Receipt No : 154664/2018/MO

राज्य मंत्री
सड़क परिवहन एवं राजमार्ग,
जहाजरानी, रसायन एवं उर्वरक
भारत सरकार

सत्यमेव जयते

Minister of State
Road Transport & Highways,
Shipping, Chemicals & Fertilizers,
Government of India

No. 275 MOS/RTH&S/2018

मनसुख मांडविया
MANSUKH MANDAVIYA

27th March, 2018

Respected Dr. Harsh Vardhan Ji,

Namaskar,

3/4

JS(KKS)

I have held a meeting with the Secretary, Department of Pharmaceuticals, Chairman, Central Pollution Control Board (CPCB), Joint Secretary, Department of C&PC and representatives of Central Institute of Plastics Engineering and Technology (CIPET) and National Chemical Laboratory (NCL), Pune to deliberate upon the Oxo-Biodegradable Technologies with a view to find a solution to plastic waste situation in the country. During the meeting, a presentation on Oxo-Biodegradable Technology was made by representatives of Oxo-Biodegradable Plastics Federation (OBPF). After the presentation, detailed deliberations were held to explore the possibilities of its application in various sectors where plastic is a primary packaging material.

I am enclosing herewith record of discussion of the meeting and copy of presentation for your kind perusal.

Based on the presentation and discussion held today in the meeting, I am of the view that it is a very good technology which would definitely help in improving the plastic waste situation in the country. Since it is the subject matter of Ministry of Environment, Forest and Climate Change, may I request you to kindly take appropriate decision at your level for implementation of this technology wherever possible.

With kind regards,

(Mansukh Mandaviya)

Dr. Harsh Vardhan,
Hon'ble Minister for Science & Technology
and Earth Sciences,
Technology Bhawan,
New Mehrauli Road,
New Delhi- 110016

Record of discussions of the meeting held on 21st March 2018 at 4:00 PM chaired by Sh. Mansukhbhai Mandaviya, Hon'ble MoS for Road Transport & Highways, Shipping, Chemicals& Fertilizers, on Oxo-biodegradable Technology in Plastics Applications.

A presentation was made by representatives of Oxo-Biodegradable Plastics Federation (OBPF) explaining the technical aspects of Oxo-Biodegradable Technology, in the chamber of Sh. Mansukhbhai Mandaviya, Hon'ble MoS for Road Transport & Highways, Shipping and Chemicals & Fertilizers on 21st March at 4:00 in Transport Bhawan. The list of participants is enclosed.

2. Hon'ble MoS (RT&H,S,C&F), emphasized the need for finding a solution to the plastic waste situation in the country. He said that while the use of plastics is on the rise, it is imperative to find an effective solution to save environment from the hazards of plastic waste. In this context, OBPF made a presentation on Oxo-Biodegradable Technology.

3. The various aspects of the Oxo-Biodegradable technology were discussed. The OBPF members submitted that the Oxo-Biodegradable technology is not a new concept, and is already in use in various countries across the globe as a proven technology. OBPF also said that Oxo-Biodegradable additives when added to base polymers at the time of manufacturing of any plastic application, does not bring any change to its physical appearance and there is no impact on tensile strength or any other technical properties.

Oxo-Biodegradable additives are also permitted by the USFDA for its use in direct contact with food products, and also complies to the food safety norms set by FSSAI. The OBPF further informed that Test Certificates and Detailed Reports are already available regarding degradation, biodegradation and toxicity compliance from various International and Indian Laboratories and Institutions.

A short video on impact of light, oxygen and temperature on biodegradation showing how the short life span can help in achieving environmental goals, was also run.

4. Secretary, Department of Pharmaceuticals agreed that introducing use of Oxo Biodegradable Plastic Technology could be considered in carry bags, packaging etc. subject to meeting the requirements duly certified by testing Agencies like CIPET. Chairman, CPCB also supported the idea of Secretary, Pharmaceuticals and imformed that compostable plastics fall under the purview of Ministry of Environment and Forests.

