

IFFCO SUPPORTS AGRICULTURE BY BIOFERTILISER

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DOI: <https://doi.org/10.5281/zenodo.17493372>

How to cite this Article: ¹Prof. (Dr.) Dhrubo Jyoti Sen, ²*Prof. (Dr.) Deepak Kumar. (2025). IFFCO SUPPORTS AGRICULTURE BY BIOFERTILISER. World Journal of Pharmaceutical and Medical Research, 11(11), 246–250.

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Article Received on 21/09/2025

Article Revised on 11/10/2025

Article Published on 01/11/2025

ABSTRACT

Indian Farmers Fertiliser Cooperative (IFFCO) is an Indian cooperative that manufactures and markets fertilisers. Founded in 1967 and headquartered in New Delhi, it is one of the largest cooperatives in the world, with around 35,000 member cooperatives reaching over 50 million Indian farmers. Indian Farmers Fertiliser Cooperative Limited, also known as IFFCO, is a multi-state cooperative society engaged in the manufacture and marketing of fertiliser. IFFCO is headquartered in New Delhi, India. Started in 1967 with 57 member cooperatives, it is today the biggest co-operative in the world by turnover on GDP per capita (as per World Cooperative Monitor 2021), with around 35,000 member cooperatives reaching over 50 million Indian farmers. With around 19% market share in urea and around 31% market share in complex fertilisers (P2O5 terms), IFFCO is India's largest fertiliser manufacturer. The cooperative was ranked 66th on the Fortune India 500 list of India's biggest corporations as of 2017, with a net worth of \$2.6 billion as of March 2021.

KEYWORDS: IFFCO, agro products, nano urea, DAP, NPK, green diet, flora diet, biofertiliser.

Overview: Indian Farmers Fertiliser Cooperative Limited, also known as IFFCO, is a multi-state cooperative society engaged in the manufacture and marketing of fertiliser. IFFCO is headquartered in New Delhi, India.

Founded: 3 November 1967

Founder: Udaybhansinhji Natwarsinhji Jethwa

Headquarters: New Delhi, India

Area served: India

Key people: Dileep Sanghani (Chairman), Balvir Singh (vice chairman), K J Patel (MD and CEO) and Udaybhansinhji Natwarsinhji Jethwa (Founder)



Figure-1: IFFCO stars.

Products: Fertilisers

Revenue: Increase ₹42,662 crore (US\$5.0 billion)

Net income: Increase ₹2,823 crore (US\$330 million)

Website: www.iffco.in

IFFCO, or Indian Farmers Fertiliser Cooperative Limited, is a cooperative society owned by its member

farmers through approximately 35,000 cooperative societies. The company is not privately owned but is a large cooperative headquartered in New Delhi, India. The current leadership includes Dileep Sanghani as Chairman and K J Patel as Managing Director and CEO.

Ownership: IFFCO is a multi-state cooperative society, meaning it is owned by its members, who are farmers represented by thousands of cooperative societies.

Leadership: The current leadership includes **Dileep Sanghani** [12 May 1954] as Chairman and **K J Patel** as the Managing Director and CEO.

Founder: The cooperative society was founded in 1967 by **Udaybhansinhji Natwarsinhji Jethwa** [5 October 1910-20 July 1977].

IFFCO offers both traditional and advanced fertilizers, including a wide range of products like:

Sagarika (seaweed liquid), Nano Urea and Nano DAP [Di-Ammonium Phosphate] for advanced plant nutrition, and a variety of organic liquid fertilizers like Green Diet and Flora Diet for soil and foliar application, and also traditional bagged fertilizers like NPK [NPK fertilizer is a blend of nitrogen (N), phosphorus (P), and potassium (K) to provide plants with essential nutrients for healthy growth, with different ratios tailored to specific plant needs.] and DAP. IFFCO has both a large-scale agricultural division for traditional fertilizers and an urban gardening division focusing on smaller-scale and organic solutions.

For large-scale agriculture:

IFFCO Nano Urea

- Pros: Reduces the need for bulky, conventional urea; improves crop quality, including protein and nutrient content; is environment-friendly and sustainable.
- Cons: It's a newer, nanotechnology-based product,

so farmers may need education on its application.

