GLUCO

GLUCONATE FERTILIZERS

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A PRESENTATION BY:

Jiaan Biotech

JIAAN BIOTECH
Plot 282-283, Sector 3
Pithampur industrial area
MP – 454744
India
Email: info@jiaanbiotech.com
info@jiaan.in
Contact Us: +91-8349999795

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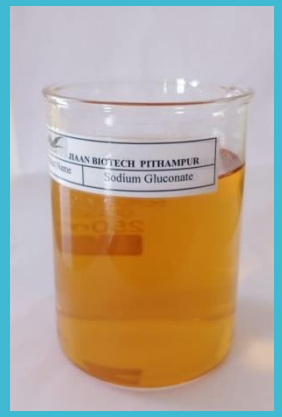
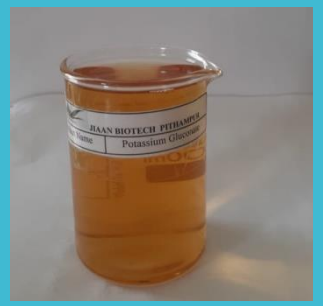
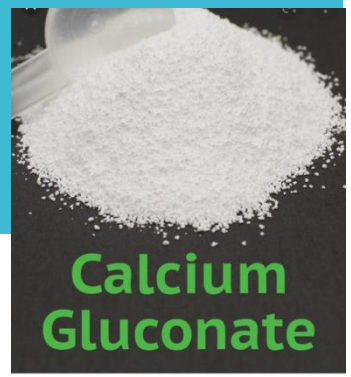


GLUCONATES





- Since Gluconates have the presence of more than one hydroxyl group , this brings some advantages as for example , great solubility , biodegradability and chemical stability of the complexes even in alkaline conditions.
- **SOLUBILITY** : All the relevant agronomic metal complexes have a solubility that exceeds 500g/L, promoting the existence of commercial products in liquid form and with a high concentration of complexed metal. The high solubility of these commercial products facilitates the dissolution of them into the fertilizer matrix and avoids the blockage of the drip nozzles in feritirrigation and hydroponic systems .
- **CHEMICAL STABILITY :** The complexes are formed because the covalent interactions between the free electrons pair of the hydroxyl groups of the substance and the free orbital of the metals.
- The structural changes of the metal complexes of polyhydroxy carboxylates as a function of the pH give also to the complexes the capacity of being stable in a wide range of pH.
- All the above properties allows Gluconates to exceed the stoichiometry and form stable complexes up to pH 10.

