

Zinc SAP

*Zinc picolinate for healthy immune function**

Zinc SAP contains a highly absorbable form of zinc, called zinc picolinate.* Zinc is a mineral that is essential in both innate and adaptive immune function.* Zinc is also important to maintain connective tissue formation, intestinal health, and healthy skin.* In addition, metabolism of carbohydrates, fat, and proteins to form red blood cells relies on zinc for proper function.* Long-term supplementation of high doses of zinc can result in copper deficiency, which is why a small dose of copper is included in **Zinc SAP** to prevent potential deficiency.*

SUPPLEMENT FACTS

Serving Size: 1 Capsule	Amount Per Serving	Servings: 60 % Daily Value
Zinc (from zinc picolinate)	25 mg	167
Copper (from copper citrate)	1 mg	50

‡ Percent Daily Values are based on a 2,000-calorie diet.

**Daily Value not established

Other ingredients: Vegetable magnesium stearate, silicon dioxide, microcrystalline cellulose and a non-GMO vegetable capsule composed of vegetable hypromellose and purified water.

Contains no: Gluten, soy, wheat, corn, eggs, dairy, yeast, citrus, preservatives, artificial flavour or colour, starch, or sugar.

Zinc SAP contains 60 capsules per bottle.

DIRECTIONS FOR USE

Take 1 capsule daily with food or as directed by your healthcare practitioner. If you are taking other medications, take this product a few hours before or after them.

Consult a healthcare practitioner for use beyond 3 months.

INDICATIONS

Zinc SAP:

- Is important for connective tissue repair.*
- Helps in metabolism of fats, proteins, and carbohydrates to help with red blood cell production.*
- Assists in healthy immune functioning.*
- Can contribute to reducing inflammation due to chronic zinc deficiency.*
- May reduce intestinal permeability in susceptible patients.*

CAUTIONS AND WARNINGS

For adult subpopulation only. Do not use if you are pregnant or breast-feeding.

PURITY, CLEANLINESS AND STABILITY

All ingredients listed for each product lot number of **Zinc SAP** have been tested by a third-party laboratory for identity, potency, and purity.

*** 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.**

Scientific Advisory Panel (SAP):
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ZINC, IMMUNITY, AND INFLAMMATION

Substantial research supports zinc as an essential trace element for immune function.^[1] Zinc is important for both the maintenance and development of immune cells in the innate and adaptive immune systems.^[1] Altered zinc homeostasis leads to impaired formation, activation, and maturation of lymphocytes; poor intercellular communications via cytokines; weakened innate host defence via phagocytosis; and oxidative burst.^[1] In vivo zinc deficiency can alter the number and function of neutrophil granulocytes, monocytes, B and T cells, and natural killer (NK) cells.^[2] The function of T cells and the balance between the different subsets are especially susceptible to changes in zinc status.^[2]

Zinc availability is tightly regulated by several transporters and regulators, which dictate its availability to the immune system.^[3] When this mechanism is disturbed, the availability of zinc is reduced, resulting in an alteration of survival, proliferation, and differentiation of the cells of different organs and systems, in particular cells of the immune system.^[3] Acute zinc deficiency causes a decrease in innate and adaptive immunity.^[3] Chronic zinc deficiency increases inflammation due to the production of proinflammatory cytokines, which can influence the outcome of a large number of inflammatory diseases, including rheumatoid arthritis.^[3]

A significant number of studies have looked at changes in zinc metabolism in human chronic inflammatory diseases.^[4] Changes in zinc plasma concentration, as well as intracellular disturbance of antioxidant intracellular pathways, have been found in association with age-related inflammatory disease, such as atherosclerosis.^[4] In the geriatric population, zinc deficiency is extremely common, partially because of the diet modification that elderly often make tended toward lowering cholesterol. As a result, foods rich in zinc—such as meat products—are consumed less, and more refined wheat products with low mineral content are increasingly consumed.^[4] The plasma concentrations of several metallic ions including zinc are directly influenced by the production of proinflammatory cytokines.^[4] One of the targets for zinc is NF- κ B, which is critical for the expression of many proinflammatory cytokines.^[4] The production of these cytokines is finely regulated by extra- and intracellular inhibiting and activating factors that interact with regulatory elements on cytokine genes.^[4] The cytokine genes are highly polymorphic, with some of these polymorphisms having been associated with age-related diseases like atherosclerosis.^[4] Zinc deficiency in an individual with a genetic predisposition leads to a dysregulated inflammatory response, and may result in adverse events and reduce the chance of healthy aging.^[4]

