

# SPECIALTY ADDITIVES FOR PLASTICS



### **Introduction**



Together with our manufacturing partners, we are focusing on the next generation of High Performance Additives designed to substantially increase the shelf life of consumables (fruit, vegetables, meats, etc.), add environmental value to packaging and sustainable protection to wire & cable products.

Some of our products are unique, exclusive and patented, and all of our products are at the forefront of technological advances which make plastics safer, even more useful, and simply better!

## Specialty Additives

- 1. FrescoPlus <sup>™</sup>
- 2. PreservePlus ™
- 3. Anti-Microbial/Anti-Fungal (S)
- 4. Anti-Microbial/Anti-Fungal (O)
- 5. Oxo-Photobiodegradable
- 6. Photobiodegradable-(T)
- 7. UV Blocker
- 8. Anti-Drag/Anti-Scratch/ Print Plus
- 9. Anti-Corrosive
- 10. Anti-Static
- 11. Barrier
- 12. Anti-Fog
- 13. Ant Repellent
- 14. Rodent Repellent



### FrescoPlus<sup>™</sup> Additive



#### **Introduction:**

- ➢ Fruits, Vegetables, Cut Flowers & Meat are spoiled due to:
  - i. Ethylene generation. Ethylene acts as an auto-catalyst during ripening
  - i. Microbial attacks of bacteria, virus & fungi
  - ii. Unhygienic transport & storage conditions

FrescoPlus <sup>™</sup> Additive is an ideal solution to enhance shelf life of fruits, vegetables, cut flowers & meat by up to 100%.





- 1. Based on silver coated micro, inorganic particles
- 2. Increases the shelf and transit life of packed fruits, vegetables, cut flowers & meat by reducing ethylene concentration
- 3. Remains unconsumed while constantly working as a catalyst, hence gives long-term effect.
- 4. Effective at low addition levels
- 5. RoHS compliant
- 6. End Product certified by SGS for efficacy & food safety
- 7. Human safe, Eco-friendly
- 8. Compatible with respective polymers
- 9. Patented in many countries
- 10. Economical

#### **Areas of Applications:**

#### **Plastic/Polymer Industry:**

- Used as Master Batch in Packaging Products like Cling films, Liners, Containers, Bags etc..
- These products are used for packing fruits, vegetables, meat & cut flowers for local & export markets.

### **Life Extender Packaging Products**





**FrescoPlus™ Bags** 



**FrescoPlus™** ZIP Bags



**FrescoPlus™** Cling Film





**FrescoPlus™** Containers

### In House testing of FrescoPlus<sup>™</sup> Container



**Plain Container** 

**FrescoPlus™** Container

#### Lady's Finger after 6 days of storage at ambient conditions

### In House testing of FrescoPlus<sup>™</sup> Bags



Control

**FrescoPlus™ Bag** 

#### **Strawberry after 5 days of storage at ambient conditions**

### In House testing of FrescoPlus<sup>™</sup> Bags



Control

FrescoPlus<sup>™</sup> Bag

#### Lemon after 13 days of storage at ambient conditions

#### **COMPARATIVE DATA OF FrescoPlus™ BAGS**



FOOD PRODUCT	PLW (%) At Room Temperature		STORAGE DAYS At Room Temperature
	Control bag	FrescoPlus™ bag	In FrescoPlus™ bags
Strawberry (Sweet Charley)	10.04	6.19	5
Green grapes (Thompson seedless)	12.05	2.57	13
Black grapes (Sharad seedless)	10.38	2.26	15
Pomegranate (Bhagawa)	29.04	6.82	65
Guava (Sardar)	10.50	5.12	8
Lime (Kagzi)	21.02	10.99	13
Bottle gourd	4.44	3.85	11
Fenugreek	64.69	26.54	5
Spinach	30.87	7.17	3
Coriander leaves	40.85	9.45	3
Curry leaves	39.24	23.40	5



