EcoCortec Biodegradable Film Technology

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International conference – Packaging and Environmental protection

CROPAC, may 2006
EcoCortec Biodegradable Films Outline

• EcoCortec’s Mission into Biodegradable Films
• Definitions & Standards
• Importance of Biodegradables & Market overview
• EcoCortec Product Line-Up
• Comparisons to Other Technologies
• Common Questions Answered
• Conclusion – NEW biodegradable film factory
EcoCortec’s Mission

• Develop and bring to market, value-added biodegradable flexible films that outperform non-degradable and other biodegradable materials currently on the market.

• Customers buy first on PERFORMANCE, then on environmental attributes.

• Therefore our mission is to develop eco-efficient production of biodegradable films that combines new technology and high productivity with positive effect on Environment
Definitions and Standards

- **Biodegradable/Compostable**
  - A packaging product is biodegradable if, under realistic disposal conditions, the material breaks down rapidly into elemental components of water and carbon dioxide with no negative effect on plants, soils or animals.
- **Specific to Packaging**
- Compost disposal is “realistic” disposal
- “Rapidly” refers to “as quickly as other materials commonly composted”
- Basis for DIN Certco IBAW Mark (Europe), BPS (Asia) and BPI (USA)
- Standards used in ASTM D 6400 and DIN V 54 900
Importance of Biodegradables

• Environment & Sustainable Development
  • Landfills are filling up and are limited
  • In many regions, landfills are not used
    – In these same regions composting is common/required
  • Plastics contamination is visible and costly

• Government/Industry Regulations
  - Many countries are implementing or evaluating tariffs, fees on inbound packaging materials

• Sales & Business Sense
  • Polyethylene is becoming more expensive and even more competitive
  • EcoCortec’s products offer a value-added approach to market and technology— they set us apart from competition!
Market overview

- Plastics are everywhere!
- One of the fastest growing industries with continuous growth (3% higher than overall ind. growth) in last 60 years
- Total world demand 220M t (Europe 47M t) Production in Croatia 40.000 t
- Biodegradable films production – estimated 70.000 t (F, GB, NL, D, I)
- Changes are the only constant in plastic business! MAIN Market GOALS in Industry are: cutting costs, reduction (elimination) of waste in production process and environment protection
- World trends in plastic industry are:
  a) production of green products (environmentally friendly)
  b) production of smart packaging (fully adjusted to product)

EcoCortec products combine both green and smart packaging:
Eco Film™

• Certified compostable per ASTM D 6400
• 300% Stronger than LDPE
• High and Low Temperature Stable
• Heat-Sealable, Convertible, Laminations
• Biodegrades within 45 days of composting
• Biodegrades rapidly in soil (varies on region), as little as 45 days
• Elastic and visually attractive material
• Bags, Tubes, Sheets primarily
• Stock products available in 3 common sizes
Eco Film™ bags for organics collection are the most common product form at this time.
Eco Film™ Cryogenic Film

- Certified by BPI, Din Certco per ASTM D 6400
- Specific Eco Film formula for frozen goods
- Patented in 2003
- Does not become brittle at extremely low temperatures
- All the benefits of Eco Film (strength, etc)
- Ideal for frozen packaging
  - Food, Medical
Eco Film™ Cryogenic film and bags are ideal for frozen food packaging.
Eco Works™ Premium Films & Bags

- Certified compostable per ASTM 6400 and DIN CERTCO
- Meet proposed USDA definition of Biobased
  - A minimum of 25% of the formulation must contain material that is derived from an annually-renewable source
  - New formula Eco Works® 70 has been tested for biobased content at Iowa State University and has a completed BEES environmental profile for “Durable Films”
- Certified and approved for Food Contact (Faculty of Food Technology and Biotechnology Zagreb, Croatia)
- 300% Stronger than LDPE
- More rigid than Eco Film (allows handle bags)
- Longer curb life in some areas (UK)
- More marketable to some customers
- Formulation derived, in part, from corn
Analytical report proving health validity of EcoWorks™ (Faculty of Food Technology and Biotechnology Zagreb, Croatia)
Eco Works™ is ideally suited for highly visible applications and specialty markets.
Eco Works™ household bags produced in Croatia suited for shopping centers and stores
Eco Wrap™ Compostable Stretch Film

- Up to 60% better yield per roll
  - Wraps 60% more pallets than standard stretch film
- Perfect for items that are flash frozen
  - Frozen foods, medical
  - Does not become brittle
- Applied with the same stretch equipment
  - Hand or machine, can withstand 400% prestretch
- Agricultural markets initially
  - Typically do not use pallets, so twine (also biodegradable) and stretch film are only packaging materials
- Accepts printing
  - For marketing and identification
Eco Wrap™ is perfect for agricultural import/export customers.
Eco-Corr™ Biodegradable VpCI™ Films & Bags

• Meets requirements of compostability

• Combines:
  • All the benefits of Eco Film, Eco Works and Eco Wrap
  • Multi-metal corrosion protection
  • Ability to downgauge up to 50% (50 vs 100 micron)
  • High/Low Temperature Stability
  • Not susceptible to moisture/humidity breakdown

• Patented in 1998

• The ONLY biodegradable corrosion inhibiting film in the world!

