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## **PACKAGING MATERIALS AND EFFECTS ON QUALITY OF LIFE**

**Abstract:** Development of packaging materials shows a development parallel to the technology. Especially the increase in the number of employees and involvement woman in working life more and more increased the demand for ready-made food. Increasing demand for easily prepared food brought the new packaging technology and functionality of packaging is increased. Most of packaging material is designed to be used for once. Fast-food style nutrition brought along with single-serve packaging material. Instead of eating at home outdoor eating habits increased. As human food consumption philosophy began to change issues like sensitivity to the environment became more concerned. New food products have necessitated new packaging techniques. Packaging is a living concept and changes in parallel to technological advances. While packaging industry meets demands and the expectations of people today it also tries to predict future size of packaging and what future demands of consumers will be from food packaging industry. Today, packaging making a difference among food packaging products produced in industrial scale, more natural ones and which facilitate people's daily lives are preferred by consumers. In this study we discuss effects of food packaging materials on human life quality, contributions to daily life and changes undergone by packaging material in parallel with technological developments.

**Keywords:** Packaging, quality of life, technological development

### **1. INTRODUCTION**

Food packaging is improved based on essential requirements corresponding to consumer priorities [1]. Besides self-service stores, technology that enables packaging forms and release of mass packaging materials played a role rapidly increase of packaging. In today's industrialized societies factories just not only produce goods, in particular offer food products to the market by making them ready to serve. Consumer tastes give direction to the packaging of the products. It is known that higher the level of life consumers allocate more share for service industry. The importance of packaging increases in parallel with the rise in living standards [2]. Today, because differences between products that are produced on industrial scale decrease and product variety begins to increase, it is

getting more difficult to make difference between products and to influence the purchasing decisions of consumers. Packaging of industrial products has become more important with attention to health conditions, significance of satisfaction of consumers and mandatory protection of consumer rights [3]. Production managers understand the importance of packaging involved and try to make a difference in the product's packaging and to give an identity to the product [4]. Packaging is an extension of life besides being a sales tool [5].

In parallel with the development of technology in recent years packaging preference of the people has changed. Packaging makes everyday life easier with ensuring easy product access; food directly can be eaten on its container, light packaging, re-sealable package types, products providing ease in opening and

closing of products, offering options such as portion control. Safe food demand of people against poisoning, food choice of an appropriate size to the specific requirements, seeking recycling property on the packaging, government regulations, environmental concerns have led to development of new packaging technology and presentation in a wide range.

## 2. FACTORS AFFECTING THE PACKAGING DEVELOPMENT

Packaging activities start from the manufacturing process of food and determines present and future needs and expectations of the people and makes life easier. Food products are created ultimately for consumers, consumer attitudes and opinions play an important role in the creation of food packaging. In food packaging market the driving factors for growth are convenience, functionality and tolerance are consumer centered. Manufacturers and retailers need to understand packaging innovations that can offer benefits to consumers and important for consumers and affect consumer purchasing practices in order to remain competitive [6]. New materials, designs and technologies enable packaging to respond to the rapidly evolving demands of modern consumer lifestyles [7]. In today's competitive environment with rapid development of technology and increase in production packaging is used to make objects of consumption more attractive than they are to highlight their distinctive features [8]. Today important scientific literature specifies that; consumers more interested in healthy food to prevent diseases and to maintain a healthy life [9]. Healthy product preferences of consumers satisfy their basic values of a healthy lifestyle [10]. Increase in the number of single-person households has resulted in a growing demand for simplicity in lifestyle trends. The aging population, individualism [11] changes in home structure [12], participation of women in labor, long working hours [13], and consumer welfare [14] moving towards a healthy diet requires new experiences [15]. In addition, reduction in cooking skills, change of traditional meal times, less effort in activities related to meal preparation and arrangement [11], desire for spending less time for food and shopping [16] contributed changes in packaging. Increased number of chain of trademarks offering a wide

range of products that guarantee quality, easy shopping, cost-effectiveness and ability to compare plays a major role in the actual changes in demand. The increase in income level, women increasingly taking place in business life, increasing awareness of travel, sport and culture and as consequences of these people doesn't have enough time and increase of smart shopping rate over the internet. Aging of the population or proportion of young people directly affects packaged food consumption [17].

