

Fertilizers And Agro-chemicals

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Sodium Chlorite (50% / 80%)

An Effective Bleaching Agent

DESCRIPTION

- Effective and non-degrading method of bleaching man made fibres
- Water soluble, weakly hygroscopic flakes

Advantages

- Has better oxidising power than Hydrogen Peroxide
- Excellent bleaching that is maintained after resination
- Safely transported and it reacts to form Chlorine Dioxide at the bleaching site

Target Countries

- South East Asia
- USA
- Australia
- Africa (Ethiopia)

Applications

- Only effective bleaching agent that imparts permanent whiteness to man made fibre, cotton, fibre blends, blended fabrics, oils, and fats without degradation
- Used in metal cleaning, water purification and pulp bleaching
- Preparing of bleaching bath

- **Current stage of development**
In industrial use
- **Collaboration options**
Information exchange, Research, Technical co-operation

SPECIFICATIONS

Appearance	White
Composition	Weakly hygroscopic flakes
Solubility	Hot and cold water
Stability	Good
pH	Alkaline
Environment liability	None

Organisation

Gujarat Persalts Private Limited

Cross Reference

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Defoamer (Anti-Foaming Agent)

DESCRIPTION

- Defoamer is a chemical, which suppresses the foam generated due to decomposition of carbonates when phosphate rock is acidulated with nitric acid or sulphuric acid
- The manufacturing process consists of two mixing vessels. The Ingredients used are surfactant, water, Additive-I Solution and Additive-II Solution. These are required in fixed proportions, depending upon the concentration of active matter in the surfactant for the desired quality of Defoamer Formulation to be prepared (at least 20% active matter)
- A defoamer plant (2.6 MT per batch) is working since January 2002

Advantages

- Improvement in quality of Defoamer (the specific consumption of defoamer has come down by 33%)

Target Countries

- China
- Indonesia
- USA
- Pakistan
- Other fertiliser manufacturing countries

Applications

- Useful in ANP, other complex fertilisers and Phosphoric acid plants (in all fertiliser plant)

- **Current stage of development**
Commercialised
- **Collaboration options**
Open to all options
- **IPR details**
Secret know-how

SPECIFICATIONS

pH	6.8 - 7.5
Specific gravity at R.T	1.05 - 1.10
Flash point (open cup)	> 175 °C
Viscosity	10 - 40 CPs
Active matter	20% +-5
Reduction in foam height	75%

Organisation

Rashtriya Chemicals and Fertilisers (RCF)

Cross Reference

Organisation Page 168

Zincated Urea in Prills Form

DESCRIPTION

- The technology is based on feeding zinc-salt solution of required concentration at a specified flow rate and prilling the melt, to produce uniformly distributed prills containing zinc salt (as 2% zinc)

Advantages

- Distribution is more uniform, thereby avoiding excess concentration of zinc at any place, which could lead to toxic action on plants
- Reduces the handling problems for farmers since they have to give single dosage
- More economical over the traditional ways of using zinc sulphate separately

Target Countries

- Asian countries

Applications

- Fertilizer manufacturers
- Application in zinc deficient soils

- Current stage of development**
Commercialised
- Collaboration options**
Open to all options
- IPR details**
Secret know-how

SPECIFICATIONS

Capacity	40 MT
Zinc content	2%
Alternate technologies	None
Environmental impact	None

Organisation

Rashtriya Chemicals and Fertilisers (RCF)

Cross Reference

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Arsenic Contaminated Solid Waste Management

DESCRIPTION

- Arsenic containing sludge removed by filtration of hot potassium carbonate solution in Ammonia plants using GV (Giammarco-Vetrocoke) process for CO₂ recovery, as well as circulating solution is treated with (Hydrogen peroxide and Ferric chloride) to convert all Arsenic into highly insoluble and environmentally stable Ferric arsenate complex
- All Arsenic (III) is converted to Arsenic (V), which bonds better with iron to give environmentally stable Ferric arsenate

Advantages

- No treatment with lime to eliminate formation of less stable Calcium arsenate
- Ease of operation due to less number of filtration steps
- Alternative technologies include adsorption, ion exchange, sulphide, precipitation etc. These technologies do not produce environmentally stable compounds suitable for safe disposal in a landfill site

Target Countries

- All countries

Applications

- Detoxification of solid waste containing leachable arsenic, rendering solid waste suitable for disposal at notified landfill site
- Ammonia plants
- Control of environment pollution due to arsenic

- Current stage of development**
Tested, Available for demonstration
- Collaboration options**
License agreement
- IPR details**
Patents: Applied for

Organisation

Gujarat State Fertilisers and Chemicals Ltd.