• Custom sizes and formulations
Eco-Corr™ is ideally suited for small parts packaging, liner films, shrouds and similar forms for customers shipping to environmentally sensitive areas.
Eco-Corr™ ESD Compostable Films & Bags

• Meets requirements for compostability
• Combines
  • All the benefits of Eco-Corr, Eco Film, Eco Works
  • Multi-metal corrosion protection (VpCI)
  • Electro-static Discharge (like VpCI 125)
• Designed specifically for electronics
  • Protects electronics from corrosion, static damage
  • Leaves no residue after unwrapping
  • Does not affect solderability
• Custom Sizes and Formulations
Eco-Corr™ ESD was designed specifically to protect high-value electronic components for customers concerned with the environmental impact of their packaging materials.
Comparison to LDPE (PE-LD)

• EcoCortec Films
  – Compostable
  – Stronger by 300%, can down gauge
  – Unique/New applications
  – Prices likely to decrease in 3-5 years

• Plain Polyethylene
  – Recyclable
  – Must use thicker gauges for same applications
  – Most applications already covered
  – Prices likely to INCREASE in next 6-12 months
Comparison to Starch Based

- **EcoCortec Films**
  - Resistant to moisture
  - Holds up in high/low temperatures
  - Completely Shelf Stable
  - Suitable for specialty applications

- **Starch Based**
  - Break apart in moisture
  - Weaken in high/low temperatures
  - Shelf stable until wet, hot
  - Limited to basic, short-use applications

*Starch-based products are a majority of the competitive, certified compostable products you will run into while marketing EcoCortec products.*
Cortec Successful Programs

- City-Wide Programs
  - City of Hutchinson, MN (population 15,000)
  - City of Ottumwa, IA (population 75,000)
  - City of Guelph, ON (population 100,000)
  - Atlantic Canada Region via Retail Pack (Al-Pack)
  - Canadian-wide through Wal-Mart Canada (Retail)
  - King County/Seattle, WA & Pacific Northwest
  - Several Bay Area businesses

- Approvals received at:
  - Washington, Oregon, California, Minnesota, Florida, Missouri, Ontario, Nova Scotia, UK (multiple councils), Alberta, Hawaii, Japan, Israel, Nebraska, North/South Carolina, New York…many more!

- Multiple Specialty Programs
  - Packaging of retail goods, pet food packaging, chemical packaging, convertible films (stretch netting), many others.
Key Projects/Customers

• Starbuck’s Coffee—Headquarters Building
• Walt Disney World FL—Conducted 2 month test
• Wal-Mart store brand—Carried in all Canada Stores
• Multiple cities (before)
• Organic grocery store chains
• School Districts in Minnesota (60 schools)
• UK Councils
• Atlantic Canada
• Retail Pack Development
Guelph, Ontario
Common Question #1

• What are the EcoCortec films made from?
  – Eco Film is made from polyester, which come from the reaction of an alcohol and an acid.
  
  – Eco Works is made from polyesters, which come from alcohols and acids, most of which are derived from corn dextrose.
  
  – Eco-Corr combines the above with VpCI™

• The short answer is:
  – “Our products are made only from certified compostable materials”
Common Question #2

• What causes the films to biodegrade?

  – The carbon chain (polymer) is scientifically designed to allow microorganisms to *directly consume* the film as a food source. The microorganisms digest the film, then release water and carbon dioxide.

• Short:
  • “The same bugs that eat your leaves, grass and food, eat the films. This is why the breakdown of films occurs at about the same rate as it does with other organic material.”

  • Other films on the market require initial heat, UV exposure, moisture or other “triggers” which delay the biodegradation.
Common Question #3

• How much do the films cost?

  – For most applications, they are the same or lower *per application* than other materials that would perform the same function.

  – Downgauging, improved yield per unit make this possible.

  - Paper bags (for collection of organic material) are usually twice the cost of Eco Film bags.
Common Question #4

• What forms are available now?
  – Any standard film form we currently produce (flat, gusseted, BOR, tube, sheet)
  – 10 cm – 3 m width
  – Bulk rolls up to 40 cm outer diameter
  – Retail Packs (custom orders)

• What forms will be available shortly?
  – Bubble wrap/bags
  – Custom Eco Works formulations
Common Question #5

• Are these products certified?
  – Eco Film™ and Eco Work™
    – BPI per ASTM D 6400
    – Din Certco (IBAW Mark) per ASTM D 6400
    – Approval for Food Contact (PBF Zagreb)
  – Eco Wrap, Eco-Corr, Eco-Corr ESD
    – Applications will be made for logo use as soon as market develops and requires the logo to be used.
    – Right now, corrosion industries do not recognize the logo, so the cost of doing so is not justified.
    – Internal testing does show compliance for the standards
Conclusions

• EcoCortec’s line of compostable/biodegradable films bridges the gap between performance and environmental protection for flexible films.

• Our products are the strongest, most resilient on the market while retaining strict adherence to the international environmental standards.

• Ecocortec vision combines early development of new products with research and development of improved product properties produced in eco-effective process.

• NOT JUST MAKING DIFFERENT PRODUCTS, MAKING PRODUCTS DIFFERENTLY!

• Questions?
NEW Biodegradable films factory in Beli Manastir, Croatia

www.ecocortec.hr

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