Edible Packaging: A Profitable Alternative and a Waste Reducer

Abstract

The purpose of edible packaging is to reduce waste while creating a stronger barrier to the elements that can increase the shelf life and quality of the contained food. The concept is gaining in support as new edible packaging materials are being introduced into the market and research continues to be done on the subject. However, edible packaging has many obstacles to overcome before it can become a staple in the food industry, such as consumer acceptance and Food and Drug Administration (FDA) regulations.

Key Words
Alternative/Edible Food Packaging, Waste Reduction, WikiCell, FDA, Consumer Acceptance

Introduction

Recently, many businesses have been transitioning from completely cost-efficient to cost-inefficient production methods in an attempt to be environmentally conscious and reduce waste. This trend has reached the food industry, where corporations and innovators are looking to create alternative food packaging materials, such as edible packaging, in an attempt to reduce the waste from food packaging materials that cannot be recycled. While in its infancy, edible packaging looks to be a promising alternative; however, there is still much research to be done by individuals and corporations in order to create cost-efficient, non-hazardous food packaging materials. These materials must also meet the regulations mandated by the FDA before they can reach the market. Finally, researchers and developers must find a way to appeal to consumers who may have a hard time both literally digesting the packaging materials if not produced properly and figuratively digesting the idea of eating the packaging. This may be the most difficult obstacle to overcome because the success of edible packaging depends on the
consumer’s acceptance. Despite these obstacles, research on edible food packaging should be funded and widespread because it will greatly reduce the amount of waste in landfills and potentially lead to a new, profitable market in the food industry.

The Purpose of Edible Packaging

The idea behind edible packaging is not to completely replace non-biodegradable packaging, but rather to reduce the amount. For instance, yogurt is sometimes double packaged in that each serving of yogurt is individually packaged in a container and many individual containers are placed in one larger container. In some cases, edible packaging would replace the individual containers so that only the larger one would be needed (Spector 2012). Edible packaging also prevents contamination and offers improved protection of taste, texture, quality, and convenience for the consumer. Specifically, it can prevent spoilage and maintain the desired traits of the food by blocking out moisture, oxygen, and any substances that a non-biodegradable packaging material could transfer to the food. An example of successful, convenient form of edible packaging can be seen in the medicine industry. Pills that are soft or hard gel capsules have an edible outer shell containing the medicine within (Janjarasskul 2010). These pills can be found in nearly every home in the United States, indicating the applicability and practicality of edible packaging technology. However, the these pills are made up of components different than those that would be consumed in edible packaging.

The Make-Up of Edible Packaging

The four primary film-forming materials used in edible packaging are proteins, polysaccharides, lipids, and resins, which are combined to make a composite material that is edible packaging. Proteins are the most significant component because there are wide varieties
with different properties, such as globular proteins, which would allow the material to be malleable enough to be folded into spherical shapes to create a strong structure for the packaging. Many proteins also have favorable optical and mechanical properties, so they can prevent contamination from foreign substances. Polysaccharides, which have desirable film-forming qualities, are utilized due to their low cost, abundance, and diversity. Many films of different consistencies can be formed due to the variety of polysaccharides available. Polysaccharides are effective barriers to lipids and oils, but do not protect as well against water and can therefore be damaged by certain humidity levels (Janjarasskul 2010). The protection from the elements is essential to increasing the shelf life and resistance to microbiological alterations (Moreira 2010).

On the other hand, lipids protect very well against water and also can enhance the aesthetics of the product by adding sheen. When combined to form a composite material, lipids provide protection from moisture, whereas the polysaccharides and proteins give structural integrity to the packaging that the lipids lack. Resins, like lipids, also enhance the moisture barrier of the product, but are not structurally strong and are unable to protect the contents of the packaging from gas. The combination of these materials into one composite material provides for a structure that is sturdy and resistant to many outside contaminants. Researchers are also experimenting with food industry by-products in edible packaging, such as potato starch from potato chip waste and whey protein from cheese production (Janjarasskul 2010). This reduces waste in two ways, in that the waste produced from food by-products decreases and that same waste is being used to create waste reducing edible packaging. This method, while in the long run is profitable, is costly in the short run; therefore, researchers such as Dr. David Edwards are
currently looking into more readily employable methods of introducing edible packaging into the market (Spector 2012).

The WikiCell

Dr. David Edwards, Harvard Professor, is the innovator of the WikiCell, an edible skin that can incase anything from wine to ice cream. The edible shell consists of three components: a polysaccharide, such as Chitosan or Alginate, natural food particles, such as nuts or chocolate, and a nutritive ion-like calcium for example (Spector 2012). The WikiCell will soon be on the market, showing how close edible packaging is to becoming a factor in the food industry. However, as stated before, the WikiCell may only eliminate the secondary, individual packaging. The outer shell of some WikiCells will be a an edible material, whereas many will have non-edible, hard shell packaging, in which case they will be completely biodegradable and therefore non-harmful to the environment. WikiCells’ CEO, Robert Connelly, states that the company wishes to partner with established corporations in the food industry to give them an alternative packaging system (Spector 2012). If this becomes a practical economical venture, the food market could see the widespread use of WikiCells in food products consumed everyday and become a significant factor in the reduction of waste. Even before the WikiCell can be introduced into the market, the FDA must first test it.

Food and Drug Administration Regulations

While consumers may have a hard time accepting the concept of edible packaging, if on the market, edible packaging should gain the approval of the consumer. In fact, edible packaging will improve the quality of the food contained because the composite materials used provide for better protection from microbiological alterations (Moreira 2010). One of the many jobs of the FDA is to ascertain whether a food contact substance, including packaging materials, will have
any technical effect on the food or the consumer. In order to even reach the market the packaging must meet the safety assessments required of all food contact substances. A product termed “safe” as defined by the members of the FDA, signifies that after much testing and reasoning, the product is deemed non-harmful by a group of competent scientists employed by the FDA (Sotomayor 2009). If the public trusts in the FDA, then trust in edible packaging is warranted.

Conclusion

Edible packaging poses an economically efficient and safe solution to waste production in the United States that would satisfy the push for environmental protection and awareness. If developed in accordance with the rules of the FDA, the composite materials used to create edible packaging, consisting of natural components such as proteins, polysaccharides, and lipids, will provide a stronger, safer method of food packaging. Should the American consumer come to accept edible packaging, the food industry would be able to significantly reduce its waste production, also allowing a whole new market of jobs and revenue to be created.
References