5. It was decided that CIPET may conduct tests as per standards to verify the claims made by OBPF members. It is necessary for the samples of Oxo-Biodegradable plastics to be tested at any of CIPET laboratory to ascertain its degradation and toxicity compliances. OBPF would support CIPET by providing technical data and also assist in testing parameters and conduct various knowledge sharing discussions which would take around 6-8 months.

6. The meeting ended with a vote of thanks to the chair.

Annexure-I

1.**Sh.Jai Priye Prakash,** Secretary, Dept. of Pharmaceuticals, M/o. Chemicals and Petrochemicals -GoI, Shastri Bhawan, New Delhi. 2. **Sh. Biplab Chattarji,** CEO, BPPI	1.**Sh.S.P. Singh Parihar,** Chairman, Central Pollution Control Board (CPCB), Pariveshbhavan, East Arjun Nagar, delhi-110032 2.**Dr. S.K. Nigam**, Scientist-CPCB	1.**Smt. Aparna Sharma,**JS-C&PC, Chemicals and Petrochemicals- GoI, ShastriBhawan, New Delhi. 2. **Dr. S C Shit**, Principal Director (NP), CIPET 1) **Sh. S Sugumar,** Principal Director (T), CIPET 2)	1.**Dr. Kadhiravan Shanmugnathan**, Sr.Scientist, National Chemical Lab, DST	1. **Shri Rajbir Singh,** PS to Hon. MoS, 2. **Sh. Anil Kumar Radadiya**, Addl. PS to MoS	1.Representatives of OBPF i) **Akash Sharma**: - Member of OBPF ii) **Pankaj Sehgal**: - Member of OBPF

3/21/2018

OXO-BIODEGRADABLE PLASTICS FEDERATION

OBPF

OXO-BIODEGRADABLE PLASTICS FEDERATION
www.obpf.org

c/o 9 School Road, West Felton, Oswestry, Shropshire. SY11 4HH United Kingdom

Supporting information for the meeting convened by
Government of India, Ministry of Chemicals & Fertilizers, Department of Chemicals & Petrochemicals
to discuss the inclusion of oxo-biodegradable technology as an amendment to the Indian Solid Waste Management Rules

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OXO-BIODEGRADABLE PLASTICS FEDERATION

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OXO-BIODEGRADABLE PLASTICS FEDERATION

Board & Founding Members

Add-X Biotech	Add-X Biotech AB Sporthallsvägen 2b, 26334 Höganäs Sweden	Markus Jörgensen CEO Vice- Chair OBPF
EKMDEVELOPMENTS	Scheuinstandstrasse 53 D 79100 Freiburg Germany	Eugen Karl Messner
epi	EPI Environmental Technologies Inc. Suite 801 - 1788 West Broadway Vancouver, BC, V6J 1Y1 Canada	Adelene Ong
WELLS PLASTICS LIMITED	Emerald Way Stone Staffordshire ST15 0SR	Dr Gary Ogden FIMMM, Csci Chair OBPF
WILLOW RIDGE PLASTICS	Willow Ridge Plastics, Inc. 3208 Dixie Highway Erlanger, KY 41018	Ray Loflin Secretary OBPF

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OXO-BIODEGRADABLE PLASTICS FEDERATION

The **OXO-BIODEGRADABLE PLASTICS FEDERATION (OBPF)**

is an industry wide, global collaboration group formed to promote the appropriate use of oxo-biodegradable products through participation in the development of standards, regulations, material guides and positive community interaction.

The OBPF has been founded by a group of leading manufacturers and technologists and is supported by scientific, economic and social research into the development of products, applications, and systems deriving from and using oxo-biodegradable products. It is intended to help educate and further public awareness of oxo-biodegradable products as an available alternative to existing products and to promote the use of these products without any anti-competitive activities in relation to other relevant industry and academic associations.