### **PreservePlus<sup>™</sup> Additive**

#### **Introduction:**

- Fruits, Vegetables, Cut Flowers & Meat are spoiled due to:
  - i. Ethylene generation. Ethylene acts as an auto-catalyst during ripening
  - i. Microbial attacks of bacteria, virus & fungi
  - ii. Unhygienic transport & storage conditions

PreservePlus <sup>™</sup>Additive is a cost-effective solution enhance shelf life of fruits, vegetables, cut flowers & meat by up to 40%





- 1. Based on micro particles of modified zeolite
- 2. Increases the shelf & transit life of packed fruits, vegetables, cut flowers & meat by reducing ethylene concentration by adsorption, hence has limited life
- 3. RoHS compliant
- 4. Human safe, Eco-friendly
- 5. Compatible with respective polymers
- 6. Cost Effective

#### Areas of Applications:

#### **Plastic/Polymer Industry:**

- Used as Master Batch in Packaging Products like Cling films, Liners, Containers, Bags etc..
- These products are used for packing fruits, vegetables, meat & cut flowers for local & export markets.

## In House testing of FrescoPlus<sup>™</sup> & PreservePlus<sup>™</sup> Bags



#### Alphanso Mangoes after 17 days of storage at ambient conditions

### **Anti-Microbial/Anti-Fungal Additive**



#### **Introduction:**

- Pathogenic bacteria, protozoa and fungi Cause of many infectious diseases
- Microbes present in nearly everything that we handle daily, even in the air that we breathe!
- Effective dealing with harmful microbes to prevent infection
  & disease is a challenge

Anti-Microbial/Anti-Fungal Additive is an ideal solution to provide anti-microbial properties to the surface of polymers.





#### **Unique Features:**

- 1. Enriched with metallic silver particles & other additives in polyethylene wax
- 2. Imparts excellent bacterial and fungal-controlling properties on the surface of polymers
- 3. Remains unconsumed
- 3. Effective at low addition levels
- 4. RoHS compliant
- 5. End product certified by MICROCHEM LABORATORIES for efficacy
- 6. Human safe, Eco-friendly
- 7. Compatible with respective polymers
- 8. Economical

#### Areas of Applications:

#### **Plastic/Polymer Industry:**

• Used as Master Batch in inner liners of household appliances (refrigerators, microwaves, washing machines, air conditioners etc.), in toilet seats, car interiors & molded furniture, toothbrushes (body and bristles) etc..

### Anti-Microbial/Anti-Fungal (O) Additive



#### **Introduction:**

- Micro-organisms live in all parts of the biosphere to fulfill vital roles in all ecosystems.
- In spite of their vitality microbes like pathogenic bacteria, protozoa & fungi are the cause of many infectious diseases.
- Dealing effectively with harmful microbes to prevent infection & disease is a challenge.

Anti-Microbial/Anti-Fungal (O) Additive is a cost-effective solution to provide anti-microbial properties to the surface of polymers.



- 1. Based on organic micro particles & other additives in polyethylene wax/or as powder.
- 2. Imparts excellent bacterial & fungal-controlling properties on surface of polymers
- 3. Effective at low addition levels (but less effective than AntiMicrobial-AntiFungal Additive)
- 4. Gives long-term effect
- 5. RoHS compliant
- 6. Human safe, Biodegradable, Eco-friendly
- 7. Compatible with respective polymers
- 8. Cost-effective

#### Areas of Applications:

#### **Plastic/Polymer Industry:**

- <u>Wax-based product</u> used as Master Batch in inner liners of household appliances (refrigerators, microwaves, washing machines, air conditioners etc.), in toilet seats, car interiors & molded furniture, toothbrushes (body & bristles) etc..
- **<u>Powder-based product -</u>** finds wide applicability in pharmaceutical industries in topical formulations & in paint industry in various exterior-interior paint formulations.

### **Oxo-Photobiodegradable Additive**

#### **Introduction:**

- Managing plastic waste is a big challenge.
- Most polymers do not degenerate for decades after land filling or by throwing as garbage.

