Innovative, Ecological Flexible Packaging

by Malcolm Cohn, Market Manager – Americas, Innovia Films

Introduction

Ecological Flexible Packaging has become increasingly important to all who are concerned about the future well-being of our Planet. It was Mahatma Gandhi who said "The future depends on what we do in the present", and we need to do something now to radically change the way we conserve our natural resources, our oceans, the quality of the air we breathe; indeed, to conserve the environment in which we live, for future generations.

This brief overview outlines the development of biodegradable & compostable packaging films, and the role Innovia Films is playing to satisfy the needs of retailers and consumers alike to achieve the goal of better utilization of sustainable or renewable materials.

Biodegradable &/or Sustainable Packaging

Why the big move to Biodegradable &/or Sustainable Packaging?

Well, there's an undeniable shift underway in the world of packaging. The global packaging industry is facing mounting economic pressures to reduce non-renewable waste, as more and more nations move to limit the commercial use of oil-based products. America is no exception, and the 'hot-button' action today is to focus on this emerging market for 'socially responsible' packaging.

Let's have a look at some of the key drivers behind the growing awareness and interest for compostable packaging. The world is just beginning to come to the realization that its dependence on oil and oil based derivatives is a significant cause for concern. This realization is to a great extent a result of price volatility and diminishing supplies. Petroleum-based products are being depleted world-wide for several reasons. There is increased demand from China and India, further aggravated by the continuing uncertainty in the Middle East. Catastrophic events like hurricanes Katrina and Rita left their mark on oil production in the Gulf States, significantly impacting delivery infrastructures which brought increases to the prices of, not only

gas, but also the cost of resin. Accumulatively, all these events have led packaging suppliers to seek alternative sources of packaging materials.

When one considers the high dependence of the packaging industry, particularly the rigid tray and flexible packaging formats, on oil based derivatives, the industry should be concerned with respect to this dependence. This concern for the future of the rigid tray and flexible packaging industry needs to be considered today, to allow a change to more sustainable raw material feed stocks in a controlled fashion.
Let's look at some of the statistics and absorb the significance thereof:

- 8% of Oil is Converted into Plastics
- Over 50% of Packaging is Plastic
- Oil has increased in price 500% since the 1990's (1960's - $4/barrel, 1990's - $15/barrel, currently - $63/barrel)
- Then we have the experts who argue over how long before the oil runs out. What is certain is that for every 4 barrels of oil we're consuming today, only 1 new barrel is being discovered.

There is an advertising slogan by technology company Emerson that greets arriving passengers at the baggage collection area in Atlanta, the busiest airport in the world with some 43 million passengers passing through each year! "17 Million new Chinese consumers of plastic will be born this year. Are you ready?" It's a sobering realization of the reality, … of the potential depletion, of the Earths assets.

Key Market Drivers

- Thus, the increasing price and decreasing long-term availability of fossil resources has resulted in increasing calls for sustainable development in all areas of our lives. All round there is now a major increase in focus on 'Sustainability', and the USA is a major driver in this … (hybrid motor vehicles, alternative sources of gas, and so on).
- There is an increasing governmental and industry awareness of the need to develop the use of sustainable resources. We need to preserve our environment today, … for future generations. Companies now have the opportunity to align their packaging policies within Corporate Social Responsibility programs.

- What about waste?

  One of the most pressing problems today is what to do with various waste products. For example, retailers want to be able to send 'back of store' waste straight to the compost facility, without the need for separation.
- Then there's 'Consumer Demand'. Consumers generally do not like packaging, but they have a very positive view of biodegradable packaging. It makes them think they've done their bit for the environment. You see, we, the consumer, make an easy link between 'natural food' and 'natural packaging'. Numerous studies have shown that consumers proactively choose bio-packaging as long as they can recognize it!! (Of course, that's a major problem … because bio-packaging is not always readily identifiable).
- **Retailers and marketers want to take advantage of these issues thereby creating a significant market opportunity.** They are therefore keen to offer bio-packaging in certain segments (e.g. organic & 'own label' categories), and we see many such programs within the major supermarkets.

