup.

**Flammable limit:** Not determined.

**Autoignition temperature:** Not determined.

**Flammability classification:** Combustible liquid (OSHA).

**Flame propagation:** None.

**Hazardous products of combustion:** Carbon monoxide and carbon dioxide.

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## 5. FIRE FIGHTING MEASURES (continued)

**Extinguishing media:** ABC rated portable fire extinguishers should be used. Professional fire fighters may use water spray, dry chemical or carbon dioxide.

**Fire fighting instructions:** Sealed chemical suits and self contained breathing apparatus are necessary for fighting fires involving substantial volumes of this product.

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## 6. ACCIDENTAL RELEASE MEASURES

The size of a spill is defined in part by the local situation, especially regarding ventilation. At room temperature in a well ventilated room, a few hundred milliliters might be considered a small spill. Vapors are generated during a spill and may exceed OSHA's Permissible Exposure Limits. Wear protective gloves, rubber boots, impermeable aprons and full-face respirators. Use a damp sponge or mop to remove spilled liquid. Wash contaminated area with water. Spills left to dry will become sticky. Liquid waste may be discarded down the drain with approval by wastewater authorities, or may be removed by a licensed waste hauler.

With large spills, evacuate the area and have an emergency response team perform the cleanup. Have a licensed waste hauler remove contaminated solids and recovered liquid.

Comply with all applicable governmental regulations on spill reporting and on the handling and disposal of hazardous waste.

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## 7. HANDLING AND STORAGE

**Handling:** Wear a plastic or rubber apron, protective gloves and splash-proof goggles. Avoid all contact with skin and eyes. Do not continue to wear contaminated clothing after a spill.

**Storage:** Store at room temperature.

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

**Engineering controls:** Good general room ventilation is essential. Product should be used with local ventilation (fume hood).

### Personal protective equipment

**Respiratory protection:** A NIOSH-approved respirator suitable for organic vapors must be used if vapor levels exceed the exposure limits.

**Skin protection:** Anatech Ltd. recommends nitrile gloves. Do not use latex surgical gloves for protection against any hazardous liquid. An eyewash station and safety shower must be nearby, preferably in the same room, no more than 10 seconds away.

**Eye protection:** Use splash-proof goggles. Do not use safety glasses. If a face shield is worn as protection against biohazards, splash-proof goggles also must be used. An eyewash station and safety shower must be nearby, preferably in the same room, no more than 10 seconds away.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance:** Clear; colorless to very slightly pale yellow liquid.

**Odor:** Mild, acidic/alcohol odor.

**Physical state:** Liquid.

**pH:** 3.75 - 4.25.

**Vapor pressure:** Not determined. The vapor pressure due to glyoxal is negligible.

**Vapor density:** Not determined.

**Boiling point:** 185°F - 220°F (85°C - 104°C).

**Freezing point:** Not determined.

**Solubility in water:** Complete.

**Specific gravity:** 1.003 at 20°C.

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## 10. STABILITY AND REACTIVITY

**Chemical stability:** Stable.

**Conditions to avoid:** None.

**Incompatibility with other materials:** Strong oxidants (will convert glyoxal to formic acid).

**Hazardous decomposition products:** None.

**Hazardous polymerization:** None.

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## 11. TOXICOLOGICAL INFORMATION

**Acute eye effects:** 20 mg of concentrated glyoxal administered into rabbit eyes in the standard Draize test produced severe irritation.

**Acute skin effects:** Contact dermatitis and eczema have been reported in hospital workers who used strong antiseptics containing glyoxal. Symptoms abated when use of these products were discontinued. Workers handling a glyoxal-based resin reported eczema on their hands; fiberglass in the resin could not be ruled out as a contributing factor.

**Acute and subchronic oral effects:** OSHA considers chemicals to be toxic if their LD<sub>50</sub> is at or below 500 mg/kg. LD<sub>50</sub> is the dose killing 50% of the test animals in a given time (usually 4 hours). Glyoxal is not considered to be toxic by OSHA. Using concentrated glyoxal, the LD<sub>50</sub> was 760 mg/kg in guinea pigs, and ranged from 1.1 - 4.3 g/kg in rats. In another study the LD<sub>50</sub> in rats was 3.08 ml/kg. A 90 day feeding study with rats and dogs found no effects on food consumption, mortality, and gross or microscopic pathology. The no-observed-effect level for glyoxal in the diet of these animals was 0.12 g/kg/day.

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## 11. TOXICOLOGICAL INFORMATION (continued)

**Acute and subchronic inhalation effects:** Inhalation of air saturated with glyoxal vapor for 8 hours was not lethal to rats. Inhalation of aerosols containing glyoxal is harmful but not likely to be encountered in laboratory use. ACGIH has established a TLV-TWA of 0.1 mg/m<sup>3</sup> based upon unpublished findings of squamous cell metaplasia in the larynx of rats exposed to 2 mg/m<sup>3</sup> to 10 mg/m<sup>3</sup> for 6 hours/day, 5 days/week for 29 days.

**Other chronic effects/carcinogenicity:** There is no evidence of cancer or target organ effects deriving from workplace exposures or from reasonably relevant toxicological studies except for contact skin rashes.

