



Bioplastics

The Future is.....Compostable?
Biodegradable?
Sustainable?

great plastics, naturally

John Bray



Bioplastics

Compostability

Biodegradability

Sustainability

← The Environmental Continuum →

great plastics, naturally

John Bray



Bioplastics

10,000 opinions

5 Worldwide Producers

great plastics, naturally

John Bray



Bioplastics

I will prepare and someday
my time will come

Abraham Lincoln

great plastics, naturally

John Bray



Introduction

- **Stanelco plc** is a technology based company with a highly innovative and environmentally relevant product range – publically quoted on the London Stock Exchange.
 - **Stanelco BioPlastics** - a technical leader with a sustainable range of biopolymer products with excellent functional characteristics capable of replacing oil-based plastics in many applications.



Biotec Bioplast Range



great plastics, naturally



John Bray – Sales Manager Bioplastics

- Previously held commercial management roles for Added value Polymers since 2000, including:
 - Plantic Technologies
 - Associated Packaging Technologies
- Previously over 25 years Sales, NPD and Marketing management experience with:



- Stouffers USA, Findus, Crosse & Blackwell, Buitoni,
- Maggi, Sarsons, Rowntrees, Branston, Lyons Maid

great plastics, naturally



Agenda

- Definitions
- Markets & Drivers
- Applications
- Biotec
- Growth
- Issues
- The Future
- Questions



great plastics, naturally



Definitions

Biodegradable

Materials that breakdown naturally in nature to provide building blocks for new life



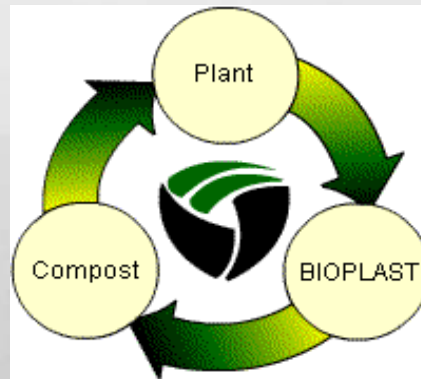
Sustainable

Made from a proportion of renewable resources



Compostable

Biodegradation measured against time in a controlled environment



Degradable

Materials that use an agent to assist breakdown into smaller particles

great plastics, naturally



World Market for Bioplastics



Current capability 500,000 Tonnes

Utilisation 55%

Growth 25% pa (+/- 100%)

Ramp up
Capability +200%
With-in 12 months

great plastics, naturally

Source: Industry estimates



Main Markets for Bioplastics



Northern Europe- Developing
France, Italy, Scandinavia, UK
Netherlands

Americas:

USA/ Canada strong growth
South America- rising interest

Israel: strong producer/ consumer
interest

Far East: little sign of home
consumption- Except Australia

great plastics, naturally

We see a difference between producer countries and user countries



World Market Drivers



Green lobbies especially in USA
And Europe

Improved product functionality

C40 Cities initiatives

www.c40cities.org

Consumer awareness- demand

Global warming - Publicity

Brand differentiation - corporate

great plastics, naturally



World Market Drivers



2008 Oil at \$110

2009.....\$200

Taxation and Legislation

Media coverage

Litter



The Trash Vortex ...as big as Texas
Greenpeace

great plastics, naturally



Bioplastic Drivers

Ease of converting

Use of existing equipment

Lower energy input

Use of existing moulds

Comparable running rates

Improved availability



great plastics, naturally



Applications for Bioplastics


Products



Thin films

Agriculture, Horticulture, Packaging, Hygiene

Shopping bags, Trash bags, Pet waste, Food bags

Wrapping, Lidding, Covering, Laminates, linings

Flow wrap, VFF, Pouch, Blisters

Produce especially added value vegetables

great plastics, naturally





Applications for Bioplastics



Sheet

Thermoforming, Vac Forming, Die cutting

RTE trays, Salads, Pots and Tubs

Point of Sale, Merchandising, Display

Printing, Multi layer

great plastics, naturally





Applications for Bioplastics

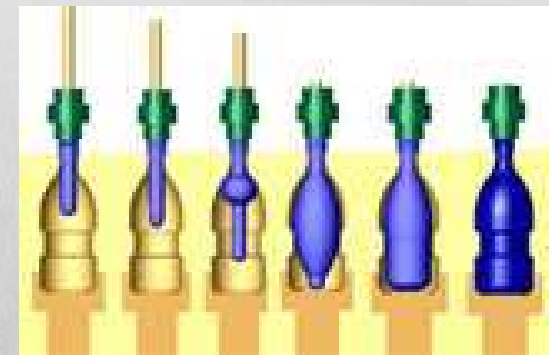


Limitless applications



Injection Moulding

Blow Moulding



great plastics, naturally



Bioplastic Range

Stanelco Bioplastics



DINCERTCO

great plastics, naturally



Biodegradable & Compostable Polymers

Developed over the last 14 years by experts
in the field of Bio-based materials,

Biodegradable & Compostable,
subject to gauge,

ISO 9000, ISO 9004 approved

Supplying the world from Southampton UK and
Emmerich Germany

Bioplast Polymers have a unique ability to drop into
current application with little adjustment or affect on
performance

