Unraveling the Mystery of Sustainability in Packaging

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ABSTRACT

Sustainability has grown to be a top priority for many businesses. Many packaging producers struggle to understand how they can positively contribute to sustainability, especially given the limitations of resources and the stringent performance requirements that producers are being asked to meet. A discussion of sustainability as related to packaging is offered.

INTRODUCTION

The term sustainability has many meanings to many people. Dictionary.com defines the term sustain as "to keep in existence" while a similar definition "to cause or allow something to continue for a period of time" is offered by Cambridge International. The term sustainable is defined as being "of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged" by Merriam-Webster. Sustainability is more difficult to describe as most sources use either the word "*sustain*" or the word "*sustainable*" in their definitions. For some, the term sustainability is synonymous with the concept of sustainable development [1]. Perhaps one way to describe sustainability is on a multi-axis scale where products that maximize performance and minimize the combined use of scarce resources provide the best sustainability. Although many definitions neglect the performance part of this description it is an important consideration especially when discussing sustainable packaging. All packaging, after all, exists for a purpose – to protect, store, and/or use a product from the time of manufacture to the time of use. In most cases the value of the product far exceeds the cost of the packaging, so it would be an unwise decision to attempt to eliminate the packaging in the name of sustainability. But there are always choices for how a product can be packaged and sustainability is increasingly becoming a key criteria for the selection of packaging.

DISCUSSION

There are many elements that contribute to improved sustainability. Some of the things that may contribute to better sustainability of packaging are:

- reduced raw material consumption
- reduced energy usage
- increased recyclability or other end-of-life options
- reduced greenhouse gas emissions
- decreased waste generation
- increased re-use
- decreased use of non-renewable sources of energy and raw materials

Because sustainability is a concept relating to the continuity of the entire system, no single attribute can define sustainability. Packaging materials which provide only a single attribute of sustainability should be evaluated in the same manner as all other products and processes, by considering the total impact that particular selection has on the entire system. One way to consider the total impact is through life cycle analysis (LCA). The use of life cycle thinking helps avoid the sub-optimization of any single element of a system or product that could result in an overall increase in resource consumption.

Life Cycle Thinking

Life cycle analysis is an important tool for understanding the sustainability of various alternatives. Different methodologies have been reported by numerous groups [2-5]. Life cycle analysis looks at

combining into a single evaluation all the resources used to create, transport, and use a product, including raw materials and energy. The user of life cycle data must fully understand the boundary conditions used to generate the comparison in order to make maximum benefit of the information. While it is not necessary to complete a full life cycle analysis for every possible case, it is useful to use the concept of life cycle thinking whenever working to maximize the sustainability performance of a system.

Individual Circumstances & Scarce Resources

Selecting the most sustainable solution will depend on your individual frame of reference and your particular situation. Consideration must be given to defining your most limited resources and most pressing issues. If water resources are scarce then washing and reprocessing packaging for reuse or recycle may not be as advantageous as it would be in locations that have plentiful water but limited landfill space. Even more important is understanding the performance requirements of a particular product. A bag used to take lawn clippings to a municipal composting facility may benefit from being compostable and breaking down under conditions of high humidity and high temperature. An extrusion blow molded HDPE bottle that is designed to contain a liquid with a shelf-life of several years and then be easily recycled into another container has a completely different set of performance requirements.

Although individual circumstances will affect final decision-making, the most important factor affecting the sustainability of the packaging itself is often the weight of the packaging used. Lighter weight packages have an advantage over heavier packages. Not only do they automatically use fewer raw materials for production, but they use less energy for processing and result in the use of less energy for transportation, which reduces waste generation and greenhouse gas emissions, two additional contributors to sustainability. Plastic packaging in particular can provide a significant savings in terms of package weight.

Sophisticated companies today also realize that sustainability is about improved long-term business viability. It combines elements of environmental, social, and financial responsibility – the triple bottom line of attention to planet, people, and profit. Without any part of this three-legged stool of success a business enterprise can not be viable as a long-term entity – that is to say it can't be sustainable. Just as businesses now recognize that sound environmental and safety practices are good for the bottom line they are increasingly recognizing that a commitment to sustainability is also good for business.

SUMMARY

Plastic packaging contributes positively to improved sustainability. High performance materials provide excellent product protection with low package weight to minimize resource intensity and maximize sustainability performance. Life cycle analysis can be used to quantify the benefits of various packaging alternatives. Downgauging, package redesign, and material substitution all offer alternatives for reducing material usage and improving sustainability performance. Packaging contributes to system sustainability by protecting the much larger investment in resources that was used to manufacture the product inside the package.

REFERENCES

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KEY WORDS

Sustainability, sustainable packaging, life cycle analysis