



Common Drinking Water Treatment Chemicals: Tolerance Levels for Anatoxin-a and ABRAXIS® Anatoxin-a ELISA

Various chemicals commonly used in the water treatment process were evaluated to determine tolerance levels in the Anatoxin-a ELISA. Assay tolerance is defined as the maximum concentration of a compound, which a sample can contain without producing a false positive result in an unspiked sample or a recovery, which is < 70% or > 130% of the theoretical recovery or the recovery obtained from an untreated spiked sample.

To evaluate assay tolerance, solutions of (+)Anatoxin-a were prepared in preserved deionized water (1 mL 10X Sample Preservation Solution per 9 mL deionized water) then treated with each water treatment chemical across a range of concentrations, including concentrations at and above those concentrations commonly used in water treatment. Water treatment chemical solutions were prepared as grains per gallon (gpg) or parts per million (ppm) solutions depending on the unit of measure that is most commonly used for application in water treatment. Solutions containing reagents that were insoluble at the desired testing levels were filtered using PES filters (Environmental Express PN SF020E) prior to analysis. All water treatment chemical tolerances were evaluated without quenching or pH adjustment unless otherwise indicated.

Water Treatment Chemical	Tolerance
Aluminum Sulfate	≤ 10 gpg
Ascorbic Acid	≤ 1 mg/mL
Calcium Oxide (Lime)	≤ 80 gpg with filtration and pH adjustment with ascorbic acid to pH 5-7 at time of sampling ¹
Carbon ³	≤ 40 ppm with filtering at the time of sampling ³
Potassium Permanganate	≤ 10 ppm with quenching using 0.1 mg ascorbic acid per 1 mL sample ²
Sodium Bisulfate	≤ 1 g/L or ≤ 10 g/L with pH adjustment to pH 5-7 at time of sampling
Sodium Carbonate (Soda Ash)	≤ 10 gpg or ≤ 25 gpg with pH adjustment to pH 5-7 at time of sampling
Sodium Chlorite	≤ 1 ppm or ≤ 10 ppm with quenching using 0.1 mg ascorbic acid per 1 mL sample ²
Sodium Hexametaphosphate	≤ 250 ppm
Sodium Silicofluoride	≤ 10 ppm
Sodium Thiosulfate ⁴	Do Not Use

¹ natural pH of solution outside of the tolerance level of the toxin/assay, therefore chemical tolerance levels determined after adjustment to within the pH tolerance of the toxin/assay

² strong oxidizer that may affect toxin, therefore chemical tolerance level of assay determined after quenching solutions with ascorbic acid

³ carbon is commonly used to remove toxins from water samples, therefore tolerance level due to adverse effect of carbon on toxin, not on assay performance

⁴ sodium thiosulfate reduces Anatoxin-a but does not interfere with the assay

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