

Study on the Application of Green Concept in Food Packaging Design

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Abstract. Discussing the food packaging design in terms of ecology, standards and requirements of green packaging and recycle, the paper aims at arousing the awareness of applying the idea of green packaging design, so as to avoid the over-design such as large interspace, too many package layers and complicated packaging on the structure. Green packaging design needs to consider the relationship between production, sales and recycle, and application of the green packaging materials and reduction of the package structure. Base on this, the materials that are biodegradable after discarding are developed, and then the food packaging that can reduce the energy consumption and cause no pollution to the environment are design.

Introduction

On March 31st, 2009, in order to promote the development of resource-conserving and environment-friendly society, reduce the consumption on food and cosmetic industry, our country published the compulsory document “Requirements of restricting excessive package-Food and cosmetics”, implicated stating the restrictions on interspace ratio and costs of food package. The total cost of all packages excepted the original package cannot exceed the 20 percent of the selling price of commodities, and the maximum of interspace ratio of food and cosmetics cannot over 60 percent. As a result, it is an important step for China to promote the growth of circular economy and low-carbon economy after enacting Circular Economy Promotion Law. Since then, the model of circular economy has put forward the new requirements for commodity packaging on the basis of constant and circulatory use of the materials and energy. And the principle of 3R1D has been proposed, which refers to reduce, reuse, recycle and degradation. It is illustrated that the green food packaging design should be discussed from the aspect of ecology, the reuse and recycle of materials.

Discussion on the Structure of Food Over-package in View of Ecology

Over-packaging has existed since ancient time. Influenced by the principle of “courtesy calls for reciprocity”, people thought the luxury packaging of gifts can show the sincerity of the givers, and more luxurious the gifts are, the higher the receivers’ status are. This kind of idea caused the excessive packaging. There was a story in the book of Han Feizi, an ancient Chinese work, saying that the people from Chu wanted to sell his pearl, so he made an exquisite box with fine pattern, and a person from Zheng bought the pearl because of its attractive package, but he returned the pearl to the seller, just keeping the beautiful pearl box. From the story, we can clearly see that, for the people from Zheng, much emphasis on the appearance rather than the commodity itself brought about wrong choice and ignorance the value of the pearl. And it is ridiculous to excessively package the pearl for the people from Chu. From the perspective of ecology, the over-packaging can be defined as a kind of the commodity package with excess function and value, which characterize by large interspace, too many package layers and complex structure. Due to using too many materials and occupying large space, generating too much waste, the packages has been far beyond their function of protecting the commodities. For instance, the packages of moon cakes and pastries.

From our viewpoint, opposing over-packaging needs to deconstruct the packaging in all aspect according as per the the ecology ethics, instead of simply decreasing the volume and reduce the use of materials. It also require us to improve the quality of materials, reduce the use of packages, increase the recycling rate of packages and actively apply the moderate packaging design from the

point of sustainable development. In order to ensure the sound and sustainable development of modern packaging design, the efforts on reduction of the packages, application of the moderate packaging, restriction of over-packaging and other measures should be made, in addition, we should take the road of protecting environment, reducing the waste of limited resources and promoting circular economy. As resource shortage and ecological imbalance became the bottlenecks which hinder the advancement of our economy, although the boundaries of moderate packaging are not well-defined, simple and moderate packaging should be promoted and excessive packaging should be avoided, which is an important reflection of developing the circular economy and building the conservation-minded society.

Specifications and Design Requirements for Green Packaging Materials

Packaging design is an indispensable part of commodity sales. In particular, food packaging design offers great convenience for people's daily life. However, in pursuit of exquisite and attractive packaging, the problems caused by pollution and waste are completely ignored in the process of food packaging, Plastic film bags, plastic bottles, glass bottles and metal cans are food packaging waste, and the disposal plastic foam is widely used in producing the food containers. The cushion package designed for fragile products and fast food box have their advantages, but the white pollution caused by discarding these packages as waste. This kind of material is hard to degrade and damages the soil after being discarded in natural environment.

Among the standards of the green and environment-protection packaging, 50 percent of consumer packaging must be recycled and 80 percent of glass and paper packaging must be recycled in German, which is compulsory to large extent. Japanese Environment Association marks with an ecological sign on the 47 kinds of products that are up to the standards of pollution control, discard, energy and resources consumption, safety and security, quality and pricing. Korea makes distinct sign on the products containing the ingredients that damage the environment. Our country also takes relevant policies that request eliminating the products that pollute the environment in the process of design, production and consumption, so as to strengthen our environmental awareness. In the early 21st century, the statistics from the State Environmental Protection Administration showed that of the tremendous packaging waste, apart from the cartons, paper boxes, beer bottles and some of the plastic packaging, the recovery rate of other packaging is rather low, and the recovery of the entire packaging doesn't exceed the 20 percent of total production. It is demonstrated that excessive food packaging is opposite of the requirements of restricting the over-packaging proposed by China. Over-packaging in China mainly reflected by rising packaging cost, laying a burden on consumers, producing a large amount of garbage and polluting environment.

