TRENDS IN AGRICULTURE SCIENCE

Popular Article

Vol.2 Issue 12 December 2023, Page: 1111-1115

Current Trends on Nutrient Management

J. Bhuvaneswari[1], S Sowmiya [2], M. Hemalatha[3] and M. Joseph[4]

[1]Assistant Professor, VOC AC&RI, Killikulam - 628252

[2]Ph.D Scholar, VOC AC&RI, Killikulam – 628252

[3]Professor and Head, VOC AC&RI, Killikulam - 628252

[4]Professor, VOC AC&RI, Killikulam - 628252

Introduction

One of the most important elements of agricultural sustainability is nutrient management. Insufficient application of chemical fertilisers led to a decline in the health of the soil, pollution of the environment, a shortage of micronutrients, and the inhibition of microorganism growth. An increase in nutrient consumption over time has led to several problems, including nutrient mining, low efficiency of nutrient use, deficiencies of both macro and micronutrients and a decrease in soil organic carbon. The two main concerns with Indian agriculture's nutrient management are nutrient mining and nutrient usage efficiency (NUE).

Current Trends in Nutrient Management

1. **Balanced fertilizer application to crops:** To sustain and improve nutrient supply, 4Rs strategies—the right source, right time, right place, and right rate—must be implemented.
2. **Real time nutrient management by leaf colour chart:** The LCC is an innovative, cost-effective tool for need-based or real-time nitrogen management in rice, wheat, and maize. It gauges the intensity of leaf colour, which is correlated with the leaf N status. Any source of applied nitrogen can be optimally used at high yield levels with LCC. These days, it is produced in four colours, known as Four Panel, and six colours, known as Six Panel LCC. Additionally, LCC receives a waterproof, laminated sticker in the necessary regional language.

Official Website: trendsinagriculturescience.com
e-mail Address: trendsinagriculturescience@gmail.com

Published: 28 Dec 2023

3. **Fertigation:** Fertigation is a type of fertiliser application where the drip system combines the nutrients in the irrigation water. Enhances crop production quality and quantity, increases efficiency in using water and fertilisers, and inhibits weed growth. The fertigation process used speciality water soluble fertilisers such as Polyfeed, MAP, Multi-K, and SOP. One of the benefits is that nutrients are evenly supplied to the root zone of the plant. It will enhance plant nutrient uptake and availability. This efficient technique reduces costs, effort, time, labour-intensive equipment, and energy consumption. It also conserves fertilisers, improves crop production by up to 25%.

Fertilizers commonly used in fertigation

Name	N – P2O5 – K2O content	Solubility (g/l) at 20 C
Ammonium nitrate	**34-0-0**	**1830**
Ammonium sulphate	**21-0-0**	**760**
Urea	**46-0-0**	**1100**
Monoammonium phosphate	**12-61-0**	**282**
Diammonium phosphate	**18-46-0**	**575**
Potassium chloride	**0-0-60**	**347**
Potassium nitrate	**13-0-44**	**316**
Potassium sulphate	**0-0-50**	**110**
Monopotassium phosphate	**0-52-34**	**230**
Phosphoric acid	**0-52-0**	**457**

4. **IPNS (Integrated Plant Nutrient Management System):** Chemical fertilizers, organic manures, biofertilizers, and crop residue are all used in combinations in IPNS. A balanced application of inorganic and organic nutrient sources is needed to maintain soil fertility, according to the integrated nutrient management approach to plant nutrition management. Restoring organic matter to the soil, lowering the amount of inorganic fertilisers used, improving nutrient utilisation efficiency, and preserving soil health are the goals of IPNS.

Official Website: trendsinagriculturescience.com
e-mail Address: trendsinagriculturescience@gmail.com
Published: 28 Dec 2023

The benefits include improving the availability of both applied and native soil nutrients, balancing crop nutrient demand with supply from both native and used sources, giving crops balanced nutrition, and lowering the adverse impacts caused by hidden deficiencies.