  Carrefour, Wal-Mart, Costco, Whole Foods and Wild Oats, amongst many others, are to be complimented for setting the pace, for being, what I call, environmental 'activists', for 'pulling' brand-owners and retailers to become environmentally concerned. For example, Wal-Mart will phase out PVC and wax paper in its private label packaging. J&J has set a goal to eliminate PVC in primary packaging, and is actively engaged with suppliers to identify alternatives. Also, organic supermarket, Wild Oats, have transitioned their petroleum-based plastic containers in their delis to containers made from corn. They also introduced biodegradable PLA drinking cups.

Sustainability – driven by Wal-Mart

I'm sure no-one can deny the leadership role Wal-Mart as a 'key-driver' in all aspects of sustainability. Through their coalition with their suppliers, … and their suppliers, NGO's and other agencies, Wal-Mart has established 14 'Sustainable Value Networks' to consider the impact of such diverse factors like the use of renewable power; conservation of energy; reduction of green-house gases; 'right-sizing' packaging; limiting the use of fossil fuel; the elimination of PVC and wax paper from their private label brands; and, to incentivise their buyers to consider, by means of a 'Scorecard,

packaging that is recyclable, … or packaging from renewable and sustainable resources, in an effort to divert waste from land-fill to recyclers, … and to composting, … by the use of certified biodegradable packaging substrates.

Biodegradable Test & Certification Procedures

Next, we come to the test procedures that qualify material as biodegradable.
A brief guide to ASTM 6400 & EN13432:

- In simple terms, the biodegradability of the material is compared to a control (pure cellulose) and must biodegrade to a minimum of 90% of the control level.
- Constituents of the packaging material >1% by weight must be measured individually, and also biodegrade to a minimum of 90% of the control level.
- Constituents <1% by weight are exempted, but the sum of such constituents must not compromise biodegradation.
- Pilot composting & plant-growing tests are also carried out on the material.
- Heavy metal tests are also required.
- After successful completion, a dossier is submitted to the certification body, like the Biodegradable Products Institute (BPI) for approval and certification.

Methods of Composting

Basically, there are two methods of composting: Industrial composting, ... there are two types, 'In-vessel' and the 'Windrow' method; and, Home composting.
A point to note is that 'Oxo-degradable' products (based on plastic with the addition of additives to trigger fragmentation) are not suitable for Industrial composting. They do not break down effectively in the required timescales for commercial. They are not certified to ASTM 6400 and not recognized by the Biodegradable Products Institute.

Product Certification

All biodegradable packaging films have to be fully tested & certified to the American standard ASTM 6400 as well as the European composting norm EN13432:2000. They can therefore carry the following logos:

- Dincertco, Germany
- OK Home Compost, Belgium
- And of course, the BPI logo, USA

Principal Bio-based Films

The most common certified bio-based materials include:

- Innovia's NatureFlex™ Cellulose film
- NatureWorks™ PLA
- Novamont Mater-Bi™ Starch-based
- BASF Ecoflex™ CoPET

Most of these biopolymers exhibit either 'Cling Film' or 'LDPE type' properties. (Tear resistant, stretchy, weld seals, low melting points). They also tend to lack transparency and gloss.

Only NatureFlex Films and PLA exhibit 'orientated' type properties (stiffness, dimensional stability, transparency and gloss).

Most biopolymers (except NatureFlex and PLA) are based on synthetic rather than renewable resources, but all are truly biodegradable these days …

Of increasing interest going forward is that a number of these bio-materials can be combined with each other and thus bring out the best properties of the respective materials, e.g. NatureFlex™ laminated to PLA.

Innovia's Product Offering

NatureFlex™ is a family of biodegradable cellulose-based films, derived from renewable wood pulp and is certified to meet both the American ASTM D6400 and European EN13432 standards for compostable packaging.

