Aditivos alimentares. O metabissulfito de sódio é pró-oxidante

22/12/2009

The prooxidant effect of sodium metabisulfite in rat liver and kidney

Elmas O, Asian M, Çağlar S, Derin N, Agar A, Alicigüzel Y, Yargıcıoğlu P.
Regul Toxicol Pharmacol. 2005 Jun;42(1):77-82

Department of Biochemistry, Akdeniz University Medical School, Antalya, Turkey.

Sodium metabisulfite (Na2S2O5) is used as an antioxidant and antimicrobial agent in a variety of drugs and functions as a preservative in many food preparations. In addition to their antioxidant activity, sulfites oxidize to sulfite radicals (SO3-) initiating lipid peroxidation. This study was performed to elucidate the effect of subchronic Na2S2O5 (520 mg/kg/day) ingestion on hepatic and renal antioxidant enzyme activities and lipid peroxidation in albino rats. The antioxidant effect of l-carnitine was also tested in rats treated with Na2S2O5. Plasma uric acid levels were monitored in all rats included in the study. Malondialdehyde (MDA) levels significantly increased in Na2S2O5 treated rats vs. controls, with kidney values of 2.21+/-0.21 vs. 1.22+/-0.35 and liver values of 79.85+/-19.5 vs. 31.36+/-5.0 nmol/mg protein, respectively. Selenium-glutathione peroxidase (GPx) activity was significantly increased in Na2S2O5 treated rats vs. controls, with kidney values of 38.22+/-2.21 vs. 8.09+/-0.76 and liver values of 31.11+/-6.37 vs. 11.70+/-1.02 U/g protein, respectively. Sodium metabisulfite treatment increased plasma uric acid levels in rats that were included in the study. No protective effect of l-carnitine was observed against lipid peroxidation in both liver and kidneys of rats treated with Na2S2O5. The presented data confirm the prooxidant activity of sulfites and suggest that increased GPx activity and plasma uric acid levels may partially reduce the observed renal and hepatocellular oxidative damage caused via the ingestion of sulfites.

PMID: 15896446

Antiperoxide activity of sodium metabisulfite. A double-edged sword

Lavoie JC, Lachance C, Chessex P.
Department of Pediatrics, Hôpital Ste-Justine, University of Montreal, Quebec, Canada.

Sulfites are chemical substances that are used widely in the pharmaceutical industry to reduce or prevent oxidation. Sodium metabisulfite (Na2S2O5) is still present in several parenteral amino acid solutions. Since intravenous lipid emulsions are contaminated by hydroperoxides, we evaluated whether metabisulfite had an antioxidant activity against hydroperoxides. In vitro, Na2S2O5 inhibited the oxidant activity of H2O2, tert-butyl-, and cumene hydroperoxides. The antioxidant capacity of metabisulfite was supported in vivo by the lower (P < 0.01) excretion of malondialdehyde, a stable end product of lipid peroxidation, in babies receiving metabisulfite in their parenteral nutrition. However, for concentrations outside the range found in solutions for parenteral nutrition, the reduction of hydroperoxides by Na2S2O5 could transform this compound into an oxidant, like a sulfite radical. It is suggested that metabisulfite has antiperoxide properties that, under specific conditions, contribute to the generation of toxic oxidants.

PMID: 8135862