ZINC AND INTESTINAL PERMEABILITY

Sufficient levels of folate are critical for healthy brain and body functioning. In a study by Sturniolo et al, researchers identified that small intestinal permeability is often increased in patients with Crohn's disease, and may be pathogenic with regards to clinical relapses.^[5] The goal of the study was to determine if zinc supplementation would improve the intestinal permeability.^[5] Twelve patients with Crohn's disease who had been in remission for at least three months and had increased intestinal permeability on two separate occasions within the last two months were admitted into the trial.^[5] Participants received 110 mg of zinc sulfate three times a day for eight weeks and were then followed for 12 months.^[5] The lactulose/mannitol ratio was significantly higher before supplementation than after.^[5] During the follow-up period, 10 patients had normal intestinal permeability and had no relapses.^[5] Of the remaining two who still had increased intestinal permeability, one patient relapsed during the follow-up period.^[5] The study demonstrated that zinc supplementation can resolve permeability alteration in patients with Crohn's disease in remission and may reduce the risk of relapse.^[5]

ZINC AND CARDIOVASCULAR HEALTH

Cardiovascular disease (CVD) remains the number one cause of mortality in the Western world.^[6] A study by Masley et al set out to determine which lifestyle factors are associated with mean carotid intima media thickness (IMT), which is a reliable predictor of future CVD risk.^[6] In a prospective cross-sectional analysis of 592 subjects, several factors were measured including body composition, anthropometric measures, fitness, diet, laboratory results, and mean carotid IMT. It was found that aerobic fitness

as well as dietary intake of fibre, zinc, fish, and magnesium were inversely associated with carotid IMT scores.^[6]

ALZHEIMER'S DISEASE AND ZINC

Developed countries are in the midst of an epidemic of Alzheimer's disease (AD) cases.^[7] Ingestion of inorganic copper from sources such as drinking water has been shown to result in increased levels of free blood copper.^[7] In one study, elevated blood copper levels in AD has been shown to correlate with cognitive decline.^[7] Specifically, AD patients were found to be zinc-deficient compared to age-matched controls. Zinc supplementation in AD patients proved to be protective against cognitive decline compared to placebo controls.^[7] In addition, zinc therapy profoundly lowered blood free copper levels. Such reduction could be due to the reduction of free blood copper levels, or due to the restoration of neuronal zinc levels, or both.^[7]

ZINC-INDUCED COPPER DEFICIENCY

Excessive zinc intake is often linked to severe cytopenia.^[8] In addition, zinc-induced copper deficiency has been recognized as a cause of anemia and neutropenia.^[8] Providing a small quantity of copper along with a zinc supplementation could prevent development of such aberrations.^[8]

ZINC ABSORPTION

A double-blind, four-period, crossover trial compared the oral absorption of three different complexed forms of zinc.^[9] Participants were randomly divided into four groups, with each group rotated for four-week periods through a random sequence of oral supplementation including zinc picolinate, zinc citrate, zinc gluconate (equivalent to 50 mg elemental zinc per day), and placebo.^[9] Zinc was measured in hair, urine, erythrocyte, and serum, and baseline and endpoint for each period. At the end of four weeks, hair, urine, and erythrocyte zinc levels rose significantly during administration of zinc picolinate compared to placebo.^[9] There was no significant change from placebo in any of these parameters with administration of zinc gluconate or zinc citrate supplementation.^[9] The results of this study suggest that zinc absorption could be improved by complexing zinc with picolinic acid.^[9]

A study by Wueher et al investigated the optimal dose of zinc for young children.^[10] The objectives of the study were to determine the effects of various doses of zinc on plasma concentrations and the growth of young children, as well as to detect any adverse effects of 10 mg of zinc supplementation on copper and iron status.^[10] The study included children who were between the ages of 12 and 30 months at baseline and had initial length-for-age z scores smaller than -1.3. Children received one of five daily supplements for six months of either 3, 7, or 10 mg zinc as zinc sulfate, 10 mg zinc plus 0.5 mg copper as copper sulfate, or placebo.^[10] Plasma zinc concentrations changed from baseline, and were positively associated with the zinc dose. Zinc supplementation with doses as low as 3 mg/d decreased the incidence of diarrhea by 21–42%, and there were no other significant differences between groups.^[10] No observed adverse effects were reported for 10 mg Zn/d supplementation on indicators of copper or iron status.^[10]

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