

THE GLOBAL IMPACT OF ZINC MICRO NUTRIENT DEFICIENCIES

Michiel C. Laker
477 Rodericks Road, Lynnwood 0081, South Africa
E-mail: mlaker@mweb.co.za

SUMMARY

The global impact of zinc micro nutrient deficiencies is discussed from a geomedical perspective. Geomedicine refers to the relationships between the essential mineral nutrient contents of soils and rocks and human health. For developing countries, zinc is the highest rated nutrient deficiency (above iron and Vitamin A deficiencies) on the list of the top ten human health risk factors.

Zinc deficiencies lead to increased incidence or bigger severity of a long list of human diseases and disorders. Zinc is, *inter alia*, very important for maintaining the immune system of humans, including having antiviral properties. It is also required for normal brain growth and functioning. Furthermore, it is important for reducing the vulnerability of humans to diseases like malaria, pneumonia and diarrhoea, which are prevalent in many developing countries. Zinc deficiency leads to retarded growth and increased incidences of dwarfism.

It is important to look not only at zinc intake in the diet, but to especially look at the bio-availability or absorbability of the zinc in food. High fibre and phytate contents, such as found in unrefined staple grains and pulses, strongly reduce the absorbability of zinc. Animal sources, especially red meat, are the most efficient sources of meat.

The efficiencies of different crops to absorb zinc from soils differ widely. Amongst the staple grains and pulses maize, rice, sorghum and beans are very sensitive to zinc deficiencies, while the small grains (wheat, oats and rye) are very tolerant to zinc deficiencies. There are also large differences between different cultivars of the same crop in regard to their zinc-efficiencies and sensitivities to zinc deficiencies. High yielding variety maize hybrids are usually very zinc-inefficient.

Zinc deficiencies in soils can be absolute deficiencies or induced deficiencies. Absolute deficiencies are related to the parent material, texture, degree of weathering and/or pH and calcareousness of a soil. Zinc deficiencies are common in soils derived from sandstone or granite, soils with sandy textures (especially light gray sands), highly weathered and leached soils of humid tropical areas and neutral to alkaline and or calcareous soils.

Induced deficiencies are mainly due to injudicious liming, injudicious phosphorus fertilization or removal of topsoil. Liming to pH(Water) levels higher than 5.5 on sandy soils or 6.0 for other soils induce zinc deficiencies and also sharply reduced the uptake of applied fertilizer zinc.

Several methods can be used to supply zinc, but fertilization with zinc-enriched commercial NPK fertilizers may be the most appropriate method for developing countries. It is simple to handle and can improve both dietary zinc levels and increase crop yields, thus improving food security.