IPNI
Plant Nutrition TODAY
Better Crops, Better Environment...through Science

From Scientific Staff of the
International Plant Nutrition Institute (IPNI)
3500 Parkway Lane, Suite 550
Norcross, Georgia 30092-2844 USA

Phone: 770-447-0335 Fax: 770-448-0439
E-mail: info@ipni.net Website: www.ipni.net

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FERTILIZER USE AND HUMAN HEALTH

Once again, food prices have been climbing. A growing human family seeks more and better food. Farmers, already under pressure to reduce impact on the environment, are pushed to produce more. Responsible stewardship of plant nutrition has never been more important.

The issue of food security comprises more than just quantity. Quality is just as crucial. Plant nutrition impacts both, ensuring that plant products nourish people. To meet the nutritional needs of expected population growth, global cereal production is forecast to increase by 70% by 2050. Important components of these nutritional needs include carbohydrates, proteins, oils, vitamins, and minerals. Plant nutrition affects them all.

Many of the healthful components of food are boosted by the application of nutrients. Since most farmers already fertilize for optimum yields, these benefits are easily overlooked. Applying N to cereals adds to the protein they produce, as well as their yields. Phosphorus, K, and S enhance the biological value of the protein in potatoes. Trace elements important to human nutrition, especially zinc, selenium, and iodine, can be optimized in the diet by applying them to food crops. Plant nutrition can impact the plant diseases that cause degradation of food products and mycotoxin risks.

Where rice is the most common staple and where intake of milk products is low, calcium deficiency can be quite common. Broccoli and soybeans are examples of plants that can contribute calcium and magnesium to the human diet. When crops like these are grown in acid soils of limited fertility, applying lime can boost the levels of these minerals. Applying K can increase the K concentration of fruits and vegetables, along with qualities like sweetness, texture, color, vitamin C, beta-carotene, lycopene, and folic acid contents.

Fertilizer use can also be associated with a number of negative factors that need to be properly understood and managed. For decades, nitrate in drinking water has been a concern. While new evidence shows a positive role for nitrate in cardiovascular health, and the occurrence of methemoglobinemia has been rare in developed countries, questions remain regarding its potential relation to carcinogenic nitrosamines. More recent questions have arisen as to whether ammonia emissions from fertilizer could contribute to the formation of unhealthy levels of smog. Eutrophication leading to harmful algal blooms has been attributed in many places to losses of agricultural nutrients.

Even though questions remain regarding the degree to which agricultural nutrients are responsible, it must be acknowledged that the perturbations arising from the globally unprecedented, large-scale increase in the use of fertilizer in the past 50 to 100 years are worthy of careful attention and study. Those engaged in research and development for cropping systems recognize the multiple benefits of increasing nutrient use efficiency, and have already made considerable progress in reducing surpluses and losses of nutrients. Continued progress is needed to ensure optimum human health on both sides of the equation: the provision of adequate quantities of nutritious food, and the avoidance of harm to the environment upon which all life depends.

Responsible nutrient stewardship has great potential to continue providing benefits to the health of humanity. Working with the International Fertilizer Industry Association (IFA), the International Plant Nutrition Institute (IPNI) plans to release a scientific publication on fertilizer use and human health in the coming year. It will provide details on the impacts mentioned above, and on many more. The intent is to inform the industry, correct misperceptions with a credible science-based approach, and to invite constructive contributions from science toward enhancing the benefits and resolving the issues.

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For more information, contact Dr. Tom Bruulsema, Northeast Director, IPNI, 18 Maplewood Drive, Guelph, Ontario N1G 1L8, Canada. Phone: (519) 821-5519. E-mail: Tom.Bruulsema@ipni.net.

Abbreviations: N = nitrogen; P = phosphorus; K = potassium; S = sulfur.

Note: ***Plant Nutrition TODAY*** articles are available online at the IPNI website: www.ipni.net/pnt