Cross Reference

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Granulated Sulphur

DESCRIPTION

- Granulated Sulphur contains 90% elemental sulphur in varying particle size. It acts as a slow release fertiliser. It is manufactured by pulverising elemental sulphur, blending with binder and granulating it

Advantages

- Capital investment and processing cost is low
- Process control parameters are very simple

Target Countries

- U.K., France, Australia, New Zealand
- Kenya, South Africa, Jordan, Tanzania, Zimbabwe
- Pakistan, Sri Lanka, Bangladesh

Applications

- It acts as a farm nutrient. It provides sulphur in non-leachable form. It acts as a slow release fertiliser

- Current stage of development**
Process developed in-house
- Collaboration options**
Marketing agreement, Commercial agreement with Technical assistance
- IPR details**
Secret know-how

SPECIFICATIONS

Elemental sulphur is pulverised to desired particle size and blended with binding agent. The blended mass is granulated to 3 to 4 mm particle size, screened and further dried.

Sulphur grinding requires inert atmosphere.

Organisation

Gujarat State Fertilisers and Chemicals Ltd.

Cross Reference

Organisation Page 154

MEK Oxime, Butyraldehyde Oxime, Acetone Oxime

DESCRIPTION

- Respective Ketone/ Aldehyde is oximated with Hydroxylamine sulphate solution. The oxime layer is physically separated and purified through distillation
- Makes use of Hydroxylamine sulphate solution, which is impure and very cheap instead of pure Hydroxylamine crystals. Hence the cost of production is extremely low

Advantages

- Lower cost of production
- Cost of production ~ US \$ 12,000 per MT for MEK Oxime
- Simple process
- No effluent
- Investment ~ US \$ 0.3 Mn for a 1200 MT/ annum capacity plant
- Alternate technology makes use of pure Hydroxylamine Sulphate Crystals, which is nearly 4 times more expensive than solution

Target Countries

- Third World countries especially SAARC members
- South East Asian countries
- US
- Europe
- China
- Australia

Applications

- Acetone Oxime is speciality agriculture product. It improves nutrient intake of plants and thus increases yield
- MEK Oxime and Butyraldehyde Oximes are paint additives

- Current stage of development**
Commercialised
- Collaboration options**
Licensing, Marketing agreement, Commercial agreement with Technical assistance
- IPR details**
Patents: Granted

SPECIFICATIONS

Feasible only where hydroxylamine sulphate solution is available and Ammonium Sulphate stream can be processed.

Organisation

Gujarat State Fertilisers and Chemicals Ltd.

Cross Reference

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Recovery of Sulphur From Sulphur Waste of Sulphuric Acid Plant

DESCRIPTION

- Sulphur waste from Sulphuric acid plant contains 40-70% elemental sulphur. A physical separation process is invented to recover sulphur
- The process comprising grinding the sulphur waste and heating it at elevated temperature and pressure in an aqueous media, filtering the reaction mass to separate agglomerated sulphur. Finally drying the agglomerated sulphur, which has more than 95% purity? Recovered sulphur can be used to manufacture sulphuric acid

Advantages

- Capital investment and processing cost is low
- Process is very simple with easy and simple control mechanism

Target Countries

- All Sulphuric acid manufacturing countries

Applications

- Recovery sulphur from sulphur waste can be used to manufacture sulphuric acid, insecticides and granulated sulphur

• **Current stage of development**

Process developed in-house

• **Collaboration options**

Joint venture agreement, Commercial agreement with Technical assistance

• **IPR details**

Patents: Applied for

Organisation

Gujarat State Fertilisers and Chemicals Ltd.