great plastics, naturally





- Established in 1992
- First Din Certco registry No 7W0001
- Location : Emmerich, Germany





Bioplast Polymers enable Manufacturers, Brand owners and Corporate Businesses to make a significant contribution to:

Reducing use of Non renewable - Oil based resources

Improving Carbon Footprints

Increasing use of Sustainable – Renewable resources

Meeting consumer expectations

Increasing the usage of Biodegradable materials in high profile applications

Meeting corporate objectives and environmental policies



great plastics, naturally



- **Special Compound Technology**

- Production facilities on twin screw extruders
- Standard grades and customised products
- Food compliant production for edible products

- **Material Science**

- 14 years experiences with biodegradable polymers
- Knowledge on starches, thermoplastic starch

- **Process Know How**

- Extensive experience regarding blending and modifying biopolymers
- Facilities for testing injection molding, film blowing, cast extrusion
- and thermo forming in lab scale
- All grades developed suitable for standard conversion equipment



great plastics, naturally



BIOPLAST

Business Sectors

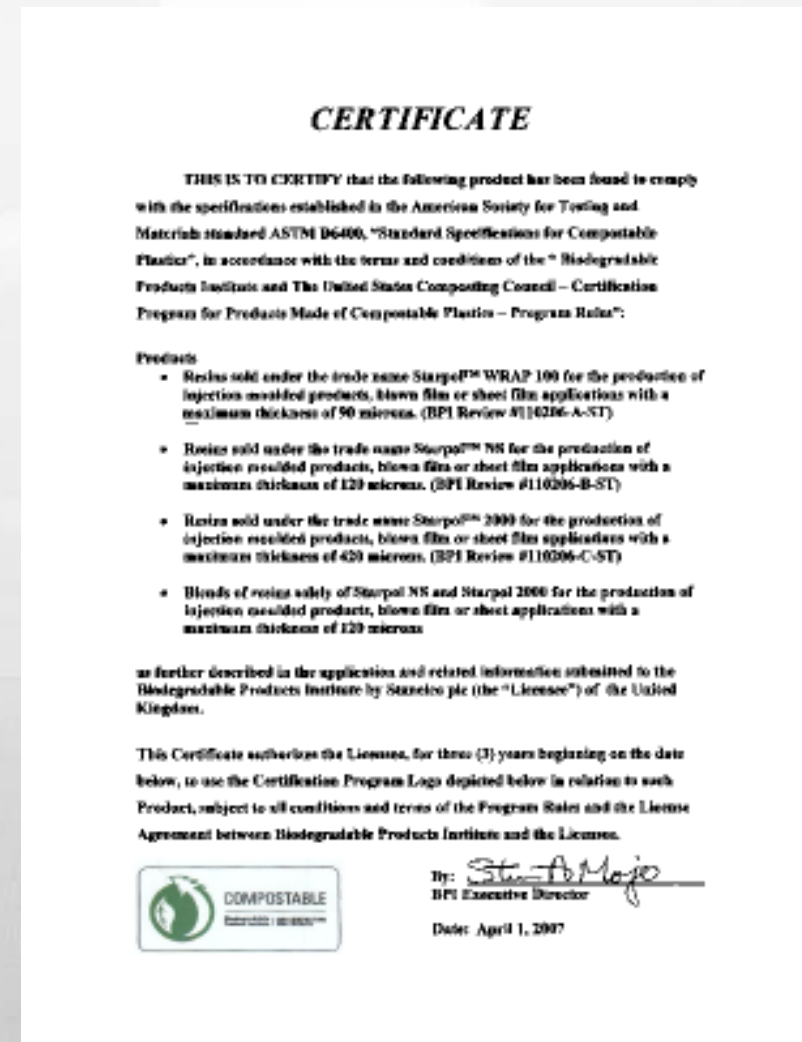
- **Thermoplastic materials for**
 - flexible films & sheets
 - rigid sheet
 - Stretch blow moulding
 - injection molded products
 - edible and ingestible products



