MTM - Micro Trace Minerals News

Sodium thiosulfate (NTS)

a chelating agent with remarkable effects

The World Health Organization's List of Essential Medicines classifies this chelating agent as one of the most effective and safest (WHO 2015). Synonyms for this chelating agent—which causes few side effects—include NTS, sodium thiosulfate pentahydrate, disodium thiosulfate pentahydrate, sodium hyposulfite pentahydrate, and thiosulfonic acid disodium salt pentahydrate.

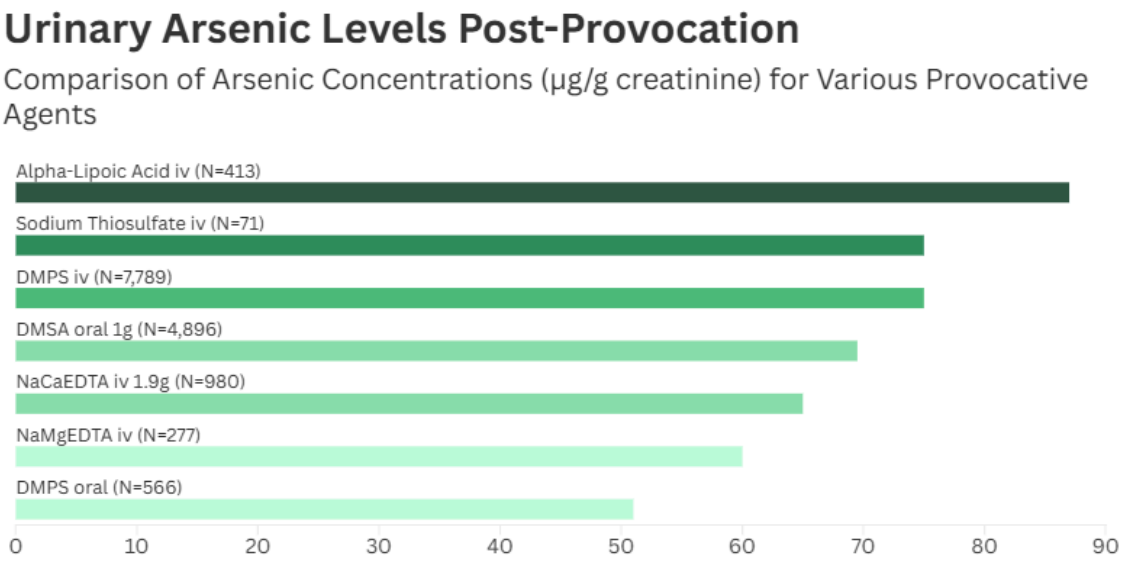
According to the review article "Medical Uses of NTS," published in 2016 in the Journal of Neurology Neuromedicine (McGeers 2016), this substance—which has a low incidence of side effects—is "generally available as a non-prescription oral medication. One of the first medical applications was the successful treatment of arsenic, lead, mercury, and bismuth poisoning. Halliday and Sutherland described the intravenous administration of sodium thiosulfate in an extremely acute case of arsenic poisoning. There was an immediate response,

resulting in complete recovery." Oral NTS is also used as maintenance therapy in patients with calcific uremic arteriolopathy and is well tolerated (Albugami 2013).

The oral dose used was up to 1,200 mg three times daily. Sodium thiosulfate (NTS) was approved in Germany in 2005. It is manufactured and distributed by Köhler Pharma GmbH. According to pharmacist Margit Schlenk, it can be prepared in any desired concentration.

Pharmacokinetics
NTS taken orally is not absorbed systemically. Most of the thiosulfate is oxidized to sulfate. Approximately 20-50% of exogenously administered thiosulfate is excreted unchanged via the kidneys. After an intravenous injection of 1g (=1000mg) NTS, the reported serum half-life was approximately 20 minutes. Sodium thiosulfate breaks down (and inactivates) thiamine. The substance should not be administered together with nutrients containing thiamine.