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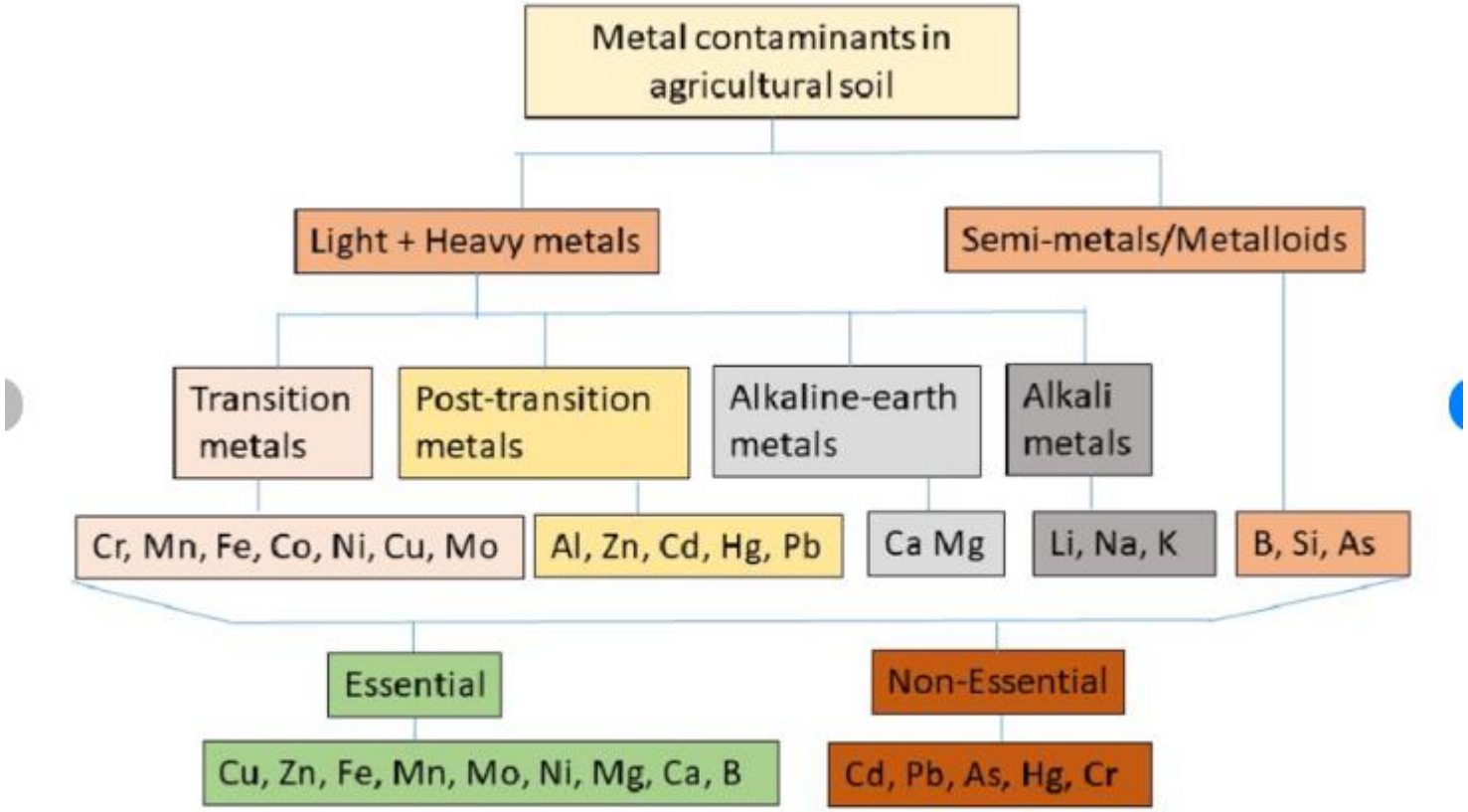
GLUCONIC ACID & ITS MINERAL SALTS



Classification of metallic and non-metallic elements, frequently found in agricultural soils. Mg (magnesium), Ca (calcium), Fe (iron), B (boron), Mn (manganese), Zn (zinc), Mo (molybdenum), Cu (copper), Pb (lead), Ni (nickel), Cr (chromium), As (arsenic), Hg (mercury), Cd (cadmium), Al (aluminum), Li (lithium), K (potassium), Na (sodium), Si (silicon).

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DIRECTION OF USE: GLUCONATES

- Taking the advantage of their high stability in solution, some gluconates based formulations have been also used in fert-Irrigation (drip irrigation) and hydroponics.
- **SOIL :** Jiaan Biotech's GLUCO metal complexes have a high stability at high pH's and a high solubility (> 500 g/L for all the micronutrient complexes), providing them of a high mobility through the soil media in order to achieve the micronutrient transfer to the plant successfully.
- Organic farming practices and usage of Lacto- gluconate based organic manures, vegetable protein and sea-weed based amino-acids, gluconic acid and lactic acid formulations enhanced the soil fertility, soil organic carbon (SOC) and increase in grain yield in crop.
- These products are made from natural ingredients with microbial actions through fermentation, the formulations are ideal substitutes of inorganic nutrients in organic farming.