great plastics, naturally



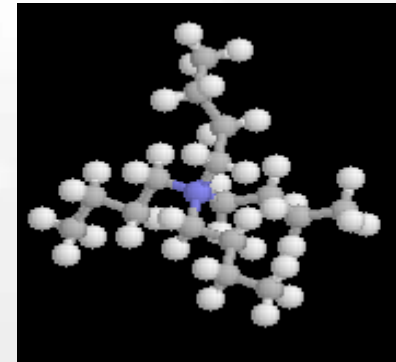
Biotec Certification



great plastics, naturally



BIOPLAST 2189



- **Bioplast 2189 is converted on conventional sheet film extrusion lines**
- **Suitable for flexible and rigid applications including film, sheet ,**
- **Thermoformed parts;**
- **Sheet range 100 – 700 micron ;**
- **Blown film 20 – 90 microns**

great plastics, naturally





BIOPLAST

106



Products



A new thermoplastic material which has sustainability in mind.

Designed by Biotec for conversion to all types of **film**, lidding, wrapping, coating, refuse, carrier and grocery **bags**

Can also be extruded into sheet for thermoforming

Bioplast 106 is a starch blend and plasticiser free material

GMO free material – Ideal for most food applications

Opaque, soft, highly flexible film with great tear strength

Gauge down to < 9 micron

great plastics, naturally





Wrap 100

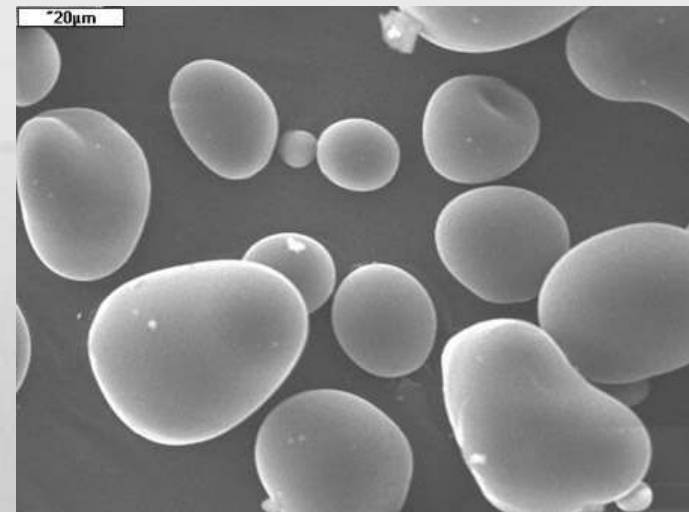
- Wrap 100 is a biodegradable material with “paper like “ feel properties
- Wrap 100 is a monolayer construction consisting of 100% biodegradable material does not allow oil or moisture to pass through it whilst permitting moisture vapour out

Wrap 100 is plastizer free, it's surface will stay dry and non sticky even after storage

TPS

- A Thermoplastic starch with excellent barrier properties for laminate and Water soluble applications

great plastics, naturally





BIOPLAST BioPlastic Products

Core Technology	Properties	Processing	End-Uses(examples)
Corn starch based rigid resin family (2189)	Rigid Cold temperature stability Shrink resistance Dead-fold Printability Breathable	Sheet extrusion Thermoforming Injection moulding Blow moulding Rotomoulding Coatings	Food trays, etc. Fridge/freezer applications Horticultural applications Labels Money cards Coated paper and board
Corn starch based rigid resin family (2189 - HT modified)	As above but with softening temperature ~90C	Sheet extrusion Thermoforming Injection moulding Blow moulding Rotomoulding Coatings	As above, for higher temperature requirements
Mixed base paper like material (Wrap 100)	Paper-like feel Biaxial easy-tear Grease and oil resistance Printability	Blown films Single/multi-layer extrusions Coatings	Food wraps Labels Speciality papers Paper & board coatings
Thermoplastic starch (TPS)	Water soluble/dispersible Gas barrier Strong and flexible Transparent	Blown films Single/multi-layer extrusions Coatings	Gas barrier films Gels/capsules Water soluble sachets for some applications
Potato starch based flexible resin family (106 variants)	Cold temperature stability Printability Breathable Strong and flexible Controlled release Grease and oil resistance	Blown films Single/multi-layer extrusions Coatings	Bags/protective films Coated paper and board



