TECH OFFER

Nano Iron Supplement for Plants

KEY INFORMATION

TECHNOLOGY CATEGORY:
Sustainability - Food Security
Chemicals - Agrochemicals
Life Sciences - Agriculture & Aquaculture

TECHNOLOGY READINESS LEVEL (TRL): TRL9
COUNTRY: MALAYSIA
ID NUMBER: TO175469

OVERVIEW

This technology offer presents a nano-formulated iron supplement designed to enhance nutrient uptake and improve plant growth efficiency. Using nano-sized iron particles, the formulation increases iron solubility and bioavailability, ensuring faster absorption through plant roots and foliage. Iron is essential for chlorophyll production, photosynthesis, and metabolic enzyme activities. In many soils, especially alkaline or calcareous soils, iron becomes unavailable, leading to yellowing leaves and reduced growth.

The formulation overcomes this challenge by delivering iron in a stable, highly absorbable form that maintains plant greenness, increases leaf development, and enhances overall plant vigor. Field trials on Brazilian spinach demonstrated up to 82% increase in plant height, broader leaf formation, and healthier coloration compared to untreated controls.

The technology owner is open to further co-development and field validation through multi-site trials, data sharing, and

performance benchmarking across various soil types and crops.

TECHNOLOGY FEATURES & SPECIFICATIONS

This nano-chelated iron formulation (23% w/w Fe) utilises nano-sized iron particles to increase solubility, mobility, and absorption efficiency in plant tissues. Key features include:

High Bioavailability & Rapid Uptake - Nano-scale particle size allows faster penetration through root and leaf membranes, improving nutrient translocation.

Supports Chlorophyll & Photosynthesis - Enhances chlorophyll biosynthesis and photosynthetic activity, resulting in deeper green foliage and improved energy production.

Prevents Chlorosis in High-pH Soils - Remains soluble and plant-available even in alkaline or calcareous soils where conventional iron forms become insoluble.

Improved Plant Growth Performance - Proven to increase plant height (up to 82%), expand leaf width, and strengthen stems, based on controlled plant trials.

Compatible with Foliar and Soil Application - Water-soluble formulation suitable for weekly foliar spray or root irrigation feeding.

POTENTIAL APPLICATIONS

Field & Plantation Crops

- Enhances chlorophyll formation and growth in crops such as paddy, corn, sugarcane, and oil palm, especially in iron-deficient soils.

Leafy and High-Value Vegetables

- Improves leaf size, greenness, and yield quality in vegetables such as spinach, kangkung, sawi, salad greens, and herbs.

Fruit Trees & Orchard Management

- Supports strong vegetative growth and fruit setting in mango, papaya, citrus, guava, banana, and other fruiting plants.

Greenhouse, Hydroponics & Vertical Farming

- Provides controlled iron supplementation in soilless systems, ensuring continuous nutrient availability for efficient plant metabolism.

Nurseries & Seedling Production

- Strengthens early-stage plant development, promoting healthier, greener seedlings with improved survival and transplant success.

UNIQUE VALUE PROPOSITION

This formulation delivers iron in a highly bioavailable nano-chelated form, ensuring rapid absorption and effective nutrient utilisation even in soils where conventional iron fertilisers fail. Its nano-scale formulation prevents chlorosis, enhances chlorophyll production, and significantly improves plant vigor and growth with lower application volume, reducing overall fertiliser cost. The product provides visible results, including greener leaves, stronger stems, and increased yield quality. Safe, water-soluble, and compatible with foliar or root application, the supplement supports sustainable, high-efficiency farming across field crops, vegetables, fruit trees, nurseries, and hydroponics. It offers farmers a proven, fast-acting, and cost-effective plant nutrition solution.