

NUTRIENTS ARE ESSENTIAL FOR HUMAN HEALTH

Fertilising Crops to Improve Human Health

Based on Extracts from 'Perspectives on Enhancing the Nutritional Quality of Food Crops with Trace Elements' by Ross M. Welch and Robin D. Graham.

Part 01

Fertilisers & Human Health
An 8 Part Series

Main Message

Good human health not only requires enough calories, but also sufficient intake of all essential nutrients.

Traditionally, fertilisers have been used to maintain or restore soil fertility, increase crop yield and to a lesser extent, improve crop quality. Their management has been progressively improved to optimise economic return, whilst minimising negative impacts on the environment.

More recently, there is increasing attention to another dimension; managing fertilisers, in such a way, that they also contribute to healthy and productive lives for all consumers.

Key Points

- Nearly all human food systems on earth are dependent on agriculture as their primary supplier of nutrients. Farmers should therefore be thought of as nutrient providers.
- Micro-nutrient malnutrition (which includes both trace element and vitamin deficiencies) is the result of dysfunctional food systems based in agriculture that do not meet all human nutritional needs.
- Agricultural tools and strategies, such as the use of liquid trace element fertilisers, can be used to address micro-nutrient malnutrition.
- There is nothing more important than supplying all the nutrients required for the good health of the human race – and the sustainable means to this end must come from agriculture.

“Despite the US' ability to produce so much healthy food, fewer than one in five American adults is metabolically healthy”, as stated by *Dr Dariush Mozaffarian, Dean of the Friedman School of Nutrition Science and Policy at Tufts University* in a recent national report. In it, he described poor diet as "now the leading cause of poor health in the US, and the cause of more than half a million deaths a year".

Source: Australian Financial Review dated April 21, 2020 by Jane E. Brody



RLF-treated Sun Rose grapes
Huyi District, Xi'an City, Shaanxi Province, 14th August 2019.

RLF. 25+ Years of Plant Nutrition.

RLF Specialty Liquid crop nutrition fertilisers have been developed, manufactured and continually refined over a period of more than 25 years to a position today where our products are targeted to provide the nutrition needs of any particular crop, or for any particular deficiency. Balanced crop nutrition, by supplying all essential nutrients is a generally recognised, cost effective fertiliser management strategy. We are playing our part to assist the world's agricultural sector transition to more efficient, productive and restorative practices to ensure a continued safe and nutritionally healthy food supply.

Complete Scientific Review Extracts are:

From: *Perspectives on Enhancing the Nutritional Quality of Food Crops with Trace Elements* by Ross M. Welch and Robin D. Graham, *Fertilizing Crops to Improve Human Health: A Scientific Review*, Chapter 3, October 2012 (ISBN: 978-0-9834988-0-3).

Fertilizing Crops to Improve Human Health: A Scientific Review, is a joint publication by the International Plant Nutrition Institute (IPNI) and the International Fertiliser Industry Association (IFA).

All biological systems depend on essential nutrients in balance to thrive. Lack of any one nutrient will lead to loss in productivity, disease states, and ultimately death.

Nearly all human food systems on earth are dependent on agriculture as their primary supplier of nutrients. If agriculture cannot provide adequate amounts of all nutrients, these food systems become dysfunctional and malnutrition ensues. The question of how agriculture can best feed a burgeoning human population when faced with unprecedented challenges occupies the minds of world leaders today.

There is nothing more important than supplying all the nutrients required for good health, felicity, and longevity of the human race. The sustainable means to this end must come from agriculture. Malnutrition, including trace element deficiencies, is the result of dysfunctional food systems based in agricultural systems that provide the nutrients to feed the world. **Thus, farmers should be thought of as nutrient providers.**

It is imperative that agriculture be closely linked to human nutrition and health and that fertiliser technology be used to improve the nutritional quality of staple food crops.

Humans require at least 10 essential trace elements (Boron, Copper, Fluorine, Iodine, Iron, Manganese, Molybdenum, Nickel, Selenium and Zinc). The foods produced from farmer fields are the primary suppliers of these nutrients.

Micronutrient malnutrition (which includes both trace element and vitamin deficiencies) is the result of dysfunctional food systems based in agricultural systems that do not meet all human nutritional needs. Agricultural tools can be used to address micronutrient malnutrition. These tools include the biofortification strategies of plant breeding and use of trace element fertilisers.

Biofortification strategies.

Biofortification is a name given to agricultural efforts to improve nutritional value of food crops (staples, mainly). The primary effort is through plant breeding, both conventional and biotechnological, but nutritional value can also be improved by the use of trace element fertilisers.

Fertiliser biofortification.

Fertiliser technologies for biofortifying staple food crops (frequently referred to as agronomic biofortification) with essential trace elements have been 'on the shelf' for decades, although a more recent technology, fluid fertilisers, may be an important advance that will benefit both yield and micronutrient value compared to current solid fertilisers (Holloway et al., 2008).

Fertilisers can be used both to increase the yield and the concentration of specific nutrients in plant parts. Typically, in these cases, adding the more deficient nutrient results in a yield increase, and adding both limiting nutrients (assuming no others) causes a large yield increase at relatively small cost. It is costly to ignore them as they can severely limit the benefits of the costly macronutrient fertilisers used.

Any nutrient deficiency is likely to aggravate the effect of an environmental stress such as heat, cold, drought, water logging, fungal pathogens, salinity, direct drilling, topsoil drying, herbicide damage and seasonal differences such as the timing of the break of the season.

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