Market Growth

Current Output 275,000 tonnes

- Unused capacity 225,000t (Headspace)
- It is estimated that the industry can increase output to meet demand quickly
- Production can be in-house or utilising excess capacity in traditional sector
- Starch crops continue to have massive over capacity, even wheat is expected to stabilise

great plastics, naturally



This

- Pricing
- Costs
- Expectations
- Needs

Or this?



great plastics, naturally

Confusion

- Terms and definitions
- Expectations
- Lack of standards
- Different approaches by Governments
- Lack of a “Standard” Bio material



great plastics, naturally

Bio-Fuels



Bioplastics



great plastics, naturally

- Strong demand for **Compostable** materials
 - Especially in countries where infrastructure develops
 - UK, USA ,Netherlands



great plastics, naturally



The Future

- **Biodegradable** becomes the message of choice for effective communication

- Simplicity
- Clarity
- Marketability



great plastics, naturally



The Future

- The development of **Functional advantage**
 - Barrier
 - Water soluble
 - Multi-layer
 - Use and leave (Tree guards)

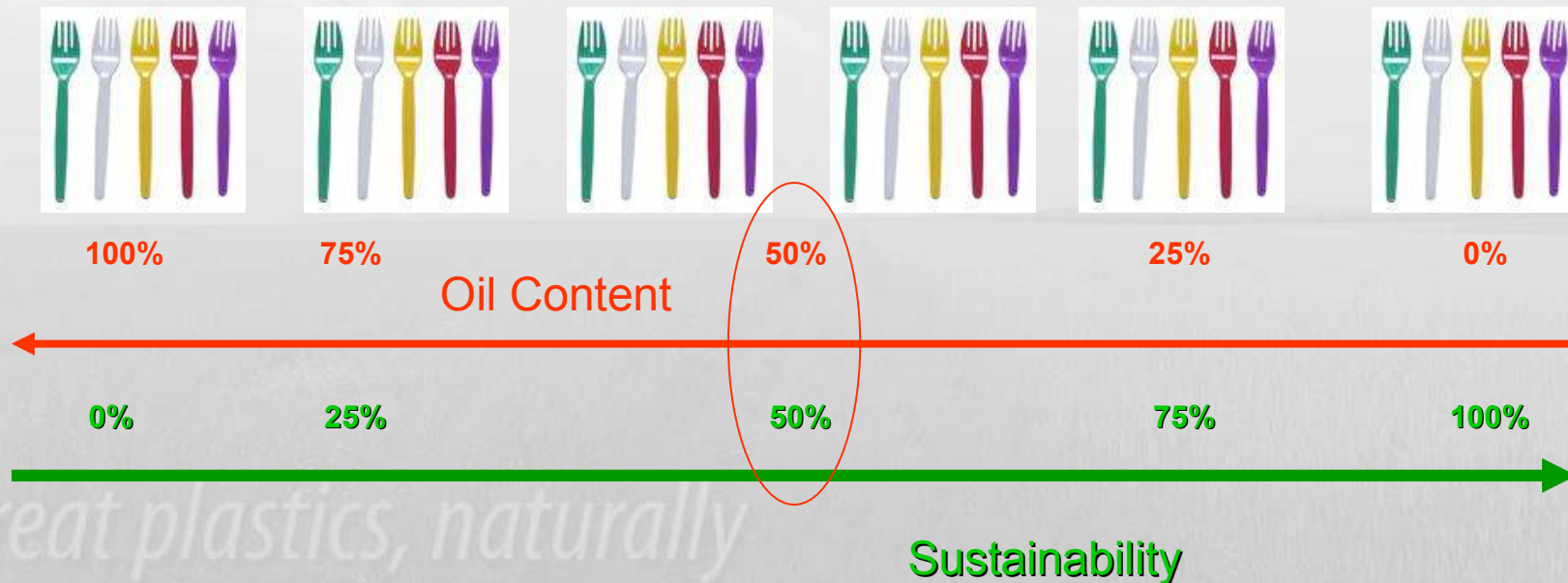


great plastics, natural



The Future

- The growth of **increased Sustainability**
- Hybrids that are neither Bio nor Traditional



great plastics, naturally

Sustainability



The Future

“Bioplastics are here to stay and have proved they can meet the demands of Consumers, Producers and Legislators”



“We should all be concerned about the future because we will have to spend the rest of our lives there”.
Charles F. Kettering



great plastics, naturally



Questions

Any Questions?



great plastics, naturally



Thank You



John Bray
Sales Manager Stanelco – Biotec

0044 7795 456082

John.Bray@stanelco.co.uk

www.Stanelco.co.uk

www.Biotec.de

great plastics, naturally