In the situation where some of the food packaging materials pollutes environment, according to the specification and design requirements for green food packaging materials, the enterprises should explore the products and packages that benefit the ecological environment or reduce the contamination of environment in some ways. In the production and marketing activities, a reasonable plan for protecting environment should be made.

Recycle of the Food Packaging Design

We can imagine that a packages is bound to be garbage at last if used only once. As a consequence, the life circle and time of food packaging have become an indicator of the degree of environmental pollution caused by packaging. If the recycled materials are applied to the food packaging, marketing, production, transport, sales, life circle, interaction between packaging and environment of each life circle and other factors should be taken into consideration. Furthermore, based on the ecological rules and the principle of environment protection, it also focus on achieving the perfection of visual effect and use function by virtual of the art method. The complete concept of packaging refer to the integrity of production, marketing, recycle. The materials used in packaging should bring the economic and social benefits, as well as meet the requirements in terms of functions and ecology. When the food packages are designed, the protection, promotion and value

of packages should be taken into account. On the other hand, the degree of impact on the environment should be considered, and recyclable packaging materials should be used to increase the life cycle of packaging, thus reducing packaging waste. For instance, an enterprise Ecolean in Sweden developed the environmental protection materials made of the pure natural packaging material--egg shell. The Zongzi and Sushi in Japan are wrapped with lotus leaves inside and packed with cellophane outside. The packages of meals in the train are almost made of the wheat straw. The packaging materials made from plants, which are harmless to human body and environment, therefore, they have gradually been developed and produced in the market.

Because packaging design features prominent in the chain of design, production, sale and recycle, so we should full realize the importance of developing the green packages and strengthen the research in this field. What's more, it is our duty to produce the packages that are harmless for the ecological environment. In the process of design, we are supposed to use the safe, harmless and recyclable materials, turning the packages into life utensils, so as to reduce pollution and waste of natural resources. For a long time, the product packages are require to conform to the principle of 4R: reduce, refill, recycle and recover. And WTO has proposed the requirements of building the green packaging system. The real meaning of green packaging is to develop recyclable and recovery materials, and the development and use of new PMP resin materials and TPR green packaging materials are new measures for green packaging design.

With the advancement of production technologies, papers, fabrics and ceramics are produced and processed from the raw materials, which evolved into the green packaging that remain the uniqueness because of the pureness, natural value, environment-protection and other characteristics. Packaging technology needs to develop the high performance materials and new packing techniques for the purpose of using fewer materials as possible and utilizing the packages for more times, which helps enter into a green world earlier.

Conclusion

Human beings live in harmony and grow together with all things in the nature, and have the inseparable and pure relationship with the nature for a long time. The reason that human have been improving the environment conditions for their survival is their original nature, in particular, the traditional philosophy of "the unity of human and nature" is indispensable in the cause of human development since ancient time. In civil society, there were many forms of packaging based on the green concept in the process of food packaging design, such as Zongzi wrapped in reed leaves like the fruit in the tree, the package of eggs that woven from water plants, envelopes, packaging bags and birthday cards that made from the sun-dried petals mixed the fragrance, "drinking" and "eating" utensils, containers for pens and chopsticks made from bamboo, gourd for pills, Dan medicine and tea and so on. Plenty of green packaging are inspired from the nature. Some packages are designed imitating the packaging in the nature, and others are designed on the basis of the idea of using plant leaves for food packaging, for example, small green orange, grapefruit, bitter melon are used to pack tea, sugar cane leaves wrap brown sugar, gourds are used to contain traditional Chinese medicine. Today, biomimetic materials developed and made by biology engineering technology, which can be biodegradable after discarding. This kind of materials can reduce energy consumption and don't cause pollution to environment, therefore they are widely used in food packaging design, which plays a significant role in promoting the application of green idea in food packaging design.

Reference

- [1] Lv Qinghua, Harm and prevention of products over-packaging, Contemporary Finance & Economics. 2 (2006).
- [2] Xi Tao, Green Reform of Packaging Design, Shanghai Science and Technique Publishing House, Shanghai, 2002.
- [3] Shi Xiazhen, Minimalist of green packaging design, University Education, 9 (2003).

- [4] Denison B, Green Packaging Design, Shanghai People's Fine Arts Press, 2004.
- [5] Dai Hongmin, Green environmental protection package in China, Package Engineering, 11 (2011).
- [6] Zheng Guiyu, Discussion on green packaging design from the point of sustainable development, Modern Business, 23 (2008).
- [7] Ma Lei, Discussion on sustainable packaging design, Package Engineering, 4 (2011).
- [8] Dai Hongmin, Green Packaging, Chemical Industry Press, Beijing, 2002.