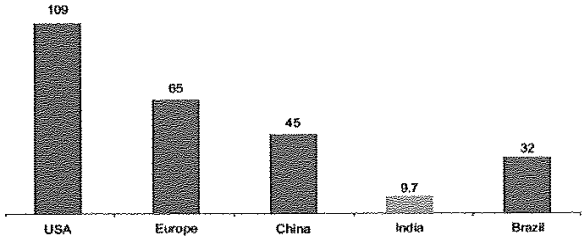
All members of the OBPF must abide by the strict code of conduct as detailed in our Articles of Association.

The OXO-BIODEGRADABLE PLASTICS FEDERATION (India) is expected to be fully established C/o. 102, Ackruti Star, Central Road, MIDC, Andheri (E), Mumbai, 400 069, Maharashtra, at The Board meeting of the OBPF scheduled for 26th March 2018.

Plastic industry in India

A wide variety of plastics raw materials are produced to meet the material needs of different sectors of the economy. These polymeric materials are broadly categorized as commodity, engineering and specialty plastics. Commodity plastics are the major products that account for bulk of the plastics and in turn for petrochemical industry. Commodity plastics comprise of Polyethylene (PE),Polypropylene (PP), Polyvinyl Chloride (PVC) and Polystyrene.

Per capita plastic products consumption (Kg/person)



Source: PlastIndia, Business Press, Research by Tata Strategic

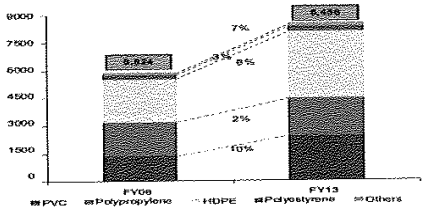
3/21/2018

Plastic industry in India

Plastic has made numerous advances in our way of life possible. It is light, durable, chemically resistant, non-reactive to outside influencing factors and has contributed to huge developments within nearly all industries. Its versatility can be used in endless ways. Whether it's keeping fruits and vegetables fresh and cheap; helping to advance medical science; or providing low income areas of the world a clean way to transport water, plastic has become a necessary part of all our lives.

In general, plastic has an incredibly low carbon footprint when compared to every other option on the market today. It needs to be handled and treated in a responsible manner.

Demand growth of plastics ('000 TPA), CAGR, FY08-13



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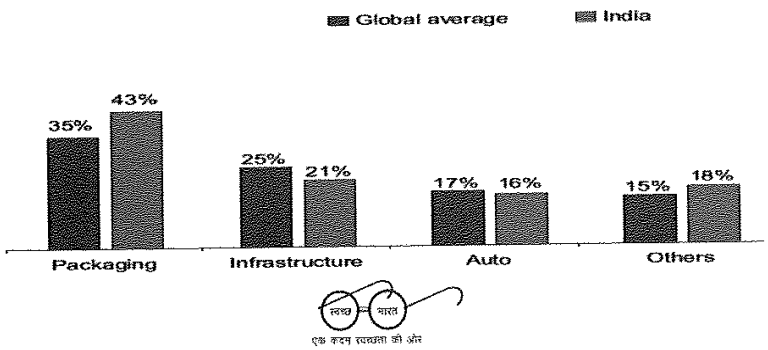
Polymer Utilization by application

Plastic in our daily life

It is necessary to prevent that „Plastic" is going to become hazardous waste itself. And where it is inevitable or due to technical, sometimes cultural conditions, not possible to be collected and re-used for a second, upgraded cycle, it needs to be biodegraded following natural processes.



