



Technology 214 : Slow-release Micronutrient Fertilizers

This technology provides a new type of water insoluble micronutrient fertilizer for crops designed so that nutrient release is activated by root acids and is, therefore, under the control of the plant itself. Root systems release acid to absorb nutrients from soil, regulating acid release according to the plant's varying nutritional needs throughout their life cycle: greater the nutritional need, greater is the acid released. This unique characteristic combined with water insolubility provides a nutrient storehouse throughout the plant's life from just one application.

- Dosage reduced to 1/10th - 1/4th of current doses for micronutrient sulfates.
- Field trials of zinc micronutrients increased rice, wheat & corn yields 11% - 59%, averaging 29%.
- Nutrition: Tested crops increased in protein content, vitamin C and iron.
- Environment: Water insoluble property does not leach or wash out and pollute water sources.
- No harmful residual materials left in soil and no soil acidification.
- Avoids "feast or famine" of many current fertilization methods.
- In addition to nitrogen, phosphorus and potassium (NPK), micronutrients are essential building blocks required by plants and animals, i.e. iron in plant pigment is required for photosynthesis.
- Farmers of low profit margin food crops including rice, wheat, potatoes and soybeans cannot afford available micronutrient fertilizers.

Cost:

- Approx. 60% - 75% less than other micronutrient fertilizers (sulfate and chelate) due to low dose and cost of readily available materials in polymeric phosphate compound.
- U.S. corn farmer: production cost: \$442/acre* | revenue: ~ \$640/acre | profit: \$198/acre. *USDA
Additional expense of zinc micronutrient fertilizer: \$14/acre.
Increased production: minimum 10% or \$64/acre revenue increase.
Increase in production cost: 3% | revenue: 10% | profit: 32%

Development Status

- 7 micronutrient fertilizers developed and field tested in India. Not yet tested in U.S.
- Only lab scale production currently (10kg of fertilizer per batch).
- Large scale production equipment readily available. Manufacture similar to many chemicals.

IP Status

- 3 U.S. patent applications, 1 PCT application and 2 PCT applications in process.
- 4 Indian patents granted + 3 patents pending approval.

Partner Opportunities

- Manufacturing licensing agreements.
- Sales through distribution channels.

Innovator

- Dr. Chandrika Varadachari: Director, Raman Centre for Applied & Interdisciplinary Sciences, Calcutta. Dr. Kunal Ghosh, Professor Agriculture Chemistry & Soil Science, Calcutta University

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