

## Trace Elements in Food: Eating to Meet Your RDAs

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Dr. Sarah Myhill, MD, is a UK-based fatigue specialist focused on nutrition and preventive medicine.\* Here she lists the daily amounts of trace minerals needed to support health; key foods we can eat to obtain these minerals; and the many physical signs that can indicate we're not getting enough of them.

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### People who traditionally live to great ages are often found living in areas watered by streams from glaciers.

Glaciers are lakes of ice which have spent the previous few thousand years crunching up rocks. Therefore the waters coming from the glaciers are very rich in minerals. This is used not just to drink but to irrigate crops and bathe in.

These people therefore had excellent levels of micronutrients. Given the right raw materials, things do not go wrong in the body and ageing is slow. For example:

- Low **magnesium** and **selenium** is a risk factor for heart disease
- Low **selenium** increases risk of cancer.
- **Copper** is necessary to make elastic tissue - deficiency causes weaknesses in arteries leading to aneurysms.
- Low **chromium** increases risk of diabetes.
- Good antioxidant status (**vitamins A,C,E and selenium**) slows the ageing process.
- Superoxide dismutase enzymes require **zinc, copper** and **manganese** to function.
- **Iodine** is necessary to make thyroid hormones and is highly protective against breast disease. (See "[Iodine](#)" )
- The immune system needs a huge range of minerals to work well, especially **zinc, selenium, magnesium**.
- **Boron** is highly protective against arthritis.
- **Magnesium** is required in at least 300 enzyme systems.
- **Zinc** is needed for normal brain development, a deficiency at a critical stage of development causes dyslexia.
- Any deficiency of **selenium, zinc, copper, magnesium** can cause infertility.
- **Iron** prevents anemia.

- **Molybdenum** is necessary to detox sulphites.

The secret of success is to copy Nature. Civilization has brought great advantages, but at the same time is responsible for escalating death rates from cancer and heart disease. I want the best of both worlds. I like my warm kitchen, fridge, cooker, computer and telly. But I want to eat and live in the environment in which primitive man thrived.

### **The Needed Trace Elements – Food Sources & RDA**

Trace element deficiencies are common partly as a result of Western style agriculture, food processing and food choices. They can be corrected by taking the appropriate supplements, but also by eating the right foods.

RDA = recommended daily amount. This differs widely from one person to another - for example, illness increases requirements. The figure after each food [below] is *how much of that food one would have to eat if the daily requirement came solely from that food.*

This list illustrates the point that it is virtually impossible to eat the RDAs of vitamins and minerals living a Western lifestyle. One would have to eat large amounts of food - and take large amounts of exercise to keep a balance. This of course is what primitive man would have done! As we age and become biochemically less efficient, these amounts all increase. One also needs efficient digestion to absorb these micronutrients.

#### **Magnesium - 350mgs**

- Kelp 2oz (57g)
- Almonds 5oz (142g)
- Cashews 5oz (142g)
- Brazil nuts 6oz (170g)
- Brown rice 14oz (397g)
- Soybeans 16oz (454g)
- Green leafy vegetables 25oz (709g)

#### **Calcium - 800mgs**

Calcium is all about vitamin D. There is plenty of calcium in food, it is the *absorption* that is the problem. This is dependent on vitamin D and the only real source of that is sunshine. In the winter especially we should all be taking a vitamin D supplement, at least 1,000iu a day and arguably 5,000iu! Kelp 3oz

- Almonds 8oz (227g)
- Corn tortillas 16oz (454g)
- Brazil nuts 16oz (454g)
- Tofu 14oz (397g)
- Dried figs 14oz (397g)
- Sunflower seeds 14oz (397g)

#### **Potassium - 2,000-6,000mg (figures for 4,000mg)**

- Kelp one teaspoonful
- Rice bran 8oz (227g)
- Nuts 10oz (283g)
- Parsnip 20oz (567g)
- Potato 20oz (567g)
- Banana 30oz (850g)(that's a lot of bananas and represents a high glycemic load, so banana is not a good way to get potassium!)
- Leafy green vegetables 30oz (850g)

### **Iron**

*Absorption* is the name of the game! Iron absorption is blocked by tea and this is the main cause of iron deficiency in UK. Another major cause of iron deficiency is hypochlorhydria [not enough stomach acid] - see ["Heartburn \(GERD\) - at last I have sussed out why this is such a common problem!"](#)

- The richest sources of iron are in liver 8.8oz (249g) and meats.