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OBPF

OUR MISSION WITH OXO-BIODEGRADABLE

Fertile Earth, Energy and Co_2 Reduction Instead of PLASTIC WASTE

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OBPF

Technology to render plastic to oxo-biodegradation

Definition:

Oxo-biodegrable technology

Degradation resulting from oxidative cleavage of macromolecules. Degradation identified as resulting fro oxidative and cell mediated phenomena, either simultaneously or successively Resulting in a complete biodegradation

Statement:

Recommended to be printed on the application

This application is recyclable like most plastics, but please do not throw it into the environment. If it is exposed to sunlight or is buried it has a limited lifetime because it degrades due to light, oxygen and temperature and ultimately oxo biodegrades due to the same micro organisms that cause the biodegradation of natural materials such as wood, straw, leafs, etc.

We do not support littering

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Overview of Oxo-Biodegradation

Oxidative degradation due to heat/light in the open environment:

Mw reduction; structural/chemical changes; loss of mechanical integrity, which under the action of wind/rain, causes structural disintegration of the material.

This material can then become intrinsically mixed into the environment where it becomes available for biodegradation (Mw 4,000-10,000 Daltons)

Oxidised, low Mw carbonaceous material can be used as a food source by microbes (cf. vegetation) converting the carbon to organic waste (humus), biomass (growth) and CO_2.

The CO_2 can be collected and measured as a means to determine the degree of biodegradation of the oxidised polymer.

Technology to render plastic to oxo-biodegradation

The oxo-biodegradable technology is a two step process where:

1. **Macromolecular chain breakdown** due to the decomposition of peroxides which drives the auto-accelerating oxidation of the polymer accelerated by the transition metal catalysts. This is initiated by the available oxygen, temperature and UV-light. The level of Temperature,oxygen and UV radiation is influencingthe speed of the process.
This causes: Reducing the molecular weight and Weakening the structure. The surface becomes hydrophilic, microorganisms attach to the surface of the polymer and grow using the polymer as carbon source.

2. **Second process is the microbial metabolization, mineralization:** Microbes, microbial enzymes break down the polymers. This is called depolimerization. Then microbes digest the inherently biodegradable low molecular weight polymer fragments. Which leads tot he ultimate degradation with the end products of CO_2, H_2O, and accumulation of Biomass.

3/21/2018

Oxo-biodegradation Standards

Oxo-biodegradable polymers can be tested and characterised according to:

"**ASTM D6954-18** for Plastics that Degrade in the Environment by a Combination of Oxidation and Biodegradation"

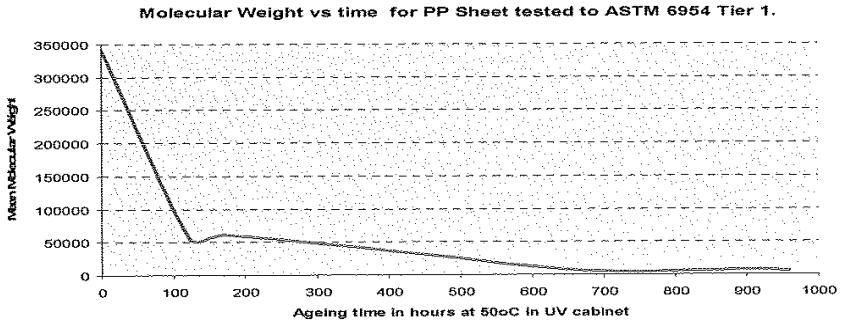
Utilises a 3-Tier methodology:

Tier 1 – Oxo-degradability
Tier 2 – Biodegradability
Tier 3 - Ecotoxicity

BS8472, UAE S 5009, SASO 2879 are similar to ASTM 6954-18

Tier 1: Oxo-degradation of Polymers

Mw vs ageing time to ASTM D6954-04 (2013) Tier 1



The PP sheet was tested following ageing at 50°C in a UV test cabinet.
It can be seen that after approximately 40 days of ageing 50°C, the molecular weight had dropped to the required ≤5,000.

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Tier 3 – Ecotoxicity testing

The residues and by-products of the oxo-biodegradation of the test materials are tested in accordance with international standards such as OECD 207 & 208 (earthworms and plants) for ecotoxicity.