The wood-pulp is sourced from managed plantations from referenced suppliers operating Good Forestry principals (FSC or equivalent). NatureFlex™ films typically have a renewable biobased content of some 95% by weight of material.

NatureFlex™ films are stiffer and more oriented than many bio-polymers currently on the market which makes them ideal for use in standard flow-wrap and form-fill-seal equipment for confectionery packaging. Glossy and transparent, they are also static-free for easy handling, so are ideal for twist wrap applications.

The NatureFlex™ range is continually expanding, a white version has recently been launched – NatureFlex™ NE2 White, a brown version – NatureFlex™ NE38 Brown, along with the first metallized biodegradable film on the market – NatureFlex™ NM. All of these films are ideal for use by candy and snack manufacturers.

NatureFlex™ - Key Material characteristics

In summary, the key material characteristics include:

- Compostable in all key biodegradation situations (Industrial, Home, Marine & Waste-water)
- Machine friendly (anti-static, wide heatseal range, easy opening, excellent deadfold)
- High gas barrier & range of moisture barrier possibilities
- Excellent grease/oil resistance
- Compatible heatseal to other bio-plastic materials
- Its fully biodegradable coating provides ultra wide heatseal range (from 170°F-390°F)
- It has a variable Tropical MVTR of 2g or 24g/100 in².24 hours, although a metallized grade newly launched has a MVTR of 0.32g/100 in².24 hours
- Standard gauges available are 75, 90, 120 and 165 gauge.

Key Market Applications

Key market applications include the packaging of natural and organic products, candy, dried snacks, bakery goods, fresh produce, household products and personal care items. These new compostable &/or environment sustainable packaging offer natural and organic product manufacturers the opportunity to align their packaging message with the spirit of their product marketing, by providing them with a biodegradable, naturally-based packaging material. Also, such packaging materials are sure to find support with the American consumer who will appreciate the link with naturally-based packaging.

Challenges for Bio-based Films

Let's first take a look at the barrier property requirements for biodegradable & compostable films.

- Gas barrier properties are not such a major issue, … certain starch and cellulose based materials can exhibit good inherent gas barrier characteristics.
  However, moisture barrier is an issue…
- A major issue facing the introduction of bio-based films in place of oil-based films is their current cost. Recent increases in polyolefin resin price have had a significant effect on the cost of these films, but there is still a substantial difference. However the gap is narrowing as the price of finite fossil-fuel based materials increases.
- Unlike renewable energy, bio-based films do not receive financial support during their development and market-entry stage. These have to be borne by the developer.
- But, let's not forget that bottled water costs 10,000 times more than tap water, and is often more expensive, per gallon, than gasoline. (Earth Policy Institute Report).
- And, just for information, the EU has introduced legislation to progressively remove the biodegradable element from landfill and direct it to composting facilities. We could certainly do with more composting facilities in the United States.
- In terms of package disposal, one of the industry's biggest hurdles for the adoption of compostable materials is the lack of curb-side collection and municipal composting facilities. Municipal composting would 'complete the circle' for biodegradable materials which will degrade back to useable compost material; and,
- Consumer awareness programs must be introduced to educate the consumer of the need to compost, …
  Otherwise, it will all be for naught!

Conclusion

For the most part, the industry is turning the corner on these hurdles. Enough reasons for change are becoming more evident because of high petroleum prices, scarcity of supply and negative environmental impact.

Retailers will play a pivotal role in this change from reliance on a non-renewable to a renewable resource that could be extended to all forms of packaging. The move might be slow to bio-based films, but undoubtedly, the rate of change will be largely dependent on the cost and availability of oil-based resins that are currently used for the majority of flexible packaging films like PP and PET.

It has been found that consumers, in general, like the basic concept of compostable products. The added cost per individual pack is normally fairly small (i.e. less than ½ cent/consumer pack!) and more than likely acceptable to the consumer if they can easily dispose of the packaging within the food waste stream with reduced disposal costs.

So, let's remember, **PACKAGING FROM NATURE, … PACKAGING FOR NATURE, …**
It's only **NATURAL!**

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