### **Zinc - 15mgs**

Zinc is often low in vegetarians or people on low protein diets.

- Oysters half an ounce (14g)
- Steak/chops 9oz (255g)
- Pecans 11oz (312g)
- Brazils 12oz (340g)
- Egg yolk 12oz (340g)
- Oats

### **Copper - 2mgs**

Rich in nuts, split peas, liver, meat, butter. Deficiency uncommon except junk food diets.

### **Manganese - 5mgs**

- Pecans 5oz (142g)
- Brazils 8oz (227g)
- Oatmeal 24oz (680g)
- Rhubarb 30oz (850g)

### **Iodine - 75mcgms**

- Any seafoods 4oz (113g), otherwise very dependent on soil iodine levels.
- If soil levels O.K, then eggs, nuts.
- Use iodized salt.

### **Chromium - 200mcgms**

Chromium is poorly absorbed. It is best absorbed from yeast, black pepper, liver, cheese and wholemeal bread.

- Meat/liver 16oz (454g)
- Potato 30oz (850g)

### **Selenium - 200mcgms**

Levels in food are very dependent on soil selenium. Since changing from Canadian to European wheat, UK selenium intakes have halved in the last 10 years...

- Herring 5oz (142g)
- Brazil nuts 8oz (227g)
- Any seafoods 10oz (283g)
- Milk 16oz (454g)
- Brown rice 16oz (454g)
- Meats 30oz (850g)

### **Molybdenum - 500mcgms**

- Lentils 9oz (255g)
- Liver 10oz (283g)
- Split peas 10oz (283g)
- Green leafy vegetables 12oz (340g)
- Brown rice 20oz (567g)
- Oats 24oz (680g).

Recent research has shown that micronutrient content of food is declining, so these amounts may already be out of date! See LifeExtension article, ["Vegetables Without Vitamins."](#)

### **Goodies and Baddies...**

- Use [sea salt](#) to get the trace minerals.
- **Vitamin C** improves absorption and tea/coffee blocks absorption. So drink fruit juice with meals, and tea/coffee between meals.
- Trace element content depends very much on **soil levels**.
- **Organic foods** will have lower water content and better trace element content than chemically fertilized foods.
- **Sugar, alcohol, caffeine** are 'anti-nutrients'. They require trace elements for their metabolism in the body and increase daily requirements.
- **Wheat bran** is rich in many trace elements but contains phytic acid which blocks their absorption.
- **White flour** is markedly deficient in trace elements compared to wholemeal.

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### **Nutritional Deficiencies - Signs to Look for if You Think You May Have Them**

This list has been compiled by Dr. Patrick Kingsley [a founder of The British Society of Allergy, Environmental and Nutritional Medicine] – so thank you Patrick! I have added in a few of my own. The following can be *pointers* to mineral and vitamin deficiencies, but they

do not apply in all cases.

### **Hands and Nails**

- Cold hands - magnesium deficiency
- White spots on nails - almost any mineral deficiency but typically zinc
- Ridges on nails - poor blood supply, zinc deficiency
- Soft or brittle nails - any mineral deficiency especially magnesium
- Bitten nails - general mineral deficiency

So often, people comment that nails get tough when they start taking nutritional supplements - What everybody should be taking all the time even if nothing is wrong. Many of the raw materials for nails are the same as for bone and connective tissue - so nail health reflects bone and connective tissue health!

### **Skin**

- Stretch marks indicate zinc deficiency. They are common in pregnancy not because the skin is stretched but because demands for zinc are high!
- Follicular hyperkeratosis (rough skin, especially on the heels)- vitamin A deficiency
- Spontaneous hemorrhages - lack of vitamins C or K. See [“Vitamin K – necessary for normal bone formation and prevention of osteoporosis”](#)
- Dry scaly skin with hair follicles plugged with coiled distorted hairs and a red halo - vitamin C deficiency
- Yellow palms - excessive beta carotene intake. But can be due to eating lots of colored vegetables!
- Pimply rough skin at the back of the upper arms (chicken flesh) - essential fatty acid deficiency
- Greasy red scaly skin of face and sides of nose - vitamin B2 deficiency
- Seborrheic dermatitis around nose and an acne like forehead rash - vitamin B6 deficiency

### **Mouth and Gums**

- Pale fissured tongue - iron (Fe) deficiency
- Sore painful fissured tongue - vitamin B3 deficiency
- Sore burning tongue and lips and peeling of lips - vitamin B2 deficiency

- Swollen tongue with lateral teeth indentations - food intolerance. Also myxoedema - see Hypothyroidism.
- Painful sore tongue with a smooth appearance - folic acid deficiency
- Angular cheilosis (splits in lips) - vitamin B2 deficiency, thrush
- Gum disease and pyorrhoea – CoQ-10 deficiency, folic acid deficiency.
- Bleeding gums - vitamin C deficiency.