Cross Reference

Organisation Page 154

Coating Agent for ANP and other Complex Fertilisers to Avoid Caking

DESCRIPTION

- Coating of granules/ prills with coating agent to protect the fertiliser from exposure to moisture and thereby improving the shelf life of the fertilisers
- A Batch process manufacturing facility (capacity 3.0 MT/Day) to produce coating agents for ANP and other complex fertilisers

Advantages

- Substantial savings in in-house production of Coating Agents
- Continuous monitoring of the quality of product
- Ensuring the supply of the best and consistent quality product

Target Countries

- China
- South America
- Sri Lanka
- Indonesia

Applications

- Manufacturers of fertilisers specifically NPK/NP fertilisers

• **Current stage of development**

Tested and available for demonstration

• **Collaboration options**

Open to all options

• **IPR details**

Patents: Applied for

SPECIFICATIONS

	Sulphala (15:15:15)	ANP (20:20:0)
Viscosity at 60-70 °C	0 to 50 cps	0 to 50 cps
Flash point	> 145 °C	> 175 °C
Reduction in crushing load	50% (min)	50% (min)
Total amine as Octadecyl amine	-	15% (min)

Organisation

Rashtriya Chemicals and Fertilisers Ltd.

Cross Reference

Organisation Page 168

DDVP

Byproduct of Methyl Chloride

DESCRIPTION

- DDVP exhibits extremely rapid insectocidal action at concentration non-toxic to mammals
- Manufacture involves reacting Trimethyl phosphite with chloral
- Needs appropriate effluent disposal systems

Advantages

- Involves lesser unit operations
- Simple and economic process with good yields
- Estimated investment for a battery limit plant of 150 TPA is around USD 0.2 million

Target Countries

- All countries

Applications

- Used for crop protection against sucking and leaf mining insects and as a household fumigant

Current stage of development

Process standardized on pilot scale

Collaboration options

Process & formulation know-how, Basic design package, Effluent, Basic toxicity and bioefficacy data, Implementation and commissioning

SPECIFICATIONS

Raw materials

Trimethyl phosphite
Trichloroacetaldehyde
Solvents

Equipment

Reactors
Condensers
Evaporators
Storage vessels
Pumps

Organisation

Indian Institute of Chemical Technology

Cross Reference

Organisation Page 159

Supercritical Fluid Extraction (SCFE)

DESCRIPTION

- SCFE is a two-step process, which uses dense gas e.g., carbon dioxide (CO₂) as a solvent above its critical temperature (31°C) and critical pressure (74 bar) for extraction
- Superior alternative to the conventional techniques like organic solvent extraction/steam distillation for extraction of natural products in food, pharmaceutical and chemical industries

Advantages

- CO₂ as a solvent: Generally Regarded as Safe (GRAS) for natural products
- Undegraded extracts with delicacy and freshness close to natural
- Simultaneous fractionation of extracts
- Flexible operating conditions for multiple product extraction
- Free of biological contaminants
- Superior product with longer shelf life
- Excellent blending characteristics
- Environmental friendly process, no pollution control related cost
- World class equipment cost substantially less than the imported equivalent

Target Countries

- SAARC member countries
- China
- African countries
- South East Asian countries
- Middle East countries
- Australia

SPECIFICATIONS

Commercial Plant	2-3 Extractors of 100-500 liter capacity. 2 separators
Operating Pressure	350 or 500 bar (max.)
Temperature	80 C (max.)
MoC	Stainless steel
Controls	Computerised PLC based system with alarms and interlocks for safety
Design & Manufacturing	As per International Codes and under International third party Inspection agency 'TUV'

Applications

- Spice Oils and Oleoresins
- Herbal medicines
- Essential Oils: flavors and fragrances
- Natural pesticides
- Natural Food colours and preservatives
- Bitter from hops
- Decaffeinated coffee and tea
- Nicotine/ tar free tobacco
- Cholesterol free food products

Current stage of development

Commercialised

Collaboration options

Technical support and Process development/optimisation, Turnkey supply of plant

IPR details

Patents: Granted

Organisation

Indian Institute of Technology, Bombay & Deven Supercriticals Pvt Ltd., Pune

Cross Reference

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Metal Chelates of Amino Acids

