



OXO-BIODEGRADABLE ADDITIVE FOR PLASTICS (A BREAKTHROUGH IN PLASTIC ENGINEERING)



BIO-DEGRADABLE PLASTIC

Plastic is a fundamental part of our busy lives. Not many people know that plastic is made from a by-product of oil which used to be wasted and that it makes good environmental sense to use it. Ordinary plastics can be re-used and recycled – however if they get into the environment they can last for many decades. The solution is to add d2w™ additive when the plastic product is being manufactured - making it “oxo-biodegradable” or “oxo-bio” for short.

Oxo-bio plastic will degrade, then biodegrade, to water, CO₂, biomass and trace-elements, on land or sea, in the light or dark, in heat or cold, in whatever timescale is required. It leaves NO fragments NO methane and NO harmful residues. There is little or no extra cost, and during its service-life strength and other qualities are the same as ordinary plastic.

In accordance to our mission to provide 'eco-friendly products at logical prices', we have come up with this product oxo-bio plastic additive, to solve the environmental problem caused by tons of polythene & polypropylene generated from packaging and other plastic applications.

Using d2w™ oxo-bio additive a polythene & polypropylene range can be developed which is inherently degradable and can degrade completely in a landfill(dumping ground) site or in compost.

d2w™ is a low-cost insurance against the accumulation of plastic waste in the environment.

HOW DOES IT WORK ?

The unique properties of plastics - strength, toughness and durability- are due to high molecular weight and the chemical bonding between the atoms. The degradation of plastics, which is constructed of carbon and hydrogen atoms, results from the rupture of carbon-carbon bonds leading to lowering of molecular weight and a resultant loss of strength and durability. This leads to the rapid breakdown of material when exposed to various environmental conditions.

Significantly, d2w™ oxo-biodegradable plastics do not need a highly-microbial environment to degrade – this will happen even if the plastic is left in the open air or in the sea! For this reason in particular, ‘oxo-bio’ plastic is preferable to ‘hydro-degradable’ eg starch-based plastic, which requires an active bio-environment before degradation will work.

A number of factors can accelerate degradation such as sunlight, heat and stress such as pulling and tearing. Once degradation is initiated either before or at the landfill(dumping ground) surface it will continue. The eventual result of the degradation is release of minute quantities of carbon dioxide and water.

Alternatively, when exposed to sunlight, photo-degradation would occur, allowing a complete breakdown of the film in CO₂, water and biomass. It is an important feature of the material that there is no potential for leachate/water table contamination as the additives are neither water soluble nor toxic in either degraded or un-degraded conditions.

COMPREHENSIVELY TESTED AND PROVEN

d2w™ oxo-biodegradable plastics have been extensively tested by RAPRA Technology, Europe's leading independent plastics research establishment, and by other specialised test establishments around the world. They can pass all the tests prescribed by American Standard 6954-04 for "Plastics that Degrade in the Environment by a Combination of Oxidation and Biodegradation." Product development is on-going and confirmation of degradability of our customers' products is included in Symphony's routine quality-control procedures.

In INDIA it has been tested by CENTRAL INSTITUTE OF PLASTIC & ENGINEERING TECHNOLOGY, CHENNAI & NATIONAL TOXICOLOGY CENTRE, PUNE for biodegradability under ASTM 6954-04.

Certified food safe

The additives are suitable for direct food-contact, in compliance with EU Directive 2002/72 as amended and US FDA Code of Federal Regulations Chapter 21. Independent food-contact regularity assessments of d2w have been undertaken by Smithers/RAPRA. Also, for more than 3 years d2w™ products have been used by major retailers for direct food-contact.

Environmentally safe

d2w™ oxo-biodegradable additive has been successfully tested in compost by government-accredited laboratories for soil safety and eco-toxicity. These tests demonstrated that the additive did not have any toxic effects and that it is totally soil safe.

Recyclate and recycling

Recycled plastics are OK, but they are not degradable and will still lie around in the environment for decades. However, ordinary plastic and recycled plastic can now be made oxo-biodegradable using d2w™ additive. Conversely, d2w™ products can be recycled and, provided that regard is had to inclusion-rate and stabilisers where necessary, the recycled plastic will not be degradable unless more d2w™ is added.

Waste management systems

In landfill d2w™ oxo-biodegradable plastic will continue to degrade while oxygen is present. Oxo-bio will not emit methane even under anaerobic conditions (unlike hydro-biodegradable plastic, paper, cotton etc.). This is important because methane is a greenhouse gas 23 times more harmful than CO₂. Oxo-bio can be incinerated for energy-recovery, and trials are ongoing to demonstrate compostability of d2w™ products in industrial composting systems.

Reduce, reuse, recycle

d2w™ oxo-biodegradable products are wholly consistent with these important environmental principles. Also, the nature of the additive allows the very best available plastic technologies to be used to achieve minimisation of raw-material usage. During its service-life the product can be used and reused and will maintain its strength – and d2w™ is recyclable as described above.