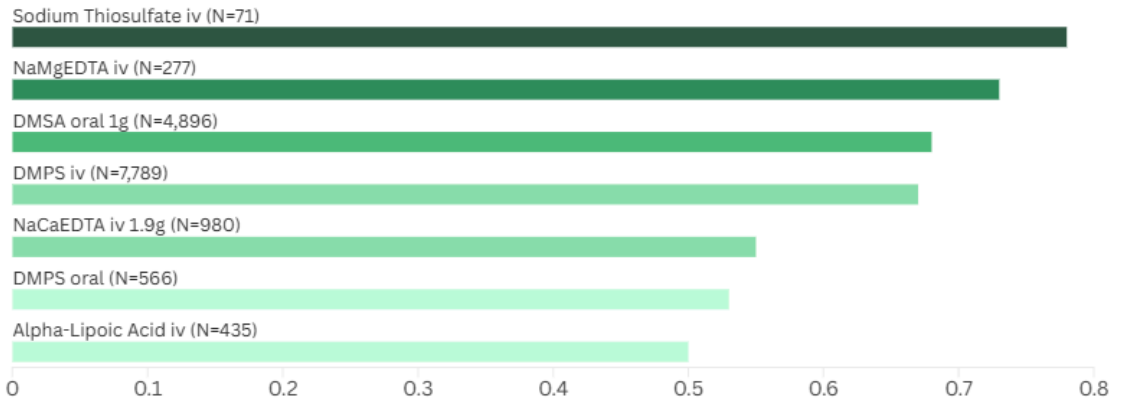
Following are statistically derived median results of urine provocation measurements involving arsenic (As) **(See Figure 1 below).**



Figures 2-4 below show median test values for **thallium (Tl), palladium (Pd) and cerium (Ce)**.
Good results were noted for **sodium thiosulphate**.

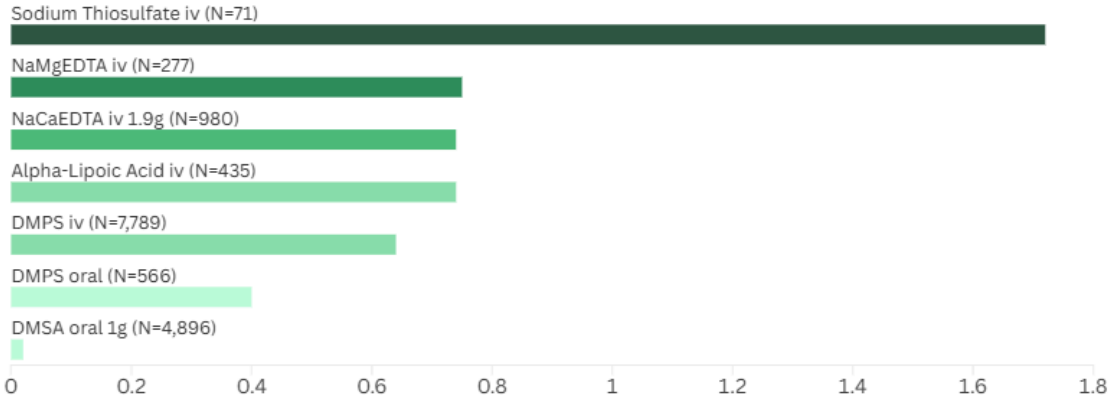
Urinary Thallium Levels Post-Provocation

Comparison of Thallium Concentrations (µg/g creatinine) for Various Provocative Agents