**Teratology:** None known.

**Reproductive effects:** None known.

**Mutagenicity:** Mutagen tests involving microorganisms and mammalian tissue cultures have dubious relevance to workplace exposures. Glyoxal was found to be mutagenic with and without metabolic activation in the Ames bacterial point mutation assay, was genotoxic in the CHO/SCE and primary hepatocyte DNA repair tests. Two whole-animal genotoxic studies have been conducted: the mouse micronucleus test showed no activity at 400 mg/kg; the *Drosophila* sex-linked recessive lethal assay was also negative.

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## 12. ECOLOGICAL INFORMATION

**Ecotoxicity:** *Prefer* exhibits a low order of environmental toxicity and a low potential to bioaccumulate. There is no inhibition of bacteria in wastewater effluent when glyoxal is properly introduced into an acclimated biological treatment facility.

The following data are from studies using concentrated glyoxal:

Cyprinodont fish: 48 hr LC<sub>50</sub> = 2800 ppm; zero mortality at 1000 ppm

Golden orfe: 96 hr LC<sub>50</sub> = 460 - 680 mg/l

Daphnia magna: 48 hr EC<sub>50</sub> = 404 mg/l

Green algae: 72 hr EC<sub>50</sub> > 100 mg/l

Bacteria: 16 hr EC<sub>50</sub> = 102 mg/l

DOC reduction: 28 day: 90 - 100% (easily eliminated from water)

Modified OECD Confirmatory Test: Elimination > 70% (good potential for elimination)

Chemical Oxygen Demand (COD) = 350 mg/g

Biological Oxygen Demand (BOD), 5 day = 175 mg/g

**Environmental fate:** All ingredients in *Prefer* consist solely of carbon, hydrogen and oxygen. *Prefer* is readily biodegradable to carbon dioxide and water.

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## 13. DISPOSAL CONSIDERATIONS

Glyoxal itself is not an EPA-listed hazardous waste. *Prefer* is ignitable.

Drain disposal is the recommended method of disposal, based on ecotoxicity and biodegradation information given in Section 12, provided approval is granted by local wastewater treatment authorities.

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### 13. DISPOSAL CONSIDERATIONS (continued)

Anatech Ltd. suggests that waste *Prefer* be introduced into the sanitary sewer system slowly, at the rate of 1-5 gallons per hour. To do this, trickle the waste into the sink from a 5 gallon carboy or drum equipped with a spigot which is barely turned on. The normal flow of wastewater through the generator's facility will dilute the waste. Under this regimen, the waste solution will have no effect on biological or chemical processes at wastewater treatment plants. Neutralization of the pH should not be necessary in most sewer districts, but in the event that it is, use magnesium oxide or magnesium hydroxide (neither one will make the solution too alkaline). Alternatively, dibasic sodium phosphate may be used in areas where phosphates are not restricted in wastewater. Sodium carbonate and sodium bicarbonate are also effective but may cause foaming. Sodium hydroxide is more hazardous to work with and may make the waste too alkaline.

As an alternative to drain disposal, use a licensed hazardous waste hauler.

This product is not recyclable.

Canadian disposal regulations generally parallel those in the United States.

Regardless of the method chosen for disposal, be sure to follow federal, state (provincial) and local regulations. Proper waste disposal is the generator's responsibility.

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### 14. TRANSPORTATION INFORMATION

Packaging for hazardous shipments must meet the specifications as required by the current editions of *International Air Transportation Association (IATA) Dangerous Goods Regulations* and the United States Department of Transportation *49 CFR*.

**DOT (ground):** Not regulated.

**DOT (air) and IATA:** **Proper Shipping Name:** Flammable liquid, n.o.s. (ethanol)  
**UN #:** 1993  
**Hazard Class:** 3  
**Packing Group:** III

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### 15. REGULATORY INFORMATION

**OSHA (USA):** Under the Hazard Communication Standard and the Laboratory Standard, this product is a hazardous material: it is an irritant and it is combustible.

The OSHA Standards cited above mandate that exposed workers receive proper training in the properties of this product, work practices involved with its handling and disposal, and interpretation of its MSDS. Customers who in turn send this product on to their clients or satellite facilities must supply an MSDS at least with the initial shipment.

**FDA (USA):** *Prefer* is for in vitro diagnostic use as a fixative in histology.

**EPA (USA):** *Prefer* is ignitable and is a reportable substance under SARA Title III.

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**16. OTHER INFORMATION**

**Label warnings:** Irritant. Avoid prolonged, repeated contact with skin. Avoid all contact with eyes. Ingestion can cause damage to the gastrointestinal system.

**Product logo:**



**NFPA (National Fire Protection Association) Rating:**

**General note:** This rating is applicable only to safeguard the lives of individuals who may be concerned with fires occurring in an industrial plant or storage location. The ratings provide information to emergency personnel on whether to evacuate the area or how to perform control procedures. It is not descriptive of hazards under normal conditions of occupational use, and is even less applicable to anticipated laboratory-scale use.

Health 2: Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Flammability 2: Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.

Instability 0: Materials that are normally stable even under fire conditions.