Oxo-Photobiodegradable Additive is an ideal solution to facilitate bio-degradation of plastics in the presence of UV/Sunlight & Oxygen





- 1. Based on mixture of transition metal salts & nano-titanium dioxide
- 2. Facilitates bio-degradation of plastics in the presence of UV/Sunlight & Oxygen
- 3. Plastic disposal becomes easy and safe
- 4. RoHS compliant
- 5. End product certified by CIPET (Central Institute of Plastic Engineering & Technology) for efficacy & by SGS for food safety
- 6. Effective at low addition levels
- 7. Ecologically safe
- 8. Compatible with respective polymers
- 9. Economical

#### Areas of Applications:

#### **Plastic/Polymer Industry:**

• Used as Master Batch in plastic materials during molding, extrusion or in blow molded components.

### **Photobiodegradable-(T) Additive**

#### **Introduction:**

- Managing plastic waste is a big challenge.
- Most polymers do not degenerate after land filling or by throwing as garbage.

Photobiodegradable -(T) Additive is an ideal solution to facilitate bio-degradation of plastics in the presence of UV/Sunlight





#### **Unique Features:**

- 1. Based on nano particles of titanium dioxide
- 2. Facilitates bio-degradation of plastics in the presence of UV/Sunlight
- 3. Plastic disposal becomes easy and safe
- 4. RoHS compliant
- 5. Effective at low addition levels
- 6. Ecologically safe
- 7. Compatible with respective polymers
- 8. Economical

#### **Areas of Applications:**

#### **Plastic/Polymer Industry:**

• Used as Master Batch in plastic materials during molding, extrusion or in blow molded components.

### **UV Blocker Additive**

#### **Introduction:**

- Plastics used extensively in various ranges of products due to their relatively low cost, ease of manufacture, versatility & imperviousness to water.
- Degradation of plastic is not desirable in applications where the polymers are extensively exposed to UV/sunlight.
- To avoid plastic degradation, UV Stabilizers based on Benzophenone and HALS are used.
- UV Stabilizers based on both these compounds are consumables. Hence their usage is as high as 6000 ppm.

UV Blocker Additive is an ideal solution to retard UV degradation of plastics.







- 1. Based on surface modified nano-titanium dioxide
- 2. Blockage of UV between 200 400 nm range



- 3. Retards UV degradation of plastics
- 4. Life-long effectivity (Non consumable)
- 5. Effective at a lower concentration of 1000 ppm
- 6. Same addition level in all climatic conditions
- 7. RoHS compliant
- 8. Ecologically safe
- 9. Compatible with respective polymers
- 10. Economical



#### **Areas of Applications:**

#### **Plastic/Polymer Industry:**

- Used as Master Batch in in plastic materials during molding, extrusion or in blow molded components.
- It can be used in Green house films, mulching films, protective films, molded furniture, molded luggage, canal lining films, molded auto components, etc..

#### **Dosage:**

Additive in	Concentration in final product
LLDPE, PBT, PS or other polymers	(ppm)
UV Blocker Additive	100

# Anti-Drag/Anti-Scratch/Print Plus Additive

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#### **Introduction:**

- Polymers face resistance from moulds or dies while molding or extrusion operations
- Solution slipping agents based on oils, silicon or waxes are added for lubrication
- Drawback They tend to migrate on the surface of polymers causing dusting, reduced printability, blocking etc..

Anti-Drag/Anti-Scratch/ Print Plus Additive is an ideal solution to improve the processibility of polymers.



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#### <u>Unique Features:</u>

- 1. Based on treated silica nano-spheres
- 2. Does not contain wax or silicone oil
- 3. Reduces drag during extrusion & molding
- 4. Improves scratch resistance
- 5. Improves printability & seal-ability
- 6. RoHS compliant
- 7. Effective at low addition levels
- 8. Ecologically safe
- 9. Compatible with respective polymers
- 10. Economical

#### Areas of Applications:

#### **Plastic/Polymer Industry:**

• Used as Master Batch in blowing, molding or extrusion operations.



