

**Textiles and the Environment:  
a more Sustainable Solution**

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## **Textiles and the Environment – a More Sustainable Solution**

*Dr. James Lunt, Cargill Dow LLC*

Consumers throughout the world are asking industry to rethink the way it does business. From the raw materials used to make consumer goods, to the manufacturing processes themselves as well as disposal of the items at the end of their useful lives, consumers are interested in finding solutions that are better for the earth, and ultimately, more sustainable in the long-term.

We are seeing a big push for “green design,” “natural spaces” “environmentally friendly” materials, and the list goes on. But it all comes down to looking at the way industry fundamentally does business and the responsibility it takes for products from the cradle to grave (raw material through disposal and ultimate degradation).

### **Where we are as an industry**

In recent years, such consumer demands have been met by industry with concerns of high expense and expectations of poor performance. The mindset has been that based on the core chemistries and fibers available there is very little that can be done beyond finding better ways to harvest natural fibers or “tweaking” chemistries and recycling man-made ones. But, this is not necessarily now the case.

Looking back through time, the textile industry has been rooted in what could be obtained naturally. Materials such as animal skins, flax, cotton, wool and silk dominated the majority of textile applications until the early 1900s. The introduction of the first man-made fiber, rayon, in 1910 radically changed things. The subsequent introduction of nylon, polyester and elastomeric man-made fibers proved a tremendous success with consumers for a wide range of textile goods.

As we survey today’s textile landscape, we find a blend of natural and the man-made fibers in most textiles produced. Each fiber type has its own unique qualities and each has their inherent limitations.

Generally speaking, natural fibers are limited by their ability to be “manipulated” from a chemical and structural standpoint without losing their core performance properties. The fibers are most often not capable of being melt processed and so are not amenable to mass production technologies

Man-made fibers are almost exclusively derived from petroleum, which is in finite supply and carries its own environmental drawbacks. With the world’s rapid population and economic growth, tremendous demand is being put on the earth’s petroleum supply. Petrochemical-based materials are an indispensable part of modern society, but the reality is that the earth’s petroleum reserves will not last forever.

So how do we move forward given the limitations of the respective fiber options and consumer demands to make our products and processes better? Well, as an industry, material suppliers, textile manufacturers and brand owners are actually making bold strides to address the dilemma.

Recycling programs are commonplace and many new quality materials are actually being made from recycled content. New manufacturing techniques, processes and chemistries have improved environmental profiles of many of the industry’s common practices. And, some companies are even challenging the precept that there are only two distinct types of fiber – natural and man-made.

Companies are now bringing new technologies to market that cover everything consumers and brand owners want with no tradeoffs in terms of quality and price. Many industry leaders are discovering that it is possible to do what was thought to be impossible – create fibers and textiles that bridge the gaps between natural and synthetic materials, delivering the most desired physical and chemical attributes of each.

With breakthroughs such as NatureWorks™ fibers, bushels of corn can be used to replace barrels of oil for the production of products we know, use and rely on in our everyday lives. The reason there are so many products made from petroleum is that this resource creates good products at a

good price that are relatively easy to make. There are options available today that prove that you can have all the same benefits – plus better environmental performance – using Mother Nature’s resources as the feedstock.

### *About Cargill Dow*

One example of a company that is pursuing a new option that I can talk about in depth -- since I have been personally involved with it for quite some time now - is Cargill Dow LLC. I am proud to say that our company is leading the charge of improved sustainability for textiles as well as packaging applications. NatureWorks fibers is setting the new standard for the future of textiles and proving that you really can have performance with reduced environmental impact. .

Cargill Dow is the first company to produce a family of melt-processable performance fibers, which can be made entirely from annually renewable resources, such as corn, wheat, etc. The environmental benefits of the fibers and their strong performance characteristics are establishing the technology as a significant breakthrough in the fibers industry. The unique property spectrum and origin of these fibers was recently further recognized by the FTC in the USA. PLA fibers are now a completely new generic fiber.

The process to create NatureWorks fibers allows the company to “harvest” the carbon that plants remove from the air during photosynthesis. Carbon is stored in plant starches, which can be broken down into natural plant sugars. The carbon and other elements in these natural sugars are then used to make a series of polymers, called PLA (polylactide) The development and manufacture of PLA relies on basic fermentation and distillation as its core chemical process, followed by simple polymerization.

When NatureWorks PLA is converted into fibers, it combines the best physical characteristics of natural fibers, such as wool, cotton and silk, and conventional synthetics. Given the unique blending of properties, NatureWorks fibers are said to bridge the gap between natural fibers and synthetics, creating an exciting new fiber alternative for a variety of textiles and design applications. The fibers compete head-to-head with traditional fibers on a cost and performance

basis and are generating worldwide interest among brand leaders in the textile industry.

Cargill Dow is following the path towards a more sustainable society and is working to make their process even better. The company is committed to making improvements in resources and efficiency and thereby reducing the size of their environmental footprint. Currently the company requires 20 percent to 50 percent fewer fossil fuels than conventional materials. This number will be further reduced as the company looks at alternative energy sources for their manufacturing plant located in Blair, Neb., USA.

The vision of NatureWorks fibers is more than just a performance product. It encompasses the additional goal of reducing the impact on the earth. The result is a product that is more sustainable than comparable synthetic fibers on the market. Cargill Dow has made significant steps towards creating a more sustainable product with unique performance attributes. This technology allows one of the world's most commonly used materials, plastic, to be made from simple plant sugars, which are then turned into fibers.

The applications of NatureWorks fibers will impact all areas of design, providing designers with a tremendous opportunity to move towards sustainability. With NatureWorks, designers will be able to create a room where petroleum-based products will be replaced with natural-based alternatives, in this case, corn.

*About sustainability* Companies don't just "need corn" to be more sustainable. We can all work with new products and technologies as well as our existing ones and find ways to improve them. The key to being more sustainable is for all of us to look at our products and processes with a more critical eye. We need to ask the fundamental questions including:

- Is this better than what we are doing today from an environmental standpoint?
- Will this be competitive in the marketplace?
- Can this business model/practice continue over the long term?
- Do our products contribute to an improvement in the quality of life?
- Can we be profitable?

If the answer to any of these questions is no, then chances are that the product, process or business may not be sustainable in the long term. It's also important to remember that sustainability is a journey, not an endpoint. No product or process is ever perfect. Each one has some room for improvement and development. But if we remain committed to constantly trying to do better, we find that we are a little smarter than we originally think we are. We also learn that we can be successful and responsible at the same time.

So, as you rethink how you are doing business, keep one thing in mind, the quest for a more sustainable future is here to stay. And, it all starts with a commitment to doing each day better than the last.

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