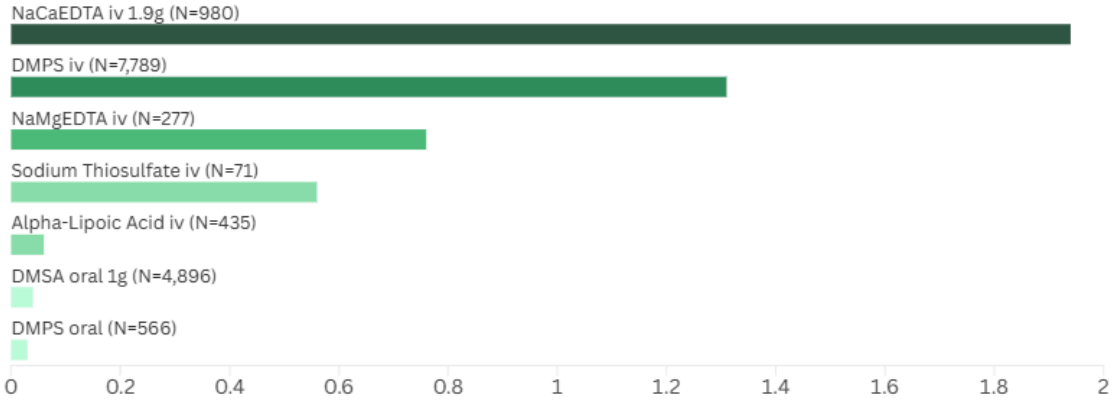
Urinary Palladium Levels Post-Provocation

Comparison of Palladium Concentrations (µg/g creatinine) for Various Provocative Agents



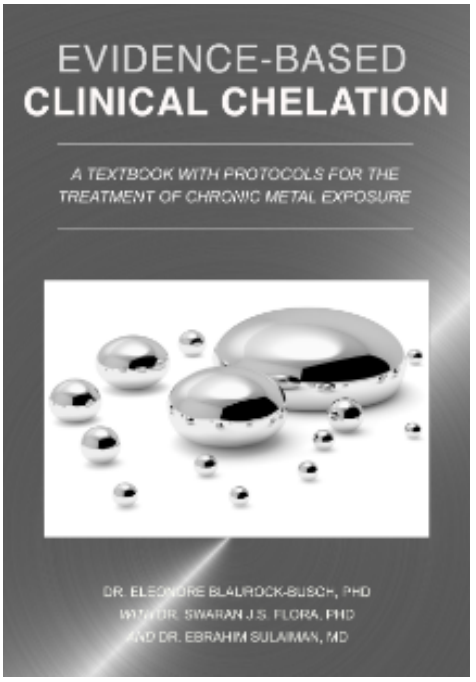
Urinary Cerium Levels Post-Provocation

Comparison of Cerium Concentrations (µg/g creatinine) for Various Provocative Agents



The different binding abilities of the chelate substances used can be seen from Figures 1 - 4. Also, sodium thiosulfate can be perceived as an effective chelating substance.

You can find out more about the topic of metal chelation in this e-book:



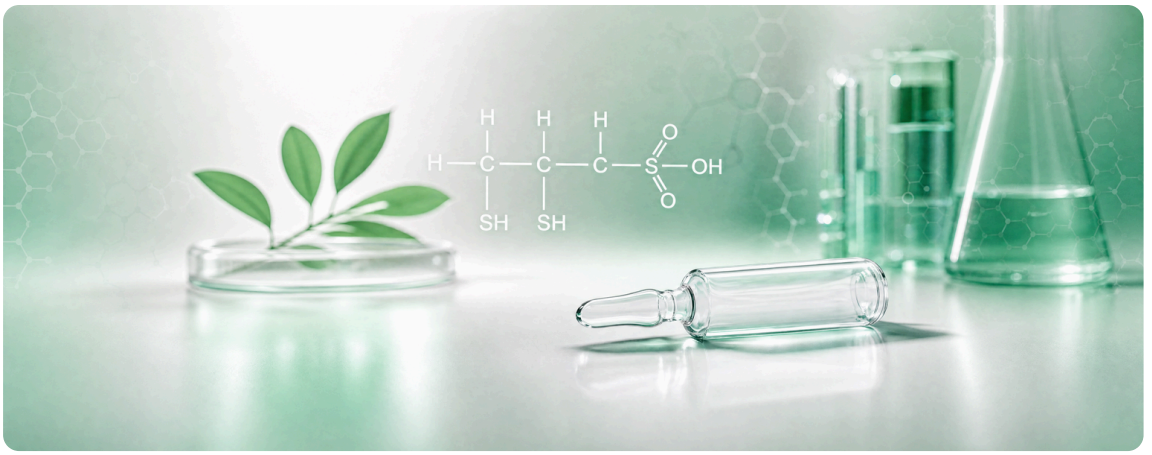
Evidence-based Clinical Chelation

A Textbook with Protocols for the Treatment of Chronic Metal Exposure

By Dr. E. Blaurock-Busch PhD, Dr. S.J.S. Flora, and Dr. E. Sulaiman.