IFFCO Nano DAP

- Pros: A nanotechnology-based product that provides nitrogen and phosphorus; bioavailable to plants due to its small particle size and large surface area.
- Cons: It's a new, advanced product that requires education on its use.

IFFCO NPK and DAP (Granules)

- Pros: Traditional and widely used fertilizers that provide essential macronutrients for crops.
- Cons: Bulky and less nutrient-efficient than nano-fertilizers; potential for environmental issues like nutrient runoff.

For home and garden

IFFCO Sagarika (Seaweed Extract)

- Pros: Organic, promotes healthy growth, is suitable for all plants, and is available in both liquid and granular forms.
- Cons: Organic products may have a different growth effect compared to chemical fertilizers.

IFFCO Green Diet

- Pros: A balanced mix of macro and micronutrients that is water-soluble and quick-absorbing.
- Cons: Requires regular application to maintain effectiveness.

IFFCO Flora Diet

- Pros: A special formulation specifically designed to boost healthy flowering in plants.
- Cons: Not a complete plant food on its own; it is meant to be used in combination with Green Diet or other plant foods.



Figure-2: IFFCO plants and agro products.

(IFFCO) is the world's largest manufacturer and marketer of fertilizers in the cooperative sector. It serves over 35,000 cooperatives and 55 million farmers across India. IFFCO has five manufacturing plants in India and 19 joint ventures within India and overseas.

Plants

- ❖ Kalol, Gujarat: Commissioned in 1975 and expanded in 1997, it produces ammonia (1100 MTPD) and urea (1650 MTPD).
- ❖ Kandla, Gujarat: Commissioned in 1975 and first expanded in 1981 and again in 1999, it produces NPK (10:26:26; Capacity 520,000 MTPD), NPK

(12:32:16; Capacity 700,000 MTPD), NP (20:20:0:13), DAP (18:46:0; Capacity 1,200,000 MTPD) and water-soluble fertilisers.

- ❖ Phulpur, Uttar Pradesh: Commissioned in 1981 and expanded in 1997, it produced ammonia (9.7 lakh MT) and urea (17 lakh MT).
- ❖ Aonla, Uttar Pradesh: Commissioned in 1988 and expanded in 1996, it produced ammonia (1740 MTPD) and urea (1515 MTPD).
- ❖ Paradeep, Odisha: Taken over in 2005, it produces phosphoric acid (8,75,000 MTPA), sulphuric acid (23,10,000 MTPA), NPK (10:26:26), NPK (12:32:16), NP (20:20:0:13) and DAP (18:46:0)

grade of fertilisers.

Biofertiliser are environmentally friendly & cost effective renewable source of plant nutrients that supplements fertilisers. Biofertilisers contain living and latent microorganism cells that are capable of fixing atmospheric nutrients or solubilize insoluble nutrients for plant absorption. They are also excellent for enhancing nutrient availability in soil. These are categorised based on fertilisers' capability to solubilize the specific nutrient.

Nitrogen biofertilisers: Nitrogen biofertilizers are a sustainable agricultural solution that use microorganisms, such as bacteria and cyanobacteria, to convert atmospheric nitrogen into a usable form for plants like ammonia, nitrates, and nitrites. These biofertilizers are crucial for plant growth and enhance soil fertility, with different types being effective for different crops, such as Rhizobium for legumes and Azotobacter or Azospirillum for non-legumes.

- **Symbiotic and free-living bacteria:** Some bacteria, like Rhizobium, form symbiotic relationships within root nodules of legume plants, while others, such as

Azotobacter, live freely in the soil. Nitrogen conversion: These microorganisms use the enzyme nitrogenase to convert atmospheric nitrogen N_2 into ammonia NH_3 , which is then converted to nitrites and nitrates that plants can absorb.

- **Growth promotion:** Many biofertilizers also produce plant growth-promoting hormones and can increase root proliferation, leading to better water and nutrient uptake.
- **Other benefits:** Biofertilizers can also help solubilize insoluble phosphates and decompose organic matter, further improving nutrient availability and soil health. Common types and uses
Rhizobium: Symbiotic bacteria for legume crops like beans and peas, forming root nodules to fix nitrogen.
Azotobacter: Free-living bacteria for non-legumes such as maize, which also has fungicidal properties.
Azospirillum: Associative bacteria that form a loose association with the roots of non-legume plants like cereals, sugarcane, and bananas.
Acetobacter: Used for sugar-producing crops like sugarcane.
Blue-green algae/Cyanobacteria: Symbiotic with plants like the fern Azolla, commonly used in rice paddies.



