

ULTRA TRACE MINERALS

MINERAL	FUNCTION/S	DEFICIENCY/S	TOXICITY/S	SOURCES
Arsenic (As)	<ul style="list-style-type: none"> ▪ treat acne ▪ to treat venereal disease ▪ involve in phospholipids metabolism ▪ has special affinity for keratin 	<ul style="list-style-type: none"> ▪ deterioration in growth ▪ increased iron in the spleen, coarse hair ▪ decreased red blood cells. 	<ul style="list-style-type: none"> ▪ weakness ▪ decreased appetite ▪ thickening of skin and peeling on palms and soles of feet ▪ numbness/burning/tingling of hands and feet ▪ nausea ▪ diarrhea/ constipation ▪ inflammation of nose/mouth/tongue ▪ sore throat ▪ laryngitis ▪ sneezing ▪ hoarseness ▪ coughing ▪ decreased salivation ▪ jaundice ▪ enlarged liver ▪ kidney deterioration ▪ urination changes ▪ deterioration of hair and fingernails ▪ paralysis ▪ anemia ▪ garlic body odor/breath ▪ increased perspiration ▪ itchy/watery eyes ▪ increased color on neck/eyelids/nipples/ armpits ▪ swelling of eyelids/face/ankles 	<ul style="list-style-type: none"> ▪ Fish ▪ Shellfish ▪ Shrimps

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<p style="text-align: center;">Boron (B)</p>	<ul style="list-style-type: none"> ▪ influence parathormone action ▪ affects metabolism of calcium, phosphorus, and magnesium ▪ involved in the formation of the active form of cholecalciferol (Vitamin D3) ▪ reduces calcium loss ▪ increase level of circulating estrogen 	<ul style="list-style-type: none"> ▪ retarded growth ▪ decreased Vitamin D and steroid synthesis ▪ decreased calcium/magnesium/ phosphorus/bone/ estrogen synthesis ▪ a breakdown of hormone function ▪ bone demineralization. 	<ul style="list-style-type: none"> ▪ nausea ▪ vomiting ▪ diarrhea ▪ abdominal pains ▪ skin inflammations ▪ dermatitis ▪ lethargy ▪ muscle spasms ▪ shock ▪ enzyme inhibition. 	<ul style="list-style-type: none"> ▪ Almonds ▪ brazil nuts ▪ hazelnuts ▪ figs ▪ prunes ▪ apples ▪ grapes ▪ dates ▪ raisins ▪ pears ▪ peaches ▪ soybeans ▪ molasses ▪ Honey ▪ Vegetables ▪ nuts

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<p>Bromine (Br)</p>	<ul style="list-style-type: none"> ▪ found in hair, the liver, lungs, and testis ▪ used as sleeping aids 	<ul style="list-style-type: none"> ▪ deterioration of brain performance and liver function ▪ mental abnormalities ▪ a deterioration of adrenals/thyroid/pituitary glands 	<ul style="list-style-type: none"> ▪ acne ▪ arm and leg coldness ▪ fetid breath ▪ insomnia ▪ male sterility ▪ headaches ▪ emotional agitation and instability ▪ fatigue ▪ hallucinations ▪ amnesia ▪ confusion 	<ul style="list-style-type: none"> ▪ Seaweeds ▪ Mussels ▪ Animal glands

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<p>Cadmium (Cd)</p>	<ul style="list-style-type: none"> ▪ trace mineral in the body with concentrations mainly in the liver and kidneys ▪ accumulates in the bones and teeth ▪ contribute to growth factor activity since it has been found to stimulate cell growth in agar 		<ul style="list-style-type: none"> ▪ retarded growth ▪ hypertension ▪ renal dysfunction ▪ nausea ▪ vomiting with abdominal cramping ▪ renal damage and disturbances in calcium metabolism leading to osteomalacia 	<ul style="list-style-type: none"> ▪ seafood ▪ whole grains

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<p>Lead (Pb)</p>	<ul style="list-style-type: none"> ▪ found in all plant and animal tissues, the environment, foods, and drinks, with higher levels in processed foods 		<ul style="list-style-type: none"> ▪ decreased appetite ▪ constipation ▪ metallic taste in mouth ▪ nausea ▪ slight albumin in urine ▪ protein in urine ▪ heart burn ▪ decreased weight ▪ hearing changes ▪ balance deterioration ▪ mental sluggishness ▪ decreased IQ ▪ destruction of nerve tissues ▪ tingling/numbness/paralysis of extremities ▪ convulsions ▪ coma ▪ swallowing difficulties ▪ vision deterioration ▪ breathing deterioration ▪ voice changes ▪ very fine facial twitching ▪ slight trembling of hands and fingers ▪ headaches/ dizziness ▪ fatigue ▪ joint pain ▪ anemia ▪ anxiety ▪ depression ▪ Insomnia 	<ul style="list-style-type: none"> ▪ Air ▪ Dust

