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## **ABSTRACT**

### **Fighting Human Malnutrition with Plant Mineral Nutrition**

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Despite increasing amount of available food for human consumption, micronutrient deficiencies (“hidden hunger”) represent still a global health problem in human populations, particularly in developing world. Zinc, iodine, iron and selenium deficiencies are well-documented micronutrient deficiencies affecting around 2 billion people. Diverse of health complications and chronic diseases develop in body as a consequence of hidden hunger. Micronutrient deficiencies are also increasingly reported in well-developed countries. Inadequate daily intake of micronutrients is becoming prevalent in many European countries, especially in children and women, especially selenium and iodine.

High prevalence of micronutrient deficiencies is closely related i) to the regions where soils contain low amounts of soluble micronutrients for plants, and ii) to consumption of foods with low amount and bioavailability of micronutrients. Rice, wheat and maize very commonly contain 10-15 µg iodine per kg grain that is far too low to meet daily iodine requirement of human populations that is between 150-200 µg per day. Plant materials used for livestock feeds are reported to be very low in iodine and other micronutrients. It is very likely that consumption of foods (and drinks) rich in nitrate and chloride induces iodine deficiency problem in human body because nitrate (and also possibly chloride) interferes with uptake of iodine into thyroid tissue. Similarly, high nitrate (and chloride) in soils may also reduce root uptake of iodine and its accumulation in edible parts of food crops.

This presentation will discuss the role of agriculture in fighting the micronutrient deficiencies in human populations. Newly published results under HarvestPlus-HarvestZinc project ([www.harvestzinc.org](http://www.harvestzinc.org)) indicate that agronomy (i.e., targeted fertilizer-strategies) provide highly

useful, natural and cost-effective opportunity for improving grain accumulation of micronutrients in field-grown plants adequately. Consuming foods biofortified with micronutrient fertilizers under field conditions is expected to significantly alleviate human nutritional problems with micronutrients.

#### Selected references

- (1) Cakmak I and Kutman B. (2018) Agronomic biofortification of cereals with zinc: a review. *European. J. Soil Science*, 69: 172–180
- (2) Cakmak, I et al (2017) Iodine biofortification of wheat, rice and maize through fertilizer strategy. *Plant and Soil*, 418:319–335