




Citric, Oxalic & Tartaric acids

2-hydroxypropane-1,2,3-tricarboxylic acid,
Ethanedioic acid & 2,3-dihydroxybutanedioic acid

Substance	Hazard	Comment
Citric acid Solid and concentrated solutions (If 1.0 M or more)	 IRRITANT	(2-hydroxypropane-1,2,3-tricarboxylic acid) It is irritating to eyes. It is an approved food additive, E330. Concentrated lemon juice may contain citric acid up to 1.7 M.
Dilute citric acid (If less than 1.0 M)	LOW HAZARD	Even dilute solutions will cause discomfort in the eye. It is found in citrus fruits, eg, lemons, oranges, grapefruit. Lemons contain citric acid up to about 0.25 M.
Oxalic acid (ethanedioic acid) Solid and most solutions (If 0.5 M or more)	 HARMFUL	It is harmful in contact with the skin and if swallowed. It is quite close to the limit at which it would be classed as TOXIC rather than HARMFUL. It removes calcium ions from the blood, forming insoluble calcium oxalate; this can block kidneys. Soluble salts of oxalic acid (eg, sodium, potassium) are as hazardous as the acid. It is found in rhubarb, especially in the leaves and in unripe leaf stalks (ie, the part which is eaten). Cases of poisoning have been reported, although very rarely fatal. The toxic effects of rhubarb may be due to other substances.
Dilute oxalic acid (If less than 0.5 M)	LOW HAZARD	Even dilute solutions will cause discomfort in the eye.
Tartaric acid (2,3-dihydroxybutanedioic acid) Solid and concentrated solutions (If 1.4 M or more)	 IRRITANT	It is used in baking powder and is found in many food products. It is an approved food additive, E334.
Dilute tartaric acid (If less than 1.4 M)	LOW HAZARD	Even dilute solutions will cause discomfort in the eye.

Typical control measures to reduce risk

- Use the lowest concentration possible.
- Wear eye protection for all but dilute solutions.
- Avoid the possibility of swallowing oxalic acid or its salts, eg, by using a safety pipette filler.

Assessing the risks

- *What are the details of the activity to be undertaken? What are the hazards?*
- *What is the chance of something going wrong? Eg, Specks of solid acid transferred into the eye, by rubbing with a contaminated finger.*
- *How serious would it be if something did go wrong?*
- *How can the risk(s) be controlled for this activity? Eg, Can it be done safely? Does the procedure need to be altered? Should eye protection be worn?*

Emergency action

- **In the eye** Flood the eye with gently-running tap water for 10 minutes. See a doctor if pain persists.
- **Swallowed** Do no more than wash out the mouth with water. Do **not** induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor.
- **Spilt on the skin or clothing** Remove contaminated clothing. Then drench the skin with plenty of water.
- **Spilt on the floor, bench, etc** Wipe up small amounts with a damp cloth and rinse it well.
For large spills, cover with mineral absorbent (eg, cat litter) and scoop into a bucket. Neutralise with sodium carbonate. Rinse with plenty of water.