MINERAL	FUNCTION/S	DEFICIENCY/S	TOXICITY/S	SOURCES
<p>Lithium (Li)</p>	<ul style="list-style-type: none"> ▪ controversial trace element that may be essential to health 	<ul style="list-style-type: none"> ▪ produced fewer offspring in some animals ▪ lowered birthweights and lifespan and altered liver and blood enzyme activity ▪ depression ▪ alcohol cravings ▪ unregulated conversion of essential fatty acids to prostaglandins ▪ unstable serotonin neurotransmitter levels ▪ decreased acetylcholine receptors ▪ decreased lymphocyte levels ▪ increased suppressor cell activity 	<ul style="list-style-type: none"> ▪ birth defects ▪ body fluid imbalances ▪ altered sodium replacement in tissues 	<ul style="list-style-type: none"> ▪ seawater & its plants

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<p>Nickel (Ni)</p>	<ul style="list-style-type: none"> ▪ activates such enzymes as arginase, trypsin, and carboxylase in the liver ▪ involved in glucose metabolism ▪ required for hormone, lipid, and membrane metabolism ▪ for basic cell integrity and for the growth of a healthy fetus ▪ Significant amounts are found in the DNA and RNA and may act as a stabilizer of these nucleic acids 	<ul style="list-style-type: none"> ▪ hormone imbalances ▪ deterioration of glands/thyroid/adrenal function ▪ deterioration of prolactin regulation ▪ deterioration of growth and pigmentation ▪ blood abnormalities ▪ decreased hematocrit ▪ increased blood cholesterol ▪ fatigue ▪ coarse hair ▪ deterioration of RNA/DNA production ▪ decreased cell membrane integrity ▪ deficiency will also affect zinc and iron metabolism 	<ul style="list-style-type: none"> ▪ sore gums/tongue ▪ small red lumps on skin ▪ dizziness ▪ nausea ▪ coughing ▪ shortness of breath ▪ low grade fever ▪ chronic asthma ▪ headaches ▪ nausea ▪ vomiting ▪ respiratory problems ▪ interference with enzymes in the Krebs Cycle ▪ skin rashes ▪ chest pain 	<ul style="list-style-type: none"> ▪ Nuts ▪ Dried bean ▪ Peas ▪ Grains ▪ Foods rich in iron

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<p>Silicon (Si)</p>	<ul style="list-style-type: none"> ▪ the metabolism of connective tissue ▪ the formation of collagen ▪ the calcification of bone ▪ the maintenance of elastic tissue integrity 	<ul style="list-style-type: none"> ▪ slow healing ▪ angina ▪ fatigue ▪ dull/glazed eyes ▪ decreased growth ▪ skin pallor ▪ deterioration of memory ▪ tooth demineralization ▪ abnormal tooth enamel ▪ deformed bones and deterioration of bone growth ▪ distorted eye socket development ▪ deterioration of collagen formation ▪ skin flabbiness ▪ decreased skin elasticity ▪ carbuncles ▪ hair falling out ▪ ribbed nails ▪ ingrown nails ▪ deterioration of embryonic development ▪ decreased immunity 	<ul style="list-style-type: none"> ▪ promotes malignant tumors 	<ul style="list-style-type: none"> ▪ high fiber foods ▪ husks of grains ▪ root vegetables

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Tin (Sn)	<ul style="list-style-type: none">helps in maintaining the structure of protein or in oxidation-reduction reactions	<ul style="list-style-type: none">deterioration of growth and of tooth developmentdecreased cancer resistance	<ul style="list-style-type: none">shortened life span	<ul style="list-style-type: none">Foods processed in unlacquered tin cans

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MINERAL	FUNCTION/S	DEFICIENCY/S	TOXICITY/S	SOURCES
<p>Vanadium (Va)</p>	<ul style="list-style-type: none"> ▪ have a role in the regulation of sodium and in the metabolism of glucose and lipids ▪ necessary for cellular metabolism and in the formation of bones, teeth, growth, and reproduction 	<ul style="list-style-type: none"> ▪ deterioration of growth and bone ▪ teeth demineralization ▪ heart disease ▪ raised blood cholesterol ▪ increased triglycerides ▪ deterioration of fat metabolism ▪ increased squalene synthetase levels ▪ decreased acetoacetylcoenzyme A levels ▪ abnormal bone growth ▪ liver deterioration ▪ decreased cancer resistance ▪ deterioration of reproductive systems 	<ul style="list-style-type: none"> ▪ anemia ▪ green tongue ▪ confusion ▪ inflammation of lungs and eyes ▪ cataract development ▪ cramps ▪ diarrhea 	<ul style="list-style-type: none"> ▪ Shellfish ▪ Mushroom ▪ Parsley ▪ Dill seed ▪ Whole grains

MINERAL	FUNCTION/S	DEFICIENCY/S	TOXICITY/S	SOURCES
Aluminum (Al)	<ul style="list-style-type: none">▪ Used to bind plasma phosphorus▪ An ingredient to analgesics and antacids		<ul style="list-style-type: none">▪ inhibit mineralization of the bones▪ Alzheimer's disease and other dementia▪ Anemia	<ul style="list-style-type: none">▪ processed cheese▪ antacids▪ analgesics

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