

Detox Antiox™



Support for the detoxification of heavy metals
and other harmful compounds

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Detox Antiox™ synergistically combines nutrients, herbal extracts and other compounds that have positive effects on the body's detoxification processes. The ingredients in this product were selected for their ability to combat free radicals and help detoxify harmful substances including heavy metals. This formula contains multiple nutrients known to raise glutathione levels, making it helpful for supporting phase II liver detoxification. Detox Antiox™ is also designed to aid in the production of metallothionein, a cysteine-rich protein with potent antioxidant effects and heavy metal binding capacity, including to cadmium and copper.^{1,2} Metallothionein has even greater free radical quenching capacity than glutathione for certain specific free radicals, such as the hydroxyl radical.¹ Taken as a whole, the ingredients in Detox Antiox™ have specific roles in the mitigation of heavy metal toxicity and can improve the mobilization and excretion of harmful compounds when used in conjunction with standard chelating agents.³

Features of Detox Antiox™

- **Lipoic Acid:** a sulfur-containing compound that exhibits amphipathic antioxidant properties (it is effective in both water- and lipid-based environments). This unique property allows it to quench free radicals in hydrophilic and lipophilic environments alike—cytosol, plasma membranes, serum, and lipoproteins.^{4,5} Lipoic acid (LA) is an "antioxidant of antioxidants." When reduced to dihydrolipoic acid (DHLA), it serves to regenerate vitamins E and C, glutathione (GSH), and coenzyme Q₁₀.^{5,6} Coupled together, oxidized and reduced LA have a greater redox potential than oxidized and reduced GSH, leading some researchers to refer to lipoic acid as a "universal antioxidant."⁵ An additional effect of LA's antioxidant capacity is its role in binding free, redox-active metals. LA has been shown to bind copper, manganese, zinc, and lead, while DHLA is effective in binding copper, zinc, lead, mercury, cadmium, and iron.⁵⁻⁷ Lipoic acid may increase the need for biotin by lowering levels of biotin dependent enzymes; thus, this formula includes biotin as LA should always be taken with biotin.^{8,9}
- **Selenium, Zinc:** Selenium is needed for the synthesis of at least five isoforms of glutathione peroxidase (GPx), which reduces damaging hydrogen peroxide to water.^{10,11} Selenium is also needed for the thioredoxin reductase enzyme family, considered to be among the major antioxidant enzymes and redox regulators in mammalian cells.¹⁰ Selenium has a key role in protecting against mercury toxicity.¹²⁻¹⁵ Some of the toxicity symptoms associated with high mercury levels may be due to reduced availability of selenium and the resulting reduction in activity of selenium-dependent enzymes such as GPx and the deiodinase enzyme needed for conversion of T4 to T3 for proper thyroid hormone levels. An adequate supply of selenium may help mitigate the effects of mercury toxicity or possibly even reverse some of the symptoms.^{12,13} Together with selenium, zinc (bound to methionine) aids in synthesis of metallothionein.

Supplement Facts

Serving Size 2 capsules
Servings Per Container 30

Amount Per Serving	% Daily Value	Amount Per Serving	% Daily Value
Vitamin C (as Ascorbic Acid)	500 mg 556%	Green Tea Extract (<i>Camellia sinensis</i>)(root) [standardized to contain 98% polyphenols and 45% EGCG]	50 mg *
Biotin (as d-Biotin)	150 mcg 500%	Turmeric Extract (<i>Curcuma longa</i>)(root) [standardized to contain 95% curcuminoids]	50 mg *
Zinc (as Zinc Bisglycinate Chelate)	15 mg 136%	Grape Seed Extract (<i>Vitis vinifera</i>)(seed) [standardized to contain 95% proanthocyanidins]	50 mg *
Selenium (as Selenomethionine)	100 mcg 182%	R-Lipoic Acid	30 mg *
Manganese	3 mg 130%	Vitamin E Isomers (as DeltaGold® delta and gamma tocotrienols)	15 mg *
(as TRAACS® Manganese Bisglycinate Chelate)			
Molybdenum	100 mcg 222%		
(as TRAACS® Molybdenum Glycinate Chelate)			
N-Acetyl-L-Cysteine (NAC)	250 mg *		
L-Leucine	150 mg *		

*Daily value not established.

Other Ingredients: Microcrystalline cellulose, cellulose (capsule), vegetable stearate, silicon dioxide.