Oxo-biodegradable products compliant with ASTM D6954-18 will demonstrate no ecotoxic effect within the requirements of these standards, *and* comply with the heavy metal and toxic substances content requirements of standards such as EN13432.

Oxidation, the most natural way....

Prof: Andrej Kržan
http://www.icmpp.ro/sustainableplastics/files/Biodegradable_plastics_and_polymers.pdf
Quote: „...Microorganisms recognize biodegradable polymers as food ..."
„...Decomposition generally begins with fragmentation...
the products of this decomposition are mineralized by
microorganisms..."

A review of biodegradation of plastic waste: G. Gnanavel1, VP. Mohana Jeya Valli2 and M. Thirumarimurugan
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BASF: https://youtu.be/P5L3owBT5Lk „....becomes smaller and smaller until it can be digested by the bacteria..."

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The eco-intelligent way

Infrastructure Situation
- Limited Waste Collection Available
- No Industrial composting facilities

Issue
- Compostable products are not useful

Process and Social Situation
- Incorrect Disposal
- Littering prevalent everywhere

Issue
- Straight polymeric and compostable products are inappropriate

The eco-intelligent way
- Sustainable, cost effective and compliant solutions that work using oxo-biodegradable technology
- Oxo-biodegradable additive, compound and formulations

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The eco-intelligent way

Oxo-Biodegradable additive **Performance, the Eco intelligent production proposal:**

Material	Energy for production MJ / kg	
Polylactic acid (PLA)	69	
Polyhydroxy alkanoates (PHA)	89	
Polyethylene (PE)	29	as well applicable for the Additive system
Mineral modifier	1,3	Eg: $CaCO_3$
Paper	Up to 600	
HIPS	15	

Additive + mineral modifier = < 18 MJ / kg (at compound 50/50)

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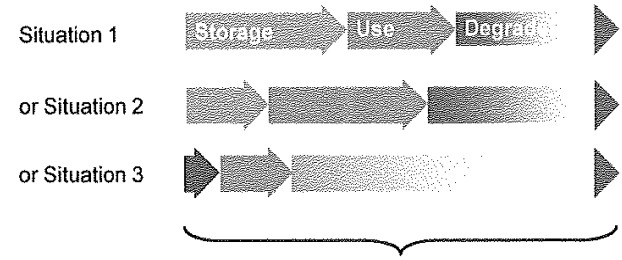
System unique controllable performance



Controlled Service Life and Tailored Degradation

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Countries in which Oxo Biodegradable plastic is used with regulatory support

United Kingdom
France
China
Pakistan
Vietnam
Sweden
South African region
UAE
Saudi Arabia
Serbia
Jordan
Sri Lanka

3/21/2018

World Wide Legislation

A. TYPES OF LEGISLATION
1. impose a tax on conventional plastic, with a lower tax or no tax at all on degradable plastic, or
2. ban the use of conventional plastic, but permit degradable plastic.

B. WHICH PRODUCTS? Government may apply the legislation
1. to shopping bags alone, or **2.** to one or more items

C. TYPE OF DEGRADABLE PLASTIC Legislation may define "Degradable Plastic" as (1) oxo-biodegradable or (2) hydro-biodegradable, or (3) both.