Figure-3: Biofertilisers.

Phosphate stabilizing biofertiliser: A phosphate stabilizing biofertilizer is a product containing beneficial microbes, such as phosphate-solubilizing bacteria (PSB) that convert insoluble phosphorus in the soil into a plant-available form, improving its uptake and reducing the need for chemical fertilizers. These biofertilizers, which can contain bacteria like *Bacillus polymyxa* and *Pseudomonas fluorescens*, or fungi like *Aspergillus niger* also promote plant growth, enhance root development, and improve overall soil health.

- ✓ **Converts insoluble phosphorus:** It breaks down the complex, insoluble phosphate compounds in the soil into simpler, water-soluble forms that plants can absorb.
- ✓ **Increases nutrient availability:** By making phosphorus more accessible, it also enhances the plant's ability to absorb other micronutrients like zinc and iron.
- ✓ **Produces growth-promoting substances:** The microbes can produce organic acids and growth regulators that stimulate plant growth and strengthen the plant.
- ✓ **Improves crop yield:** Increases plant growth, flowering, and fruiting, leading to higher yields.
- ✓ **Enhances root development:** Promotes a more robust and deeper root system, which improves water and nutrient absorption.
- ✓ **Reduces chemical fertilizer use:** Offers an eco-friendly alternative to synthetic phosphorus fertilizers, which can be costly and lead to environmental residue.
- ✓ **Boosts soil health:** Improves the overall structure and fertility of the soil.
- ✓ **Increases disease resistance:** Helps to make plants more resistant to soil-borne diseases and strengthens their stems.
- ✓ **Seed treatment:** Apply the biofertilizer to seeds before planting, as described for other microbial inoculants.
- ✓ **Seedling dipping:** Dip the roots of seedlings in the biofertilizer solution before transplanting them.
- ✓ **Soil application:** Apply the biofertilizer directly to the soil.

All types of crops, including pulses, vegetables, oilseeds, and cereals. Organic farming and sustainable agriculture practices.

Potassium stabilizing biofertiliser: A potassium stabilizing biofertilizer, also known as a potassium mobilizing biofertilizer (KMB), is an eco-friendly product containing beneficial bacteria that converts insoluble potassium in the soil into a soluble form that plants can absorb. By releasing potassium from minerals like feldspar and mica, these biofertilizers improve crop yield, growth, and stress resistance while enhancing overall soil fertility.

- ❖ **Mobilizes potassium:** KMB contains microorganisms, such as *Bacillus* species, that break down insoluble potassium compounds in the soil.

- ❖ **Uses organic acids:** These bacteria produce organic acids, like citric and oxalic acid, to release potassium from minerals into a plant-available form.
- ❖ **Increases solubility:** This process enhances the solubility of potassium, making it easier for plants to absorb and use.
- ❖ **Benefits:**
- ❖ **Increases crop yield:** By improving potassium availability, these biofertilizers can lead to higher yields and better crop quality.
- ❖ **Enhances soil health:** Consistent use improves soil fertility by maintaining a balanced nutrient profile and restoring beneficial microbes.
- ❖ **Improves plant health:** It promotes vigorous root development, enhances nutrient and water uptake, and strengthens plants against environmental stresses like drought and salinity.
- ❖ **Environmentally friendly:** It is a natural, chemical-free alternative to conventional potassium fertilizers, promoting sustainable agriculture.
- ❖ **Use:** Follow the specific dosage instructions on the product label, which often involves diluting the biofertilizer in water for soil application or foliar spray.
- ❖ Store the product in a cool, dark place away from direct sunlight to maintain its efficacy.
- ❖ Avoid mixing it with chemical pesticides or herbicides.