## 3. HISTORY OF PACKAGING

The principal roles of food packaging are to protect food products from outside influences and damage, to contain the food, and to provide consumers with ingredient and nutritional information [18]. Traceability, convenience, and tamper indication are secondary functions of increasing importance. The goal of food packaging is to contain food in a cost-effective way that satisfies industry requirements and consumer desires, maintains food safety, and minimizes environmental impact [19]. Packaging is at the same age as the history of mankind. Mankind needed excess food to wrap with a variety of natural ingredients and store for later consumption. Today, however there have been major changes in the packaging functions, in addition to storage and protection; functions such as transportation, warehousing, sales, hygiene are also included in packaging. On the basis of these changes in packaging lies ego's like competition and being superior [20]. Packaging has played an important role in protecting, preserving, containing, storing and delivering products since the earliest civilizations [21]. In BC. 300 Egyptians, Phoenicians, Persians and Turks could blow glass and made bottles and they could use cubes and jars as containers for liquid foods and use papyrus for packaging. In the ages where the first packages were used as social needs increased types of packaging used were also increased. In A.D. 105 invention of paper and its rapid expansion of production and consumption after 12<sup>th</sup> century and reform movements in Europe in the 15<sup>th</sup> century are the most important factors in accelerating the development of packaging. The structure and scope of the packaging in today's form were determined through developments and technological innovations occurred in the last

200 years. In the 17<sup>th</sup> century paper bags, in the 19<sup>th</sup> century cans and cardboard boxes, quality glass bottles for milk and other liquid beverage and other packaging types were presented one after other to the service of humanity [22]. In 1923 moisture-proof cellophane has encouraged the growth of self-service cellophane wrapping stores. Like the previous paper bags, it has accelerated the consumption and purchasing of food products. A type of plastic polyethylene has been introduced on the eve of the Second World War. Since 1950, plastics replaced many steel, glass packaging and paper cups. These plastic films (or sheets) are made with aluminum foil, paper packages or a combination of them [23]. In the 1960s with emergence of fast food concept in Europe and the United States new types of packaging for fast food began to be designed. From this date consumers all over the world met with single-serve packaging. While number of sales points increased, instead of home eating outside habit increased. While there was a growth in fast food applications, production technologies and especially range of plastic materials continuously increased [21]. Plastic containers resin coding system was introduced in 1988 by Plastics Industry Inc. Association (SPI) [23]. Invention of the twentieth century such as glass bottles, shrink wrapping paper, aluminum foil and plastics have led to more benefit and flexibility in food packaging. Other 20<sup>th</sup>-century packaging developments such as packages incorporating antimicrobials and oxygen scavengers established new precedents for prolonging shelf life and protecting food from environmental influences. Nevertheless, omnipresent global trends such as increased industrial processing of food, greater importation and exportation of food products, and less time for preparation of fresh foods compel the food and beverage packaging industry to investigate newer, more advanced packaging solutions. Thus, while protecting and preserving food were once perceived as the principal roles of food packaging [24], facilitating convenience has quickly emerged as equally important. Other elements of increasing importance in food packaging include traceability, tamper indication, and sustainability ([25,19]).

Many new and exciting developments in food packaging fulfill these roles and more. Beyond delaying environmental factors affecting food products passively using active

and intelligent food packaging are dynamic techniques in food preservation ([26,27]). Some of the most exciting developments in food packaging involve nanotechnology; the science about very small materials is poised to have a big packaging materials. Nano-sized innovation could produce remarkable new packaging concepts for barrier and mechanical properties, pathogen detection, and active and intelligent packaging. At the forefront of nano-sized development in food packaging are nanocomposites [28]. In general, in the food packaging, industry there is a strong movement towards improving consumer convenience; increasingly foods are available in packages from which they can be directly consumed [29].

#### **4. CONTRIBUTION OF PACKAGING TO OUR DAILY LIVES**

Plus of the welfare of consumer's means they want to pay that a little more price for packaging made for comfort, appearance, reliability and prestige. Innovative packaging provides great benefits for consumers, producers and environment [2]. World Packaging Organization (WPO): defines improving the quality of life for people through better packaging as its goal and slogan and emphasizes the importance they attach to the packaging. It is necessary to balance increase in quality of life by packaging and providing safe and high quality products [30]. Maintaining balance is the most important building block to ensure a healthy and a long life on earth. Maintaining the balance between man and nature is to make present and future program by using natural resources effectively to meet needs of future generations by ensuring development. Indicator of an advanced society as contribution of packaging to the product and the community reveals that use of packed products should increase [31]. Efforts to build a psychological link between consumer and packaging have come with the success of the package and consumers are ensured to have dependency habits [20]. A well designed package should meet the needs of purchase. These may be psychological or practical applications [23]. Food products are ultimately created for the consumer, their attitudes and opinions play a key role in creating food packaging [6]. Because people separate less time for eating in the intensive work schedule, they usually prefer food in individual portions, easily