D. APPLYING TO WHOM? 1. Everybody, or **2.** Specific sections eg. Restaurants, Supermarkets

Legislation in:
Espirito Santo State and Goias State and several cities, in Brazil have adopted options A2, B2, C1 and D2
Neuquen Province, Argentina has adopted options A2 , B2, C3 and D2
Parana State, Brazil has adopted options A2, B2, C1, D2
Brazil has adopted options A1, B2, C3, D2
Mexico City has adopted A2, B2, C3, D2
Slovenia has adopted options A1, B2, C3, D2
Romania has adopted A1, B1, C3, D2
Hungary has adopted A1, B2, C3, D1
United Arab Emirates has adopted A2, B1, C1, D2
Montenegro has adopted A1, B2, C3, D1
Barbados has adopted A1, B2, C3, D1
Mauritius has adopted A2, B1, C1, D1

Source: OBPA Oxo-Biodegradable-Plastics-Association 2011

UAE Method

Example United Arab Emirate

This regulation covers the following products made of Polyethylene and Polypropylene:
1. All Carrier Bags (including shopping bags, garbage bags, and any disposable bags).
2. Courier and Security bags.
3. Mail Order Bags (Magazine and Newspaper Bags)
4. Disposable Cutlery such as plastic plate and plastic cups
5. Bubble Wrap and Cushioning Packaging
6. Flower Wrap
7. Overwrap Packaging
8. Stretch Film
9. Cling Film
10. Shrink Film
11. Plastic Liners for Cartons
12. Personal Care products made of plastic materials such as gloves, shoe covers, aprons and any disposable personal care products
13. Plastic bags for seedlings
14. Polyethylene Sheets on Rolls such as table covers
15. Bags for packaging Bread, nuts, sweets and all bakery items

Emirates Authority For Standardization & Metrology

3/21/2018

OBPF proposal

Amendment to the Indian solid waste handling rules to include oxo-biodegradable technology as a suitably alternative, cost effective, method of assisting in tackling waste management issues in India.

The OBPF is able to provide independent advice on:

- *Development of certification programmes, standards, legislation & regulations.*
- *Education and promotion for public awareness of Oxo-biodegradable products.*
- *Promotion of scientific, economic and social research into the development of products, applications, and systems deriving from and using Oxo-biodegradable technology.*
- *Provision of informed and considered information.*
- *The promotion of the appropriate use of oxo-biodegradable products.*

Present Indian Legislation (Highlights)

[Published in the Gazette of India, Part-II, Section-3, Sub-section (i)]
Ministry of Environment, Forest and Climate Change
Notification
New Delhi, the 18th March, 2016

"compostable plastics" mean plastic that undergoes degradation by biological
processes during composting to yield CO2, water, inorganic compounds and biomass at a rate consistent with other known compostable materials, excluding conventional petro-based plastics, and does not leave visible, distinguishable or toxic residue; carry bag made of virgin or recycled plastic, shall not be less than fifty microns in thickness. The provision of thickness shall not be applicable to carry bags made up of compostable plastic. Carry bags made from compostable plastics shall conform to the Indian Standard: IS 17088:2008 titled as Specifications for Compostable Plastics, as amended from time to time. The manufacturers or seller of compostable plastic carry bags shall obtain a certificate from the Central Pollution Control Board before marketing or selling.

9. Responsibility of producers, Importers and Brand Owners.- (1) The producers, within a period of six months from the date of publication of these rules, shall work out modalities for waste collection system based on Extended Producers Responsibility and involving State Urban Development Departments, either individually or collectively, through their own distribution channel or through the local body concerned.

(2) Primary responsibility for collection of used multi-layered plastic sachet or pouches or packaging is of Producers, Importers and Brand Owners who introduce the products in the market. They need to establish a system for collecting back the plastic waste generated due to their products. This plan of collection to be submitted to the State Pollution Control Boards while applying for Consent to Establish or Operate or Renewal. The Brand Owners whose consent has been renewed before the notification of these rules shall submit such plan within one year from the date of notification of these rules and implement with two years thereafter.