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GLUCONATE MINERAL SALTS

FOLIAR

- Foliar feeding is widely used and accepted as an essential part of crop production. It targets the growth stages where declining rates of photosynthesis and levelling off of root growth and nutrient absorption occur, in attempts to help translocation of nutrients into the seed, fruit, tuber or vegetative production. Secondarily, foliar feeding can be an effective management tool to favorable influence pre-productive growth stages by compensating for environmentally induced stresses of adverse growing conditions and/or poor nutrient availability.
- The primary objective of foliar spray is to get maximum absorption of nutrients into the plant tissue. Not all the fertilizers are suitable to be used as foliar spray. In order to be efficiently absorbed by the plant cells, formulations should meet the following standards:

  - Low salt index - High solubility

- Choosing the correct fertilizers source for foliar application of secondary and micronutrients becomes very critical. In this respect, organic complexing agents have shown to enhance secondary and micronutrient foliar

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METAL GLUCONATES

FERTIRRIGATION

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- Fertirrigation consists on the application of fertilizers through an irrigation system.
- Benefits of fertirrigation over traditional broadcast or drop-fertilizing methods include:

  - Increased nutrient uptake by plants

  - Reduction in fertilizer and chemicals needed

  - Reduced leaching to the water table

  - Reduction in water usage due to the plant's resulting increased root mass's ability to trap & hold water

  - Application of nutrients at the precise time they are needed and at the rate they are used.

- In this long period of time, gluconates have proven to be efficient as well as safe for the crop and the environment.
- No phytotoxicity symptoms have observed when applied in foliar spray.
- Besides, when used in drip irrigation systems, fertilizers containing gluconates are easily dissolved in the solution and do not lead to drip plugging. Moreover, they have shown to be compatible with other fertilizers and plant protection products.

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OUR PRODUCTS : GLUCONIC ACID & GLUCONATES

- The components that are combine with the Gluconic Acid, have the GLUCONATE of NITROGEN (eliminating the Nitrates, well-known for their high toxicity towards the environment and man) Phosphorus, Potassium, Magnesium, Calcium, Iron, Manganese, Boron, Molybdenum, Copper (which can, surely, substitute Copper Oxychlorides, Hydroxides, Sulphate Carbonate for the defense of the plants, allowing a reduction of a least 90% of Metal Copper in the environment, with distinctly superior Phytosanitary results) of Sodium, Zinc, Ammonium, Algae, Phyto regulators , etc.
- In the European patent, it has demonstrated that the nutritional components administered to the plants as GLUCONATES, represent the formulation that permits us to obtain the best Technical-Agronomical results, so summarized:

1. A HIGH LEVEL OF PLANT ASSIMILATION
2. REDUCED ASSIMILATION TIME
3. REDUCED ADDITION OF NUTRITIONAL ELEMENTS TO THE CULTIVATION
4. NO LOSS OF PRODUCT ADMINISTERED
5. SAVING
6. REDUCTION OF POLLUTION BY AT LEAST 90%.
7. SUITABLE FOR SOIL OR FOLIAR APPLICATION.
8. SUITABLE FOR DRIP IRRIGATION
9. STABLE AND WILL NOT PRECIPITATE AT LOW TEMPERATURES
10. COMPATIBLE WITH MOST HERBICIDES & INSCETICIDES

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GLUCONATES FUNCTIONS/ BENEFITS/ USAGE

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- The nutrition of components administered to the plants as GLUCONATES, become systematical, in which, Gluconic Acid stimulates the absorption of the component or the substances with which it is bound, penetrating the lymphatic system very rapidly (from 2 to 4 hours), through the foliage system, the radical system and through the cortex.
- Through numerous research and testing that have been carried out, it has been noticed that the COPPER GLUCONATE (with a percentage in Cu Metal of 5-6%) allowed plants to be free form fungus and bacterial attacks, administering the plants every 9-10 days, doses of cc. 250-400/Hectoliter of water reducing, therefore, the administration of metal Copper of a least 90% (compared with Copper Oxychlorides and Sulphate) with far superior results.
- With this new plant nutrition technique, the same time increases the resistance to Fungus and Bacteria for a strong production of FITOALEXINE in the plants.
- The GLUCONATES, allow us to administer nutrition via the leaves as well as via the roots, eliminating any loss of nutritional substance, as the plants adsorb them; they also allow us to eliminate the dangerous Nitrates.