opened, saving time and proper for immediate consumption. Consumers demand convenience and want fresh and quality products and this packaging technology can be achieved through protection technology that increases the shelf thout compromising the product's freshness [32]. Packaging is an important aspect of easy food for consumers because it helps to save time and effort [19]. The features considered acceptable by consumers are: access, use and disposal, product visibility, ease, re-sealability and microwave ability and a significant impact on the packaging innovation [19]. Convenience solutions must meet the requirements for business, public or home requirements in order to ensure attractiveness. These requirements are short preparation time, vegetarian meals, special diets for seniors, weight, lightness, sustainability, heated, cold food, etc. [33]. Quick-service restaurants (QSRs) offer a wide variety of foods on their menu and nearly the entire menu items are eaten "on-the-go", meaning they do not require the use of cutlery and can be eaten with hands. Consequently, the majority of food products in QSRs are consumed directly from a container or package. In the QSR, industry this type of packaging is known as single-use or disposable foodservice packaging [29].

Packaging must be at flawless function and performance to meet the new eating habits of the consumer. Packaging innovations in recent years are to apply consumer understanding to design of the packaging, creation of new distribution and service (design, color, shape, and size), new concepts and habits, creation of packaging which is adapted to the life style and to meet the needs of consumers in non-traditional ways. Packaging with less service volume, packaging can be more easily opened and closed, value added packaging, packaging promotes purchasing stimulus with eye-appealing appearance on the shelf. People are eating more in action and therefore products that can be opened and closed are requested.

The increase in eating habits in move is associated with heavy work load and increase the frequency of eating outside the home [17]. Packaging responds to increasingly varied consumer demands by providing a wide range of portion sizes, portions of food containing a specific number of calories, tamper evidence, child-resistant closures, easy opening for less able consumers [7]. Changes in lifestyle,

demographics and consumer habits influence packaging and overall consumption. Convenience is one of the key drivers and packaging manufacturers increasingly have to recognize that busier lifestyles, smaller household units and a general lack of time will change consumption habits. Even grooming while on the move will determine packaging innovation [34]. Generally, older consumers are more concerned about health and want a long life and thus they are more motivated to buy healthy products ([35,36]). Today, the food industry has focused too much on young consumers. But increased in elderly consumers forces industry to think also about packaging design [37]. The old generation is worried about their health and will be more willing to buy health-oriented food products [36], this, at the same time, for example can be functional fast food. On the other hand, elderly people may have more physical difficulty in preparing meals [38] and therefore comfort, variety and healthy diet can help. If they find it compatible with their lifestyle they can be motivated to adapt to food innovation. Aging consumers can understand how to do it immediately by looking at packaging with very little instructions, if necessary. This visual clue is vital and can influence the decision-making of the elderly people. Re-sealability is a big advantage for elderly citizens because it helps them to keep products fresh longer in multipacks and enables fast consumption when they want. Brand managers should consider offering products to fit an active lifestyle. To meet the needs of strong demographical needs brand owners should revise products and packaging [39].

Because different members of the family eat at different times of day it entails smaller portions. Increasing demand for food ready to cook require more sophisticated packaging protection. The demand increases for less protective in food and therefore packaging requires more protection to achieve the same shelf life. All of these factors should be considered by policy makers before encouraging reducing the packaging [40].

Convenience features such as ease of access, handling, and disposal; product visibility; resealability; and microwavability greatly influence package innovation. Packaging plays a vital role in minimizing the effort necessary to prepare and serve foods. Oven-safe trays, boil-in bags, and microwavable packaging

enable consumers to cook an entire meal with virtually no preparation. New closure designs supply ease of opening, resealability, and special dispensing features [19].