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Comparison of Oxo-Biodegradable and Hydro-Biodegradable Plastics

With respect to IS/ISO 17088 and related normative and testing recommendations

OXO systems	HYDRO systems
Usually made from a by-product of oil-refining	Made from fossil fuel, derived polymers and starch
Can be recycled as part of a normal plastic waste-stream	Damages recyclate unless extracted from feedstock (Roediger report 5 December 2013)
Can be made from recyclate	Cannot be made from recyclate
Emits CO2 slowly while degrading and forms biomass	Emits CO2 rapidly while degrading
Inert deep in landfill. So that it will not generate methane	Can emits methane in landfill
Can use same machinery and workforce as for conventional plastic	Needs special machinery
Suitable for use in high-speed machinery	Not suitable
Can be compostable. Comparable to the time line of pine needles, straw, leaves.	Compostable (if hydrolysed)

Little or no on-cost (max 10%)	Three to five times more expensive than conventional plastic
Same strength as conventional plastic	Weaker than conventional plastic
Same weight as conventional plastic	Heavier
Can be made very thin (15 – 20 µm) in order to save raw material	Thicker
Degrades anywhere on land or sea Degradation upon accidental littering starts immediately due to the integrated UV light activation. mandatory in some areas of the Middle-East, Asia and Africa.	Degrades only in high-microbial environment (if hydrolysed) Degradation under littering does not happen
CO2 burden / carbon footprint is 6 kg per produced kg of PE/PP	CO2 burden / carbon footprint is 38,4 kg per produced kg of plastic

Production uses no fertilisers, pesticides or water	Production uses fertilisers, pesticides and water
No limit on availability of feedstock	Limited availability of feedstock

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Ministry of Environment, Forest and Climate Change

"Central Pollution Control Board has estimated the generation of 15,342 tonnes of plastic waste in the country everyday, out of which, 9,205 tonnes were reported to be recycled and leaving 6,137 tonnes uncollected and littered,"
Statement given by Hon Ex MoEF Min Late Shri Anil Dave to "Business standard" on 02 Aug 2016.

One of the OBPF members have approached the NGT, MoEF and CPCB to introduce the possibilities of introducing Oxo-Biodegradable technology in India. In the same reference a letter from MoEF has been send to the CPCB dated 11 August 2016, As a response, CBCP asked to submit our test certificates and register the company as a supplier/Manufacturer of COMPOSTABLE plastic, this is very different from our plead to the MoEF and CPCB, as a response we replied to CPCB stating the same that we are not a manufacturer of COMPOSTABLE plastics, we are suppliers of Oxo-Biodegradable plastics. Since then there has been no communication at all from CPCB. Copy of the said letter has been attached in the file.

3/21/2018

Ministry of Environment, Forest and Climate Change

Oxo-biodegradable Additives are tested under ASTM D-6954, ASTM D-5208, ASTM D-5510, ASTM D-5338, ASTM D-3826, ASTM D-6400 (ISO 17088 & EN 13432), ISO-14855, and **Indian food safety norms as per IS 9833: 1981, IS 9845: 1998**
Oxo-Biodegradable additives are approved by the USA FDA, Health Canada, EU NORMPACK, ESMA (UAE), SASO (Saudi Arabia)
Oxo-Biodegradable compound and Additives can be used along with LLDPE, HMHDPE , HIPS,PP, GPPS, PVC. PET. Nylon & EVOCH etc

Compostable plastic is very expensive as compared to regular plastic, hence its is not a practical solution when it comes to introduce it at ground level e.g.: Grocery bags, carry bags etc..(ref Report submitted by Prof S P Gautam to CPCB in 2009)

Oxidation, the most natural way....

Prof: Andrej Kržan
http://www.icmpp.ro/sustainableplastics/files/Biodegradable_plastics_and_polymers.pdf
Quote: „...Microorganisms recognize biodegradable polymers as food ..."
„...Decomposition generally begins with fragmentation...
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BASF: https://youtu.be/P5L3owBT5Lk „....becomes smaller and smaller until it can be digested by the bacteria..."