5. **Site Specific Nutrient Management (SSNM):** GPS-based fertility maps, Nutrient Manager GIS, and Nutrient Expert are tools for site-specific nutrient management.

   Nutrient Expert: The 4R guidelines can be included into a fertiliser recommendation using the Nutrient Expert® Decision Support System software. For crop advisors, it is a computer-based decision assistance tool. It was created for rice, wheat, and hybrid maize. It establishes the ideal planting density for a given area. It assesses the efficacy of current nutrient management strategies and assists in establishing a meaningful yield target based on achievable yield.

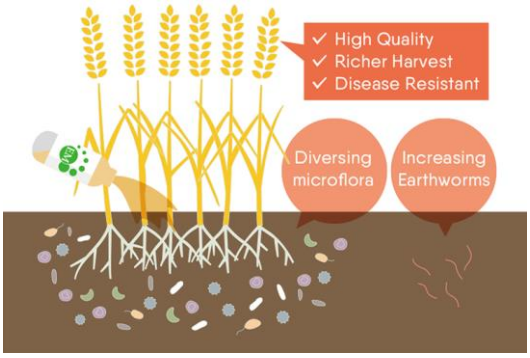
   Nutrient Manager: The International Rice Research Institute created Nutrient Manager, an interactive, user-friendly computer-based decision-making tool. A farmer or extension agent could easily complete the 10 to 15 multiple-choice questions on this decision tool in that amount of time. IRRI created.

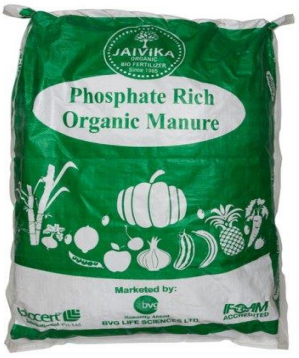
   GIS and GPS based fertility maps: These maps make it easier to detect a soil's fertility level at a distance. It also aids in planting, nutrient management, and other tasks site-specific.

6. **Soil Test Crop Response (STCR) :** The goal of the STCR technique is to provide a foundation for accurate quantitative fertiliser dose adjustment under a range of soil test values and crop performance targets. In order to provide a quantitative basis for determining the profit-maximizing dose of fertilisers based on soil tests for any crop, soil test crop response (STCR) studies based on soil test-based fertiliser recommendation should be conducted. A strategy that falls under STCR is the targeted yield idea.
7. **EM:** A consortium culture of various efficient microorganisms that are frequently seen in nature is called an effective microorganism. N2-fixers, P-solubilizers, photosynthetic microorganisms, lactic acid bacteria, yeasts, Rhizobacteria that promote plant growth, different fungi, and Actinomycetes are the most significant among them. Each member of this consortium has a unique and advantageous role in the cycling of nutrients, protecting plants, enhancing soil fertility, and maintaining soil health. The benefits of using EM include improved plant growth, photosynthetic potential, seed germination, seedling emergence, flowering, fruiting, and grain ripening. Additionally, it fosters the development and dispersal of the soil's flora and fauna.
8. **PROM:** By co-composting high-grade (32% P2O5 +/- 2%) rock phosphate in an extremely fine size (about 80% finer than 54 microns) with organic manure, phosphate-rich organic

Official Website: trendsinagriculturescience.com
e-mail Address: trendsinagriculturescience@gmail.com
Published: 28 Dec 2023

manure is created. The agronomic efficiency of phosphate-rich organic manure increases with the fineness of the rock phosphate.