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LACTO – GLUCONATES MINERAL SALTS

1. VEGETABLES
2. ROW CROPS
3. FRUITS
4. NUTS
5. GRAPES
6. CITRUS
7. OLIVES
8. ORNAMENTALS

- **LACTATE – GLUCONATES** mixed with various trace metals forms essential nutritional fertilizers with components like :- **Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Iron, Manganese, Boron, Molybdenum, Copper, Sodium, Zinc, Cobalt, Vanadium, Amino Acid, Algae, Vegetable Extracts, Phyto regulator etc**.

**Reference European Patent App 03425009.2

The Mineral Gluconates (Ca, Zn, Mg, Mn, Fe, K) have gained a high acceptance in Hydroponic and Foliar Fertilizer application due to their solubility and lack of tissue irritability.

**These Compounds are not recommended for use with antibiotics or growth regulators.

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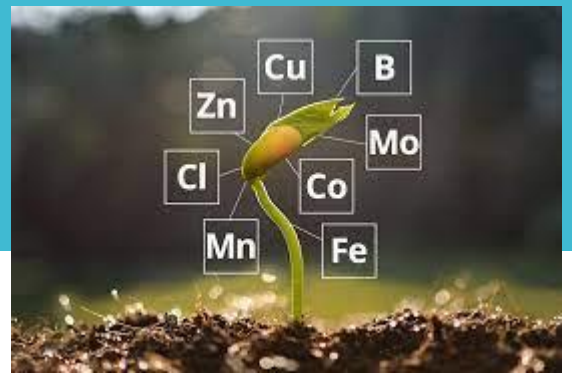
AMINO-LACTO-GLUCONATE MINERAL SALTS



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- **Gluconic Acid :** It is an organic acid which seems to be the major mechanism of phosphate solubilization by gram negative bacteria.
- **Lactic Acid :** Lactic acid bacteria are used for the treatment of animal manures, farm yard manure and sewage for odor abatement and as an inoculant to accelerate the composting of organic wastes (Okada, 1998).
- **Amino Acid :** The chelating ability of amino acids has been used in fertilizers for agriculture to facilitate the delivery of minerals to plants in order to correct mineral deficiencies, such as iron chlorosis and other nutrient deficiencies. These fertilizers are also used to prevent deficiencies from occurring and improving the overall health of the plants (Ashmead, H. DeWayne 1986).
- **Protein lacto gluconate Nutrients:** Several organic carbon (OC) rich formulations tailored with amino acids, gluconic and lactic acids blended with elemental Nitrogen(N), phosphorous(P), potassium(K) , sulphur(S), calcium(Ca), magnesium(Mg), boron(B), copper(Cu), iron(Fe), molybdenum(Mo), manganese(Mn) etc., were produced from research & development based biotech industries. These formulations were proved through bio-efficacy studies by several national and international agriculture universities and research laboratories on various crop systems and environmental conditions.

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FIELD EXPERIMENT: RESULT & CONCLUSION

- A Field Experiment with various compositions as mentioned below was done on Maize Crop :
- Crop: Maize (Zea Mays)
- Variety: Longe-5
- Seed rate: 10-12 kg seed/Acre
- Spacing: 75 cms x 30 cms (Bet. R –R: 75 cms; P –P: 30 cms)
- Maturity: 100 -115 days
- No. of treatments: 6 (T0, T1, T2, T3, T4, T5,)
- No. of replications: 3 (R1, R2, R3)
- Experiment Design: Randomized block design (RBD) (Addelman, Sidney, 1969)
- Total Area: 1 Acre, Each Block: 224 sq.mts

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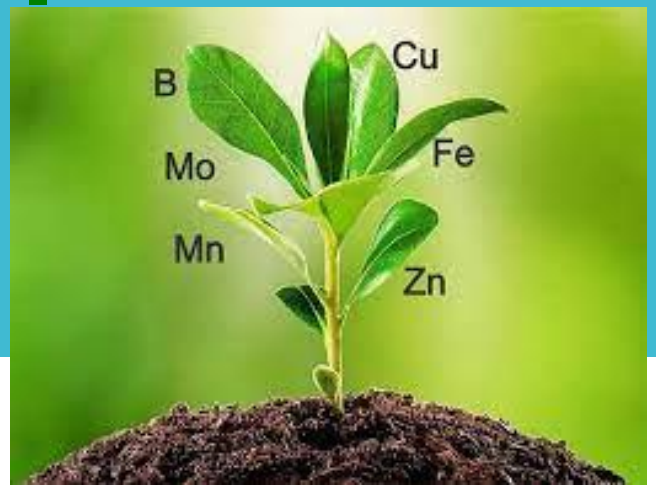
The 6 Treatments compositions:



TREATMENTS

- **To**: Control (No fertilizer)
- **T1**: 100% Inorganic fertilizers
- **T2**: 100% Organic inputs
- **T3**: 75% Inorganic fertilizers + 25% Organic fertilizers
- **T4**: 50% Inorganic fertilizers + 50 % Organic fertilizers
- **T5**: 25% Inorganic fertilizers + 75% Organic fertilizers
- **Inorganic fertilizers:**
- **DAP** (Di-ammonium phosphate), Urea, MOP (Muriate of potash)
- **Organic inputs (Organic acids – gluconic acid, lactic acid, amino acids):**
- **Organic N**: source Amino acids from vegetable protein
- **Organic P**: Phosphorous, protein hydrolysates/Amino acids
- **Organic K**: Potassium Gluconate and potassium lactate/potassium blend of protein hydrolysates, gluconic acid and lactic acid.
- **Organic Micronutrients**: micronutrients Ca, Mg, B, Cu, Fe, Mo, Mn blend of gluconic and lactic acids.
- **Organic Zn :** Zinc blend with amino acids, gluconic and lactic acids.

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CONCLUSION RECOMMENDED DOSAGE:

The above comparative field studies in Maize (Zea mays) showed that the organic acids (Amino acid, gluconic and lactic acid) based products increased the percentage of soil organic carbon (SOC) in maize.

T4 **50% Inorganic** + **50 % Organic**	Compost :50 kg	Last Basal
	DAP: 25 kg + Organic P:25kg	Basal/At sowing
	,Urea:50kg + Organic N:25 kg	25 DAS
	MOP:.50 kg + Organic k: 25 kg	45 DAS
	Organic P @ 1.5 ml per liter of water	20 DAS
	Organic N @1.5 ml per liter	between 21 – 30 DAS
	Organic Zn @ 1.5 ml per liter of water	between 31 – 35 DAS
	Organic Micronutrient @1.5 ml per liter of water	between 40 – 50 DAS
	Organic k @1.5 ml per liter of water	between 50 – 60 DAS

Hence, "T4" gave us the highest results in terms of grain yield and increased soil carbon (%SOC) . This was due to the chelating nature of amino acids and organic acids in Protein-lacto- gluconate formulations in organic fertilizers increased the bioavailability of the available nutrients in the inorganic fertilizers to the crop.

Hence, Grain yield was increased along with the increased ratio of organic fertilizers.

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JIAAN BIOTECH's PRODUCT LIST

- Jiaan Biotech has formulated below products based on Field Trials, R & D , Various available p
  Experiments done proving that the below formulations have proven higher yields and results.
- **Potassium Lacto Gluconate** : **K (4-6%)**
- **Fe Amino L - Gluconate** : **Fe(2.5 – 4.5 %)**
- **Mix GLUCO (MH)** : **K (4 %) Fe (2.5%) Mn(1%) Zn(3%) Cu(1%) B(0.5%) Mo (0.1%)**
  (Recommended for Maharashtra region(INDIA))
- **Mix GLUCO (CH)** : **K(4%) Fe(4.5%) Mn(2.5%) Zn(6%) Cu(1.25%) B(2.5%) Mg(1%) M0(0.3%)**
  (Recommended for Chattisgarh region(INDIA))
- **Mix GLUCO (MP)** : **K(4%) Fe(1%) Mn(1%) Zn(4%) B(0.5%) Mg(2%)**
  (Recommended for Madhya Pradesh region(INDIA))
- **Mix GLUCO (AP)** : **K(4%) Fe(4.5%) Mn(3.5%) Zn(6.5%) Cu(1.25%) B(2.25%) Mo(0.05%)**
  (Recommended for Andhra Pradesh region(INDIA))
- **Mix GLUCO (G)** : **K(4%) Fe(4%) Mn(0.5%) Zn(6%) Cu(1%) B(0.5%)**
  (Recommended for Gujarat region (INDIA)) .
- **CBM GLUCO** : **Ca (8-9%) B (2-3%) Mg (4- 6%)**
- **ZMB GLUCO** : **Zn (6%) B (2-3%) Mg (3%)**
- **RICE-GLUCO** : **Fe (1%) Mn (1%) Zn(3%) Ca(11-12%) B(0.5%) Mg(3%) Cu(1%) k(2%)**