### **Anti-Corrosive Additive**

#### **Introduction:**

- All ferrous & non-ferrous metals are prone to atmospheric corrosion in presence of oxygen and moisture.
- ➤ The oxidation needs acidic pH.

Anti-Corrosive Additive is an ideal solution to prevent surface corrosion of packaged components.





- 1. Based on weak acid salts of aliphatic amines incorporated in wax
- 2. Prevents surface corrosion of packed components
- 3. RoHS compliant
- 4. Human safe, Ecologically safe
- 5. Compatible with respective polymers
- 6. Economical

#### **Areas of Applications:**

#### **Plastic/Polymer Industry:**

• Used as Master Batch in films used for packing/ protecting of auto or other mild steel components.

### **Anti-Static Additive**



#### **Introduction:**

- During processing, polymers can accumulate static charge on their surface due to shear-generating production equipment.
- This can hinder production operations & degrade final intended use of the polymer.
- It can also pose serious fire hazard in solvent-based applications

Anti-Static Additive is an ideal solution to eliminate static charge accumulation on surfaces.





#### **Unique Features:**

- 1. Based on poly-functional hydrophilic polymer
- 2. Makes the surfaces hydrophilic which permanently stops accumulation of static charge on the surface
- 3. Avoids dust accumulation on film surfaces
- 4. Easy film roll unwinding
- 5. Reduces fire hazard
- 6. Not extractable by water contact
- 7. RoHS compliant
- 8. Human safe
- 9. Compatible with respective polymers
- 10. Economical

#### **Areas of Applications:**

#### **Plastic/Polymer Industry:**

- Used as Master Batch in films
- It is used for improving surface hydrophilicity of polyolefin films which stops accumulation of static charge on the surface & reduces fire hazard



## **Barrier Additive**

#### **Introduction:**

- Plastics are widely used for packaging due to attributes like flexibility, clarity, low-cost, shelf appeal, ease of transport, storage & use
- All forms of plastics are permeable which may hinder their storage performance for food materials, corrosive components etc.. They may also affect printability of polymers.
- Hence, it is important to have barrier property to the movement of gas/liquid molecules through the plastic matrix comprising the package.

#### Barrier Additive is an ideal solution to

decrease permeability of polymers for any material (like gases- $O_2$ , Water, Fatty acids or Bases) by a factor of approximately 100 for 10 micron thickness.



- 1. Based on surface modified inorganic platelets with very high aspect ratio.
- 2. Drastically reduces permeability of all diffusing molecules like oxygen, water, oils, fatty acid etc..
- 3. Helps to maintain printability & seal-ability of the plastic
- 4. RoHS compliant
- 5. Food safe, Ecologically safe
- 6. Compatible with respective polymers
- 7. Economical

#### **Areas of Applications:**

#### Plastic/Polymer Industry: As master batch –

- In films for reduced permeability of packaging materials for decreased diffusion of free fatty acids in vegetable oils, improved printability of plastics & retention of print matters
- For packaging of fried & baked foods like biscuits, wafers etc.. This prevents spoilage of foods due to oxidative or hydrolytic rancidity & sogging
- For packaging of bread. It retains the softness of bread.
- For packaging of fruits & vegetables. This prevents spoilage due to oxygen degeneration
- To improve overall barrier properties of plastic materials

### In-House test of Barrier Property (LDPE films exposed to Hexane)



Bulging indicates prevention of diffusion of hexane vapors

#### **Control Film**

### **Barrier Film**

#### Diffusibility at 24°C to 30°C.

- For Control Film  $-0.482 \text{ gms}/\text{cm}^2/\text{day}.$
- For (1%) Barrier Film -0.391 gms /cm<sup>2</sup> /day.





#### **Areas of Applications:**

#### **Plastic/Polymer Industry:**

• Used as Master Batch in domestic/industrial cables , drip irrigation pipes, automobile cables etc..

#### **Dosage:**

Additive in	Concentration in final product
LLDPE, PBT, PS or other polymers	(ppm)
Rodent Repellent Additive	500-1000

# **Contact Us**



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