9. **Customized fertilizers (area and crop specific):** A customised fertiliser is a multinutrient carrier that is made using a systematic granulation process and contains macro and/or micronutrients from both organic and inorganic sources. It is manufactured to meet the crop's nutritional needs specific to its site, soil, and stage and is verified by a scientific crop model developed by an accredited fertiliser manufacturing/marketing company. In order to maximise fertiliser usage efficiency of applied nutrient in a cost-effective manner, the primary goal of customised fertilisers is to promote site-specific nutrient. It is a crop-based soil fertiliser that is dependent on the climate to provide all the nutrients in the proper amounts. It boosts crop output, quality, and financial gains. Because it is a site- and crop-specific fertiliser, it enhances soil health.
10. **Slow-release fertilizer:** The use of slow-release fertilisers improved nutrient recovery, increasing the fertiliser application's return on investment. Yield is increased, while adverse environmental effects are decreased. Example: Sulphur coated urea, Urea super granule.
11. **Controlled release of fertilizers (crop and climate specific):** These fertilisers precisely control nutrient release properties to match the unique nutrient uptake requirements of each crops and climate circumstances through the application of advanced polymer coating technology.
12. **Fertilisers with nitrification and urease inhibitors:** Nitrification inhibitors are substances that, over time, slow down the activities of the soil-dwelling Nitrosomonas and Nitrobacter bacteria. This prevents the bacteria from oxidising ammonium ions and nitrite. These microorganisms are employed in denitrification, leaching, and boosting the effectiveness of nitrogen-applied fertiliser. Ex: urea covered in neem. Urease inhibitors stop or slow down the conversion of amide-N in urea to ammonium hydroxide and ammonium over a predetermined

Official Website: trendsinagriculturescience.com
e-mail Address: trendsinagriculturescience@gmail.com
Published: 28 Dec 2023

amount of time. They prevent ammonia losses to the atmosphere through volatilization by slowing down the rate at which urea hydrolyses in soil.

13. **Fortified fertilizer:** Products that are under the subsidy system might have up to 20% of their production fortified. Eleven enriched fertilisers based on zinc and boron have been added to FCO 1985. At its Kandla factory, IFFCO has installed a 30,000-ton-per-year zinc sulphate monohydrate 33% zinc production unit. Currently, the nation uses 0.18 million metric tonnes of micronutrient. Examples include zincated urea, boronated SSP, boron-fortified NPK Complex (10:26:26:0.3 and 12:32:16:0.3), boron-fortified DAP (18:46:0:0.3), boron-fortified NPK Complex (10:26:26:0.5 and 12:32:16:0.5), zinc-fortified DAP (18:46:0:0.5), and boron-fortified nitro phosphate with potash (15:15:15:0.2).
14. **100% water soluble complex fertilizers:** Currently, 16 grades of 100% water soluble fertilisers that are fully soluble in water according to their nomenclature have been notified in the FCO (1985). These fertilisers are sprayed foliarly or with drip irrigation. In the nation, these fertilisers are used in about 80,000 tonnes.
15. **Nano fertilizers (Nano urea):** With the use of nano-fertilizers (NFs), crop productivity with high-quality fruits and grains is increased, as well as soil quality and plant growth performance. Globally, managing macro-micronutrients is a challenging issue because it primarily depends on synthetic chemical fertilisers, which may not be cheap for farmers to use or environmentally beneficial for people. By controlling the number of fertilisers available in the rhizosphere, NFs can improve plant output and nutrient uptake. They can also lengthen stress tolerance by enhancing nutritional capacity and defence systems.

References

Megha Dubey, K.K.Agrawal and Suchi Gangwar.2014. Emerging trends of nutrient management for sustainable agriculture in India - component and tools. *JNKVV Res J* **48**(1): 14-21.

S.P. Singh, Chanchala Rani Patel and K.K. Paikra.2020. Integrated Nutrient Management: An Effective Approach for Sustainable Agriculture in Chhattisgarh: A Review. *Int.J.Curr.Microbiol.App.Sci* **9**(5): 1652-1662.

Official Website: trendsinagriculturescience.com
e-mail Address: trendsinagriculturescience@gmail.com
Published: 28 Dec 2023