**** The above products has Gluconic Acid 4-6% , Lactic Acid 3-5%, Lactate 5-6%, Phosphate 4-5% Nitrogen 3-4%, Protein 25-30%, Gluconate 16-22% other than the mentioned elemental metals. ****

" % W/V "

JIAAN AGRO CHEMICALS

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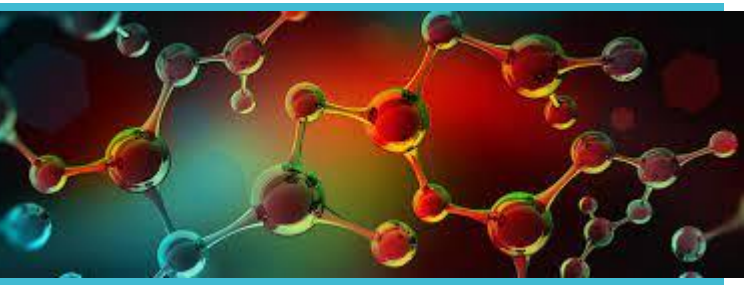

JIAAN BIOTECH's PRODUCT LIST

- **Fe – GLUCO :** Fe(8%)
- **Fe K GLUCO** : Fe (7%) Potassium (K2O)
- **Mn GLUCO** : Mn (8%)
- **Zn GLUCO** : Zn (8%)
- **FMN GLUCO** : Fe (1.5%) , Mn (3.5%) , Zn (3.5%)
- **ZM GLUCO** : Manganese (3.5%), Zinc (3.5%)
- **GLUCO-CITRUS:** Liquid. Foliar and fertirrigation Specially designed to prevent and correct deficiences in CITRUS crops.

  Fe(1.5-2%), Mn(1.5-2%) , Zn(2-2.5 %) , Mg(1-1.5%)
- **GLUCO – ORNA :** Liquid. Foliar and fertirrigation Specially designed to prevent and correct deficiences in ORNAMENTAL crops.

  Fe(1-1.5%) , Mn(2-2.5%), Zn(0.5- 1%), Mg(2 – 2.5%)
- **GLUCO – VEGI :** Liquid. Foliar and fertirrigation Specially recommended for VEGETABLES and TURF CROPS.

  Mg(1-1.5%), Fe (1.5-2%), Mn(0.5-1%), Zn(0.5 -1%), B(0.50-1%)
- **GLUCO – OLIVE :** Liquid. Foliar and fertirrigation Specially recommended for OLIVE crops. Mn(4%), Fe(2-2.5%), Zn(1-2%), Mn(0.5-1%), B (1%)

JIAAN AGRO CHEMICALS

** ABREVIATIONS : Ca – Calcium, B-Boron, Mg- Magnesium, Mn-Managanese, Fe-Iron, Cu-Copper, K-Potassium, N-Nitrogen, P-Protein, L-Lactate, Zn-Zinc, Mo-Molybdenum. **

CERTIFICATES

FSSAI//FOSCOS

ISO 9001:2015

GMP

HACCP

REACH

HALAL

KOSHER

ORGANIC

APEDA

THANK YOU

Jiaan Biotech

JIAAN BIOTECH
Plot 282-283, Sector 3
Pithampur industrial area
MP – 454744
India
Email: info@jiaanbiotech.com
info@jiaan.in
Contact Us: +91-8349999795