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OXO-BIODEGRADABLE PLASTICS FEDERATION
OBPF

Ministry of Food Processing

- The whole industry of food processing and consumer goods rely upon plastics as a main concept in packaging the food products.
- The high consumption of packaged food products have resulted in massive littering of plastic bags, tins.
- Plastic materials that have traditionally been used in food packaging include various forms of plastics as they are easier to pack and cheaper to produce.
- These used plastic packages, bags, tins again end up being in landfill releasing toxins in that area constantly.

SOLUTION

OXO-BIODEGRADABLE PLASTIC

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OXO-BIODEGRADABLE PLASTICS FEDERATION
OBPF

Ministry of Food Processing

"If you want to reduce plastic, the focus should not only be towards plastic bags but all other non-essential plastics such as snack food packaging, milk sachets, magazine plastic covers, plastics on invitation cards and bread wrappers. There should be a mandate to make all these recyclable or provide an alternative," said **Almitra Patel, Swachh Bharat Abhiyaan national expert and member of the committee that drafted the Municipal Solid Wastes (Management and Handling) Rules, 2000.**

SOLUTION

OXO-BIODEGRADABLE PLASTIC

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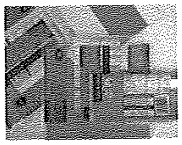
OBPF

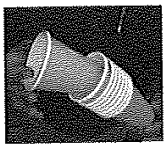
Ministry of Food Processing

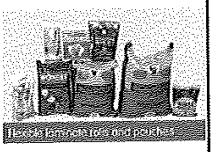
Applications


Bread packaging


Milk outer

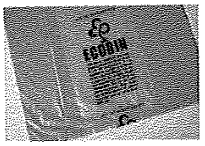
Secondary packaging

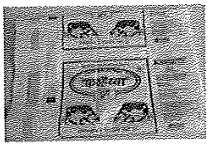

Vending cups

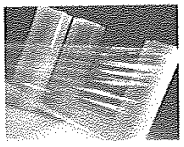

Multilayer packaging


Candy trays


EPS plates




Milk pouch


Industrial packaging

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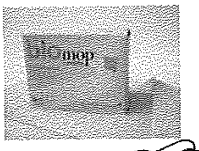
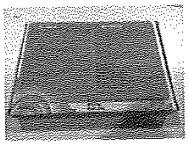
Ministry of Health

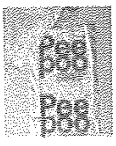
The Principle
of food contact multilayer extruded film applications valid here as well

The Oxo Additive Eco intelligent production proposal allows for the CO2 – neutral integration of a mineral

- In the skin contact „breathable film" for sanitary pads, diapers.
- Breathing masks / Cosmetic masks
- Nonwoven applications (fiber spinning with integrated mineral)
- Wiping cloth for hospitals
- Aprons
- Heat plaster
- Bio-Hazard waste collection bags







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Ministry of Chemicals and Fertilizers

- Chemicals and fertilizers are packed in various kinds of packaging. This packaging if reused or recycled without proper sanitization process can prove hazardous to human health. If these kind of packaging material is littered in the Environment, it can again pollute the land and water

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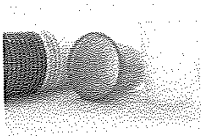
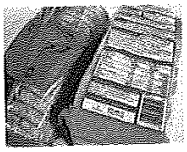
Applications

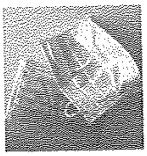

Courier Bags


Food Trays

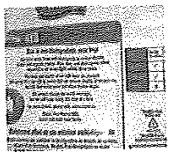

Vending Cups


Vegetable Tray


Bread packaging


Nonwoven


Disposables


Milk outer

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Request/Suggestion

A ministerial level committee comprising representatives from all the responsible ministries can together help implement the use of Oxo-Biodegradable technology in India as it's a collective responsibility of all the ministries who are directly and indirectly involved in use of plastics.

Oxo-Biodegradable technology (ASTM D-6954) needs to be included in BIS norms for effective implementation.

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Thank you

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