Detox Antiox™ may be beneficial for*:

- Boosting detoxification pathways
- Protection against heavy metal absorption
- Supporting the safe and natural elimination of toxins and heavy metals
- Increasing antioxidant activity
- Providing precursors and cofactors for detoxification nutrients
- Supporting healthy levels of glutathione
- Protecting the central nervous system from toxins
- Supporting the immune system

- **Manganese:** a required cofactor for mitochondrial superoxide dismutase (MnSOD), a key antioxidant enzyme for protecting fragile fatty acids in mitochondrial membranes against lipid peroxidation.^{17,18} Manganese is also a cofactor for the arginase enzyme in the urea cycle, so it plays a role in proper dispensation of normal metabolic wastes.¹⁹ The body's concentration of manganese is especially high in mitochondria and is also high in organs that have a large role in detoxification, including the liver and kidneys.²⁰
- **Molybdenum:** an essential cofactor in multiple enzymes involved in detoxification, such as sulfite oxidase, xanthine oxidase and aldehyde oxidase. Among other roles, these are responsible for normal breakdown of purines and sulfur-containing amino acids, oxidizing harmful sulfites to sulfates, and metabolism of pharmaceutical drugs and xenobiotics.^{21,22} Deficiency in sulfite oxidase may result from inadequate molybdenum, potentially leading to sulfite/chemical sensitivity and alterations in CYP450 activities that affect metabolism of various drugs.²³⁻²⁵
- **Turmeric and Green Tea Extract:** inducers of various CYP450 enzymes to support effective detoxification. These compounds also induce the Nrf2 pathway (nuclear factor erythroid 2-related factor 2),¹⁶ "an emerging regulator of cellular resistance to oxidants."²⁶ "Nrf2-linked pathways are involved in protective mechanisms against oxidative stress by regulating antioxidant and phase II detoxifying genes."²⁷ Activation of Nrf2 appears to protect against chemically-induced apoptosis and promote mitochondrial biogenesis.²⁶
- **Vitamin E Isomers:** a fat-soluble antioxidant that protects cell membranes and lipoproteins (including LDL) from oxidative damage.²⁸ Human and animal studies indicate that vitamin E supplementation helps prevent oxidation of GSH and increases its levels in tissues.²⁹ The vitamin E isomers in this product are provided as patented DeltaGold® delta and gamma tocotrienols.
- **Vitamin C:** a potent free radical scavenger biochemically intertwined with GSH. Glutathione recycles oxidized dehydroascorbate back to ascorbate and GSH deficiency is associated with low tissue ascorbate levels. Vitamin C supplementation has been shown to increase GSH levels in healthy adults, and the combination of vitamin C with vitamin E may have additive effects.²⁸ This combination significantly increased activity of superoxide dismutase and GPx while decreasing malondialdehyde (a marker for lipid peroxidation) in patients with cardiovascular disease.³⁰
- **Grape Seed Extract:** a more potent antioxidant than vitamin C or E.³¹ Grape seed extract (GSE) contains the antioxidant compound oligomeric proanthocyanidin (OPC), which has been shown to have free radical scavenging properties and to inhibit lipid peroxidation.³² Animal studies show that GSE protects against cadmium-induced organ and tissue damage partly through Nrf2-related mechanisms³³⁻³⁵ and also protects against hepatotoxicity induced by perfluorooctanoic acid (PFOA),³⁶ an environmental contaminant known to be a carcinogen and endocrine disruptor.³⁷
- **N-Acetyl-L-Cysteine (NAC) and L-Leucine:** The availability of cysteine is the rate-limiting factor for GSH re-synthesis.³⁸ NAC is a primary source of cysteine and a precursor to GSH, and NAC itself is an antioxidant, with the sulfhydryl group (-SH) within the NAC molecule directly scavenging reactive oxygen species.³⁹ (Lipoic acid also provides cysteine.) NAC plays a major role in healthy detoxification. Leucine, when taken with cysteine, prevents mercury from crossing the blood-brain barrier (BBB) and may also help protect the central nervous system from toxicity of other heavy metals.⁴⁰

Recommended Use

- Take two capsules per day with meals, or as directed by your health care practitioner.

For a list of references cited in this document, please visit:

<https://www.designsforhealth.com/techsheet-references/detox-antiox-references.pdf>

Dosing recommendations are given for typical use based on an average 150 pound healthy adult. Health care practitioners are encouraged to use clinical judgement with case-specific dosing based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage.

DeltaGold® is a registered trademark of American River Nutrition, LLC and protected by US Patent Numbers 6,350,453 and 8,586,109.

*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

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