Zinc solubilizing biofertilizer: It is used microorganisms to convert insoluble zinc in soil into a form that plants can absorb, making it a natural alternative to chemical fertilizers. These biofertilizers enhance crop yield, improve plant growth, and boost soil health by producing organic acids, lowering soil pH, and secreting plant growth promoters. They can be applied through methods like seed treatment, soil application, or root dipping.

- **Microbial action:** The biofertilizer contains zinc-solubilizing bacteria or microbes like *Bacillus* sp. and *Pseudomonas* sp. Acid production: These microbes produce organic acids that break down insoluble zinc compounds (like zinc oxide and carbonate) and sequester zinc ions, making them available to plants as Zn^{++} .
- **pH reduction:** The process lowers the soil's pH, which further increases the solubility and availability of zinc.
- **Benefits:** Increases crop yield and quality: By ensuring adequate zinc supply, these fertilizers improve overall crop yield and the nutritional value of the produce.
- **Enhances plant growth:** They improve physiological activities, increase plant maturity, and can lead to larger leaf size and longer internode length.
- **Improves soil health:** The microbial activity boosts soil fertility, and the effect can be long-lasting. Reduces chemical use: It can significantly decrease the need for chemical zinc fertilizers.

- **Controls deficiency diseases:** It helps in controlling zinc deficiency-related diseases, such as khaira disease in paddy.
- **Applications**
- **Seed treatment:** Mix the biofertilizer with the minimum amount of water and dry seeds in the shade before sowing.
- **Soil application:** Mix with compost or manure and apply to the soil before the final plowing, or spread it over the soil surface.
- **Root dipping:** Dip the roots of seedlings in the biofertilizer solution before planting.
- **Drenching:** Apply the liquid form directly to the soil, often at a specific rate per acre.
- **Drip irrigation:** Apply through a drip irrigation system.
- **Common crops:** These biofertilizers are used on a wide variety of crops, including: Cereals (paddy, wheat), Pulses, Oilseeds, Fruits (citrus, pomegranate, banana, and mango), Vegetables, Plantation crops.

NPK biofertilisers: An NPK biofertilizer is a type of organic fertilizer that contains beneficial microorganisms to provide a balanced supply of nitrogen (N), phosphorus (P), and potassium (K) for plants. These microbes work by fixing atmospheric nitrogen, solubilizing phosphate, and mobilizing potash, making the nutrients more available for plant uptake. Using an NPK biofertilizer can lead to increased crop yield, improved plant health, better soil structure, and reduced reliance on chemical fertilizers.

- ✚ **Nitrogen fixation:** Microorganisms convert atmospheric nitrogen into a form that plants can use for growth.
- ✚ **Phosphate solubilization:** Bacteria make insoluble phosphates in the soil available to plants.
- ✚ **Potash mobilization:** Other microbes mobilize potassium from soil particles into a form that plants can absorb.
- ✚ **Benefits:**
- ✚ **Improved crop yield:** Can significantly increase crop yield and improve the quality of produce.
- ✚ **Enhanced plant health:** Plants become more resistant to pests and diseases.
- ✚ **Better soil health:** Improves soil structure, increases humus content, and contributes to soil biodiversity.
- ✚ **Environmentally friendly:** Reduces the need for chemical fertilizers, which helps lower environmental pollution and costs.
- ✚ **Sustainable:** A biodegradable and safe option for organic farming.
- ✚ **Easy to use:** Available in both liquid and granular forms that are easy to handle and apply.

CONCLUSION

Green IFFCO" likely refers to IFFCO Urban Gardens Green Diet, a line of organic plant food products that includes liquid spray, granules, and tablets. These

products are designed to provide plants with balanced macro and micronutrients for healthy growth and lush, green foliage.

Product variety: It comes in different forms, such as liquid sprays for instant feeding, slow-release granules for long-term nutrition, and effervescent tablets.

Balanced nutrition: The products contain a mix of essential nutrients like Calcium, Magnesium, and micronutrients, as well as growth promoters, to provide all-around nourishment.

Enhanced plant health: It is formulated to boost foliar development, energize plants, and ensure they have a healthy, vibrant appearance.

Versatile use: Green Diet is suitable for a wide range of plants, including both indoor and outdoor varieties. There is also a specific version, Aqua Green Diet, for water plants.

REFERENCES

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