No Compromise

d2w™ oxo-biodegradable plastics are indistinguishable from the non-degradable alternative during the useful life of the product. There is therefore no compromise on product features or performance.

No Additional cost

There is very little additional cost – and in some cases no additional cost. This is because d2w™ oxo-biodegradable products can be made with the same machinery and workforce as normal plastic, and there is no need to change suppliers. The environmental and marketing benefits more than cover any small on-cost there may be.

Adjustable product life

The useful life of d2w™ oxo-biodegradable products is 'programmed' at the time of manufacture according to the customer's requirements, and typically includes some margin of flexibility. A number of factors can accelerate degradation such as sunlight, heat and stress (stretching and tearing) and it will be slowed by chilling or freezing. Appropriate, but not special, storage conditions and stock-rotation are all that is needed.

Life cycle cost is low

Oxo-bio plastics are made from a by-product of oil (comprising less than 5% of the oil barrel), which used to be wasted by flare-off. They are also lighter and less bulky than paper, glass, or other alternatives. This makes the life-cycle cost very low especially when compared to the use of fertilisers and machinery to grow crops to make hydro-biodegradable plastic alternatives, or the huge amounts of energy consumed in making and transporting glass and paper. In addition, the use of oxo-bio plastic avoids usage of land and water resources which drives up the cost of food for people and livestock.

Wide range of applications

d2w™ can be used in almost all PE and PP flexible and semi-rigid products – blown and cast as well as single or multi-layered, including BOPP. Symphony has an existing portfolio of solutions and new formulations are being constantly developed for new materials and performance criteria.

Major applications to date include:

- Carrier and other bags both for consumer sale and not for sale

- Refuse sacks and bin liners, kerbside collections sacks
- Mailing, polywrap and newsprint films
- Packaging films including bread, freezer and produce bags
- Collation shrink and stretch films
- Agricultural films are currently being tested on farms in nine countries. Nets and fibres are also in development.
- Disposable plastic cutlery.

Additive range

d2w™ is actually a range of specialised additives. Different polymers, different processing conditions and different requirements for shelf-life and service-life, require different formulations. We supply grades of d2w™ suitable for inclusion in polyethylene and polypropylene, and polystyrene is being developed. Certain grades provide extra high clarity and others are designed for higher processing-temperatures, or additional heat-passes.

BENEFITS:-

- A breakthrough in development of ENVIRONMENT FRIENDLY PLASTIC.
- Company can market 'GREEN CONSUMERISM'
- A low Cost high benefit product.

OXO-BIO PLASTIC v/s PAPER BAGS

- 70% more pollution than plastic bags.
- Use 500% more raw material than Plastic bag.
- Found to be 6 time more heavier.
- Takes up 10 times more storage volume of plastic bags.
- Takes 3 times more energy to make than plastic bags.
- Takes 7 times the number of trucks to deliver the same number as of plastic bags

OXO-BIO PLASTIC	STARCH BASED PLASTIC
Usually made from a by-product of oil-refining	Usually made from starch
Can be recycled as part of a normal plastic waste-stream	Damages recycle unless extracted from feedstock
Can be made from recycle	Cannot be made from recycle
Emits CO2 slowly while degrading	Emits CO2 rapidly while degrading
Inert deep in landfill	Emits methane deep in landfill
Can use same machinery and workforce as for conventional plastic	Needs special machinery and workforce
Suitable for use in high-speed	Not suitable
Compostable in-vessel	Compostable
Little or no on-cost	Four or five times more expensive than
Same strength as conventional plastic	Weaker than conventional plastic
Same weight as conventional plastic	Heavier
Leak-proof	Prone to leakage
Degrades anywhere on land or sea	Degrades only in high-microbial
Time to degrade can be set at	Cannot be controlled
No genetically modified ingredients	Possibility of GM ingredients
Safe for food contact	Safe for food contact
No PCB's Organo-chlorines, or "heavy metals"	No PCB's Organo-chlorines, or "heavy metals"
Can be incinerated with high energy-recovery	Can be incinerated, but lower calorific value
Production uses no fertilisers,	Production uses fertilisers, pesticides
No limit on availability of feedstock	Limited availability of feedstock
Demand for oxo-biodegradable plastics does not drive up cost of fuel for vehicles	Demand for hydro-biodegradable plastics drives up price of human and animal foodstuffs.

HOW TO USE IT ?

d₂w™ additive is added to the plastic granules at the extrusion stage. One has to ensure equal distribution of the additive to the granules to enable proper results. A detailed usage guide would be available to you upon request.

AUTHORISED DISTRIBUTOR:-



REGD OFFICE:- B-202, ANMOL TOWERS,
NR. RAJASTHAN HOSPITALS,
SHAHIBAUG,
AHMEDABAD - 380004.
Ph. 079-22861433, 22871501.
FAX:- 0091 79 22877092
Mb:- 0091 9879459042