## **5. PACKAGING AND ENVIRONMENT**

Packaging's role in preventing and reducing product waste is often taken for granted but, in recent years, its valuable contribution to reducing food waste has begun to be recognized [7]. Improper disposal of packaging sometimes causes pollution problems. Garbage is a social problem. People are more conscious than ever. Others live, work and play in places where people throw garbage. Less material is used to make packaging it is called "source reduction". Thin items such as aluminum cans and light plastic soda bottles are examples of source reduction [23]. Environmental factors have a very important role in the production of new products and will be. Natural polymers play a key role in the synthesis of biomimetic materials in nanotechnology (mimicking nature). Natural polymers are indispensable source in biomaterials area [17]. More efficient packaging design is expected to be recoverable and used economically [41]. Sustainable packaging meets health and market expectations for people and society and useful, safe, and cost effective throughout its life cycle. They are made by using supply, production, transport, recovery renewable energy. It is designed to have maximum renewable or recycled materials and manufactured with best practices and most clean production technologies. According to all end of shelf life scenarios it is made of all healthy materials made and physically made to use the most appropriate materials and energy effectively and recovered [42]. In the packaging industry it is believed that emphasis on recycling of consumers and "green" understanding in packaging will increase in 10 years [43].

Sustainable design is the best design in the social, economic and environmental performance or the least in the social, environmental and economic costs. Sustainable design is strategic use of design without compromising design and environmental hazards to meet future human needs [44].

## **6. NEW TRENDS IN FOOD PACKAGING**

Packaging has become an integral part of food products [45]. Other innovative trends in food packaging are occurring in foodservice. As consumers continue to spend heavily on foodservice products, the role of packaging in ensuring food safety and providing convenience can only increase. Packages designed for tracking and shelf-life extension reduce the risk of food-borne illness in the foodservice industry, but heating issues continue to be tricky. New packaging products, such as the CuliDish, are helping to address these issues [46]. The CuliDish's design allows simultaneous microwave heating of food that requires high heat and food that does not (such as salads) in the same tray. Such innovations in the area of heat and heat retention will reduce the safety risk associated with improper cooking. Food consumers prepare and eat only 60% of meals at home, and 20% of consumers eat while in transit to another location [47]. As a consequence, many of the innovations in foodservice packaging are to accommodate meals eaten in transit and multi-component meals—both of which are trends of convenience. The high demand for on-the-go meals has led to a significant increase in the variety of foods packaged for in-transit dining. Edible films and wraps have emerged on numerous foods, and package designs using modular folding cartons with flip-off lids or pouches with seatbelt flaps have been created for those who dine while driving. Multi-component packaging accommodates the multi-unit meals that are available at quick-service restaurants. This type of packaging simplifies foodservice preparation, lessens waste, and makes consumption of multi-unit meals easy. Multi-component packaging is available in many forms [28]. Quick-service restaurants (QSRs) offer a wide variety of foods on their menu and nearly all of the menu items are eaten "on-the-go", meaning they do not require the use of cutlery and can be eaten with hands. Consequently, the majority of food products in QSRs are consumed directly from a container or package. In the QSR, industry this type of packaging is known as single-use or disposable foodservice packaging [29]. A strong market orientation and integration of consumers in the product development process are essential for successful innovation policy in the food

market [48]. If a link between current demand and lack of consumer products or services in the product palette can be identified, this link may support the creation of innovative products and services that address tangible and intangible consumer benefits [49].

Technological advances in the food industry are attracting considerable interest from food producers, marketers, product managers, retailers, media, and public policy makers because of the promise to provide safer and healthier foods, make efficiency improvements, and to make operations more sustainable [50].

The factors driving growth in the food packaging market including, convenience, functionality and indulgence, are consumer centered. To remain competitive in the dynamic packaged food environment, manufacturers and retailers must understand what matters most to consumers and which packaging innovations can deliver benefits that actually impact consumer buying practices [6].

The trend of the future is personalized products that can be consumed lonely according to the tastes of consumers. Consumers request portable packaging that can easily move food comfortably, easily and keep product fresh. In recent years consumers expect long shelf life food packaging, temperature-resistant packaging and new innovations like original designs. As information technology progresses smart packaging will become more important [17].

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## 7. CONCLUSION

Packaging is an indispensable part of modern life created by technology. People's lifestyle, working life and hours, allocation of time to cultural activities, eating habits, living with or without their families, spending time to prepare meals, age and many other factors affect food packaging consumption and demand for prepared food. Technology quickly changes our lives and makes our lives more active and affects every sector differently and food packaging sector also take its share of change.

Green packaging technology which is affordable, manufactured using natural resources, which can protect the food in its entire shelf life, allowing to portions, ease of use, small footprint, having technological advantages and functional features, environmentally friendly contributes to the quality of human life.

Nowadays using efficient packaging technologies packaging is thinned as much as possible, weight has been reduced and package failure is minimized. Its shape, opening and closing features, sizing have led operation of eating to be easier and more practical and safer in compliance with consumer demands and expectations. For people to live their daily lives actively they will prefer packaging methods which are providing integration to life and replying their expectations.



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