- **Core Focus:** An evidence-based, practical guide for physicians on treating chronic metal overexposure using oral and intravenous protocols.
- **Key Science:** Explains how bioavailability impacts metal binding, why specific chelators target certain metals (e.g., DMPS for mercury), and the importance of treatment pauses.
- **Comparative Tools:** Includes data tables comparing the metal-binding capacities of EDTAs, DMPS, DMSA, and other agents.
- **Innovative Content:** Features novel approaches, including **MIADMSA** for arsenic intoxication, natural **Pectin** for gadolinium, and using alkaline environments to prevent metal redistribution.

Ask a Question About NTS



Dimaval (DMPS) Information

It is well known that the intravenous administration of Dimaval is the treatment of choice for mercury exposure or intoxication. The following information was provided by the manufacturer Heyl, Berlin:

- **1 ml of the DMPS injectable** can bind a maximum of **47.7 mg of mercury**.
- **A capsule containing 100 mg of DMPS** (bioavailability approx. 40%) can bind approximately **38 mg of mercury**.

However, the value must be lower *in vivo* because:

1. A portion of the DMPS is metabolized.
2. A portion of the DMPS reacts with essential trace elements; while these have lower binding constants, they are present in higher concentrations.
3. A portion of the DMPS reacts with other heavy metals present, such as lead.

Clinical Note regarding points 2 and 3: If metal-containing substances—such as selenium, B vitamins (which contain chromium), or vitamin B12 (which contains cobalt)—are administered alongside DMPS, the binding with substances like mercury is reduced, as the available binding sites are more readily occupied by these other elements.

Ask a question about DMPS

Hair Testing in Forensic Toxicology: Recent Insights From Root to Tip

Abstract:
Hair testing is a powerful tool in forensic toxicology, particularly for identifying past substance exposure when blood or urine samples are collected too late. Its extended window for substance detection enables the identification of previously consumed substances and patterns of exposure. Hair, from the root to the tip, has frequently been used in forensic toxicology to assess both a single dose and long-term exposures in drug-facilitated crimes, as well as in investigations of the cause of death. The ongoing development and increasing use of hair testing underscore the need for a fresh assessment of its evolving potential. This focus article provides insight into the field of hair testing, focusing on recent applications, emerging trends, and advancements in the hair testing workflow from sampling to interpretation. Recent trends to address factors influencing substance levels in hair involve new protocols for micro-segmentation, longitudinal hair scanning, assessment of melanin content and verification of cosmetic hair treatments. Advancing the field of hair testing requires the continuous development and refinement of processes to reveal forensic relevant substances such as psychoactive substances, toxins, doping agents, and environmental contaminants and their distribution in the hair.