### **Eyes**

- Cataracts - chromium deficiency or excess free radicals
- Bags or dark rings under eyes - allergies or food intolerances
- Blue eyes and blond hair are often seen in hyperactive male children - zinc, magnesium, B6 and essential fatty acids deficiencies
- Blue eyes and premature grey hair - vitamin B12 deficiency, a feature of pernicious anemia.

### **Neck**

- Goiter, thyroid swelling - iodine deficiency

### **Legs**

- Tender calf muscles - magnesium deficiency
- Brisk (hyper) knee reflexes - magnesium deficiency
- Restless legs - mineral deficiency, tendency to be acidic - see ["Acid-Alkali Balance"](#)

### **Clinical Histories of Nutritional Relevance**

The following can suggest particular deficiencies [causing or resulting] or allergies:

- Nasal polyps - salicylate sensitivity
- Catarrh, sinusitis, history of removal of tonsils and adenoids for good clinical reasons - milk intolerance
- Poor healing - zinc deficiency
- Poor dream recall - vitamin B6 deficiency
- Blood sugar swings with obvious low blood sugar episodes - chromium deficiency
- Pre-menstrual syndrome - progesterone, magnesium, zinc and essential fatty acid

## deficiencies

- Glandular fever - inadequate liver detoxification mechanisms
- Sensory symptoms - B12, B1, magnesium deficiencies
- Mental symptoms - B12 deficiency
- Parkinsonism/multiple sclerosis - glutathione deficiency
- Cervical dysplasia - vitamin B6 and folic acid deficiency, papilloma/wart virus. Heals well with DMSO on the end of a tampon
- Arthritis - boron and sulphur (MSM) deficiency
- Measles - vitamin A deficiency
- Persistent diarrhea leading to fatigue - magnesium and potassium deficiencies
- Many diuretics cause magnesium and potassium deficiencies
- Muscle cramps - magnesium deficiency
- Shaking hands - magnesium and vitamin B1 deficiencies
- Hypertension - magnesium deficiency
- Dysphagia (difficulty swallowing) - magnesium deficiency
- Sensitivity to light - magnesium deficiency
- Osteoporosis - don't forget to think about magnesium
- PET - magnesium deficiency
- Hair loss - thyroid, iron (Fe), biotin, zinc and essential fatty acid deficiencies (must measure serum ferritin to check iron stores)
- Frequent colds - zinc and vitamin C deficiencies
- Infertility, miscarriages and premature labor - zinc deficiency
- Poor sense of smell and taste - zinc deficiency
- Poor vision or night blindness - zinc and vitamin A deficiencies
- Dry eyes - vitamin A deficiency
- The contraceptive pill and HRT can cause an increase in copper levels, and zinc, magnesium and vitamin B6 deficiencies

- Blocked nose with red wine - molybdenum deficiency
- Bowel cancer - selenium deficiency
- Mercury amalgams in teeth - selenium and glutathione deficiencies
- Cardiomyopathies (Keshan Disease) - selenium deficiency
- Heart attacks - vitamin E deficiency (identified by [the Shute brothers](#), “vitamin E pioneers.”)
- Hair loss, dandruff, eczema, excessive ear wax production, poor wound healing, excessive thirst (especially in hyperactive children), pre-menstrual symptoms of any sort - essential fatty acid deficiency
- Carpal tunnel syndrome - vitamin B6 deficiency
- Vegans - vitamin B12, zinc and iron deficiencies
- Gastrectomy - vitamin B12 and HCL (stomach acid) deficiencies
- Diabetic peripheral neuropathy [nerve pain/numbness] - vitamin B12 deficiency
- Elderly - low everything, especially vitamin Bs and HCl deficiencies
- Persistent infections - vitamin C and zinc deficiencies.

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Different disease states may result in different deficiencies, but everybody needs the basic building blocks in order to achieve optimum health.

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