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## Mineral Fertilisation for Higher Agronomic Benefits and Nutritional Value

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### Abstract

Currently, poor soil fertility, improper nutrient management and imbalanced mineral nutrition are still widespread problems in many developing countries, resulting in both food and nutrition insecurity. An adequate and well-balanced mineral fertilisation is essential in achieving and maintaining high crop production and also harvesting products with adequate nutrient density. Generally, crop production takes places under stressful environments. There are a number of published examples showing that mineral fertilisers play a key role in mitigating adverse impacts of environmental stress factors on crop plants such as water deficiency, heat stress, salinity, and aluminium toxicity.

Inadequate supply of mineral nutrients to plants diminishes not only productivity but also seed nutrient density. Using seeds with low nutrient density is often associated with impairments in seed vitality and seedling vigour, leading to reduced agronomic performance of seedlings and low yield capacity. Plants emerging from seeds with low nutrient reserves are highly susceptible to environmental stress conditions and infection by pathogens. Ensuring sufficient nutrition of seeds with mineral nutrients during reproductive growth stage is, therefore, a critical issue in achieving positive agronomic impacts on productivity and improving nutritional value of the harvested products for human health. Currently, zinc (Zn) and iron (Fe) deficiencies are well-documented nutritional problems in human populations, resulting in poor public health, especially in the developing world. Reduced dietary intake of those micronutrients represents a major reason for high incidence of micronutrient deficiencies where cereal grains are the major source of calorie intake. Cereals are inherently very low in micronutrients and contain even lower Zn and Fe levels when grown on micronutrient-deficient soils. Increasing concentration of Zn and Fe in food crops is, therefore, an important global agronomic target and humanitarian challenge. Mineral fertilizer strategy represents a quick solution to alleviate micronutrient malnutrition, and highly advantageous strategy as it may also contribute to better yields on Zn and Fe deficient soils. In case of Zn, increasing evidence available from field experiments shows that foliar application of Zn fertilizers both fortifies grain Zn concentration up to 2-fold as well as improving crop yields. The results available suggest that fertiliser strategy is a useful agronomic practice for an effective enrichment of cereal grains with micronutrients and thus for contributing to nutrition and well-being of human populations.

**Keywords:** Human nutrition, mineral fertilisation, seed quality, stress tolerance