Feed Attractant in Aquaculture and Prevent Wastage of Feed

DESCRIPTION

- These chelates have all 20 amino acids along with essential amino acids
- These amino acids are obtained by enzymic hydrolysis from Soya and contain L - Tryptophan, essential amino acids which are destroyed during acid or alkali hydrolysis. During enzymic hydrolysis, the amino acids are maintained in L-form and no amino acid is racemised or destroyed

Advantages

- The rate of absorption of these chelates of Amino Acids is found to be many times faster than ordinary salts of minerals
- These chelates also meet amino acid requirements of diet

Target Countries

- All countries

Organisation

Priya Chemicals

Cross Reference

Organisation Page 167

SPECIFICATIONS

Solubility in water	Partial
Mineral content (Min.)	10%
Moisture (Max.)	10%
Raw protein (Min.)	23-35%
Crude fat	1-2%
Ash	30-57%
Raw fiber	2-3%

Properties will depend on type of metal used.

Applications

- Veterinary
- Poultry
- Aquaculture
- Agrochemical
- Foliar fertiliser
- Lawn nutrition
- Feed additives
- Feed supplements

- **Current stage of development**
Commercialised
- **Collaboration options**
Joint venture agreement, Licence agreement, Manufacturing agreement and Technical co-operation
- **IPR details**
Patents: Granted

Protein Hydrolysate Solution

Mixture of Amino Acids

DESCRIPTION

- Manufactured by enzymic hydrolysis of casein / soyabean by sophisticated technology

Advantages

- Amino Acids are in the L - form & are biologically pure & are in free-state

Target Countries

- All countries

Applications

- Agrochemical
- Foliar fertiliser
- Lawn nutrition

- **Current stage of development**
Commercialised
- **Collaboration options**
Joint venture agreement, Licence agreement, Manufacturing agreement and Technical co-operation
- **IPR details**
Patents: Granted

SPECIFICATIONS

Description	Brown coloured liquid
Odour	Specific, spicy
Density	1.10 - 1.15 GM/CC
Solubility in water	Complete
pH	4.0 6.5

Organisation

Priya Chemicals

Cross Reference

Organisation Page 167

Amchemin

Mineral Chelates of Amino Acids

DESCRIPTION

- Amchemin are the mineral feed supplements containing important transition metals like Iron, Copper, Cobalt, Zinc, Manganese etc. which are surrounded by and bonded to hydrolysed proteins or Amino acids

Advantages

- Amchemin can pass through the gastric juices without adverse reactions. They are quickly absorbed through intestinal walls into the blood stream to reach the various organs to perform their physiological functions without interruption
- Balanced key ingredients

Target Countries

- All countries

Applications

- Foliar fertiliser
- Agrochemical
- Feed supplement
- Feed additive

- Current stage of development**
Commercialised
- Collaboration options**
Joint venture agreement, Licence agreement, Manufacturing agreement and Technical co-operation
- IPR details**
Patents: Granted

SPECIFICATIONS

It Contains Calcium ,Phosphorous, Magnesium, Potassium, Zinc, Manganese, Iron, Copper , Hydrolysed proteins, Cobalt, Iodine etc.

Their concentration depends as per needs

Organisation

Priya Chemicals

Cross Reference

Organisation Page 167

Perfectose Liquid

Amino Acids Based Bio Stimulant

DESCRIPTION

- Perfectose has Amino acids with mol. wt. less than 400gms per mole & penetrate through stoma of plants into the physiochemical & biochemical system of the plant

Advantages

- Photosynthesis process is enhanced & leads to better synthesis of chlorophyll & helps to improve yield
- Reduces flower & fruit drop
- Improves rate of absorption of fertilisers
- Helps to withstand stress conditions like drought, frost & attack of insect by improving immunity

Target Countries

- All countries

Applications

- Agro-chemicals

- Current stage of development**
Commercialised
- Collaboration options**
Joint venture agreement, Licence agreement, Manufacturing agreement and Technical co-operation
- IPR details**
Patents: Granted

SPECIFICATIONS

Perfectose liquid is stable between 5°C and 40°C and can be stored at this temperature without loss of any biochemical activity for 3 years.