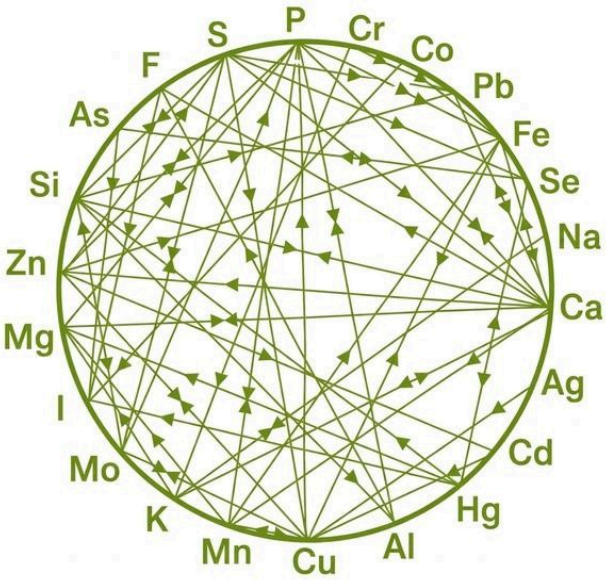
Click here to read the research article

Manganese in Whole Blood

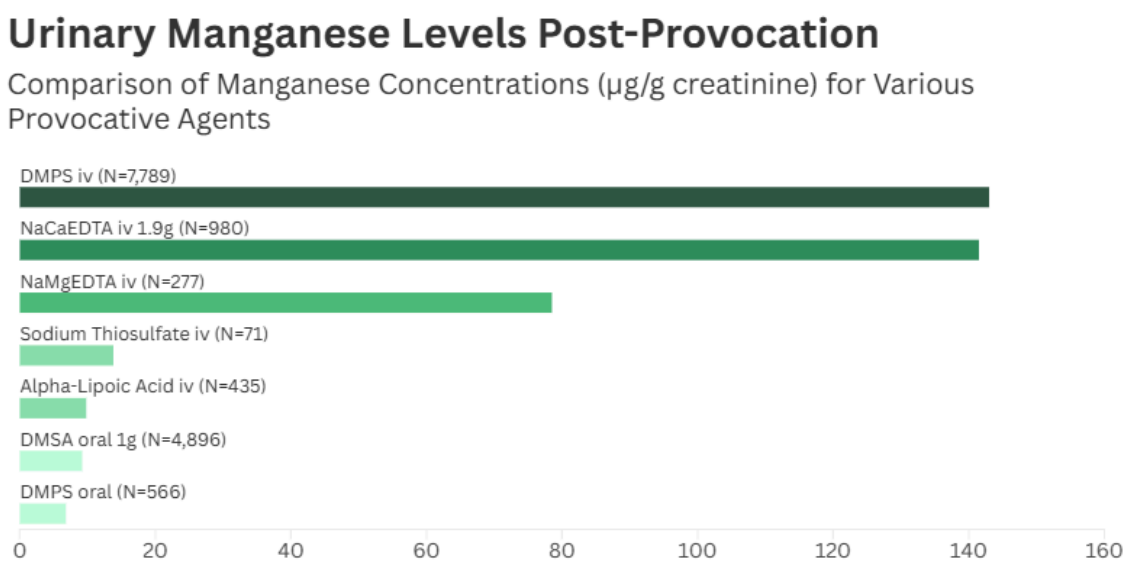
Whole blood is the preferred sample type for assessing manganese exposure (e.g., occupational or environmental), as approximately **85%** of this essential trace element is bound to hemoglobin within erythrocytes. An elevated level indicates internal exposure but does not, in itself, constitute a diagnosis of neurotoxic damage (such as manganism or pseudo-parkinsonism). An elevated blood level always requires consideration of the exposure history and, where appropriate, assessment by a liver specialist.

Elevated whole-blood manganese levels are primarily regarded as an indication of inhalation exposure. While smoking is considered a source of systemic manganese overload, welding fumes (among welders) or exposure to industrial metal dust are more critical factors, as inhaled particles bypass the natural barrier effects of the digestive tract.

Manganese toxicity leads to nausea, vomiting, and headaches, as well as psychological and neurological changes. The clinical manifestations resemble those of Parkinson's disease. Iron deficiency increases intestinal manganese absorption. **Figure 5** below illustrates how metals inhibit or facilitate one another. Potential orthomolecular detoxification options are also indicated.



The following Figure 6 illustrates which synthetic chelating agents are particularly effective at promoting manganese detoxification. It demonstrates that each chelating substance possesses a distinct binding capacity.



Ask a Question About Manganese

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Take advantage of these beautiful, warm late-summer weeks to recharge your batteries.

We wish you a fantastic time filled with joy and continued success!
Warm regards,

The MTM Team

MTM Micro Trace Minerals Lab

Director: Yvette Busch
MTM Micro Trace Minerals GmbH
Amtsgericht Nuernberg: HRB 21937
Röhrenstr. 20, 91217 Hersbruck, Germany
Phone. +49 (9151) 4332

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