An environmentally safe product

Organisation

Priya Chemicals

Cross Reference

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Perfectose Powder

Amino Acids Soil Application

DESCRIPTION

- Perfectose powder is a product consisting of Amino acids needed to improve efficiency of plant for better uptake & utilisation of nutrients & fertilisers leading to proper utilisation of water & nutrients of the soil

Advantages

- Better utilisation of nutrients & water
- Strengthening of root system of the plant by increased lateral roots
- It improves photosynthesis process
- It improves the immunity of the plant & plant become more resistant to stress such as drought frost, disease & insects

Target Countries

- All countries

Applications

- Soil application

- Current stage of development**
Commercialised
- Collaboration options**
Joint venture agreement, Licence agreement, Manufacturing agreement and Technical co-operation
- IPR details**
Patents: Granted

SPECIFICATIONS

Perfectose powder is stable between 5°C and 50°C and can be stored at this temperature without loss of any biochemical activity for 3 years.

Its an environmentally safe product and non toxic to plants, humans and animals.

Organisation

Priya Chemicals

Cross Reference

Organisation Page 167

Pronto Liquid

Amino Acids with Sea Weed Extract

DESCRIPTION

- Pronto is a biochemical product based on seaweed extract & Amino acids. It consists of Amino acids 20% & Seaweed extract 12.5%
- Seaweed extract is obtained from Ascophyllum nodosum, a weed grown in Norwegian Sea, by alkaline hydrolysis using cold process. Seaweed extract is a stress alleviator, effective in biotic & abiotic stress conditions of plants maximising both crop yield & quality

Advantages

- Increased crop yield
- Increased uptake of inorganic nutrients from the soil & improved process of photosynthesis
- Improved shelf life of fruit
- Improved seed germination
- Improved root development
- Increased resistance to stress conditions
- Improved profitability

Target Countries

- All countries

Applications

- Foliar application

- Current stage of development**
Commercialised
- Collaboration options**
Joint venture agreement, Licence agreement, Manufacturing agreement and Technical co-operation
- IPR details**
Patents: Granted

SPECIFICATIONS

Sea Weed extract consists of cytokinine, Auxins & Betains. Betains are methyl donors which plant convert to formaldehyde which leads to better immunity in crop system.

Organisation

Priya Chemicals

Cross Reference

Organisation Page 167

Phosphamidon Production

DESCRIPTION

- The process involves chlorination, condensation, concentration and purification.
- The process incorporates an on-line monitoring system in chlorination reactor.
- Needs appropriate effluent disposal systems.

Advantages

- Process parameter optimisation and built in plant practices reduce the pollutant emissions. Specially designed solvent recycle system enables optimum utilisation of solvent
- Estimated investment for battery limit plant of 300TPA is around Rs.25 million

Target Countries

- China
- African countries
- Other developing countries

Applications

- Manufacturers of insecticide for several crops

- **Current stage of development**
Standardised on pilot scale of 3 kg per batch product
- **Collaboration options**
Process know-how, Basic design package, Process demonstration, implementation and commissioning

SPECIFICATIONS

Raw materials

Diethylacetoacetamid
Chlorine gas
Sodium bicarbonate
Trimethyl phosphite
Monochloro benzene

Equipment

Chlorinator
Solvent distillation units
Vessels/ Tanks, Reactor, Boiler
Azeotropic distillation unit
Thin film evaporator

Organisation

Regional Research Laboratory (Jorhat)

Cross Reference

Organisation Page 169

Carboxylated Styrene Co-Polymers Speciality Additive During Compounding, and/or Standalone Product

DESCRIPTION

- Process/ Technology leads to manufacturing of carboxylated styrene copolymers in powder or emulsion form. The process include multi step polymerization through emulsion polymerisation route
- Incorporation of reactive moities capable of inducing reactivity/ interaction between pairs of immiscible polymers like Nylon-6, polyesters and Styrenics etc

Advantages

- Use as compatibiliser for Nylon-6 alloys

Target Countries

- Europe
- Japan
- China
- North America

Applications

- As an additive for compatibilisation of immiscible polymers. Particularly styrenics
- Use as an emulsion

- **Current stage of development**
Tested, Available for demonstration
- **Collaboration options**
Further research, Development support, Information exchange
- **IPR details**
Patents: Granted

Organisation

Gujarat State Fertilisers and Chemicals Ltd.

Cross Reference

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