

The impact of packaging on the quality and sale of goods

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Article info

Review paper

DOI:

<https://doi.org/10.71159/icemit2558S>

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Abstract

Packaging encloses goods, enabling their distribution, storage, sale, and use. Packing itself is linked to product design, evaluation, and distribution, and represents only one step in the logistics process that moves goods from production to the end consumer. Along this path, goods are exposed to numerous influences that may reduce their quality, cause damage, or destroy them. Therefore, the function of packaging is to provide the best possible protection for goods during distribution. Today, packaging also acts as a “silent salesperson” and is an important marketing tool for attracting customers. Well-designed packaging plays a decisive role in properly positioning products in the market. Selecting the right packaging for food is essential to preserve the freshness and quality of the product.

Keywords: packaging, packing of goods, transportation, food

1. Introduction

Goods are products of labor intended for the market. Preparing goods for shipment is done by packaging them in suitable materials, usually in quantities most convenient for the end user (Štrbac, 2007). Packaging is a product made from materials of various properties, used for storage, preservation, handling, delivery, presentation of goods, and protection of their contents. It also includes items used as aids for packaging, wrapping, binding, airtight closure, preparation for shipment, and labeling (Pavlović et al., 2021). In modern distribution and large retail chains, maintaining a product in the same condition it left the production line is increasingly challenging, and this responsibility rests primarily on packaging. With the development of trade, packaging has gained a stronger role in marketing and product sales (Muhamedbegović, 2015). Food is the most important commodity for survival, but it is also our social and cultural heritage. It affects human health and the entire system of economy, production, consumption, waste, water, transport, as well as social justice and sustainable development (Stanisavljević et al., 2025). There is a distinction between packaging designed for ease of transport and handling (transport packaging) and packaging intended for direct sale to consumers (commercial packaging) (Renovica, 2010). Depending on its application and the type of product it is intended for, packaging can be classified for use with agri-food, chemical, pharmaceutical, cosmetic, electrotechnical, and other products (Cvetković & Marković, 2010). The primary function of packaging is to protect the packaged product from mechanical, physico-chemical, microbiological, and biological changes induced by external environmental factors and storage conditions (Coles et al., 2003).

2. Packing and packaging food products

Packaging is a set of procedures and materials used to protect a product, preserve it, make it attractive to customers and practical for use. Packaging of food products is a specialized food packaging process with the aim of: protecting food, preserving freshness and quality, extending shelf life, informing the consumer. Packaging, by its very nature and function, is an inseparable part of the product. Food products represent natural combinations of nutrients (water, proteins, carbohydrates, fats, minerals, vitamins, pigments, and other substances), i.e., compounds of specific composition that are highly susceptible to numerous changes under the influence of various external and internal factors. Packaging materials

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and packaging itself play a crucial role in protecting food from microbiological contamination, loss of nutritional value, quality deterioration due to physico-chemical and biochemical reactions, contamination by foreign substances, and attacks by rodents, insects, and other pests. Given the complex composition and specific properties of food, as well as its susceptibility to diverse changes, it is evident that ensuring adequate protection through packaging presents a particular challenge-unlike with many other products. To successfully preserve food, it is necessary to understand its composition and the behavior of individual components under the influence of various factors that determine the choice of packaging material and design. There is no safe food without the proper selection and application of packaging materials and systems (Stanisavljević, 2016). The composition of food is diverse, ranging from single chemically pure components, such as sucrose, to complex colloidal systems, such as milk, meat, bread, and other products. Attributes such as taste, appearance, odor, specific gravity, freezing and boiling points, specific heat capacity, coefficient of expansion, viscosity, fluidity and plasticity, surface and interfacial tension, conductivity, and others are significant physical properties of foods that must be considered when selecting packaging materials and packaging systems. Equally important are their physico-chemical (e.g., pH value - *potentia hydrogenii*) and colloidal-chemical properties. For long-term preservation, it is essential that packaging is resistant to mechanical stress, does not absorb odors, does not retain moisture, and does not react upon contact with the product. Advances in packaging science have revealed that enhanced protective effects can be achieved through the application of different packaging conditions. A wide range of food packaging materials exists, each designed to preserve product quality and freshness. Every material has advantages, limitations, and specific functionalities that affect food protection. Manufacturers of food packaging offer a broad assortment of plastic bags and containers designed to protect and preserve food freshness. These are produced from high-quality materials such as LDPE (Low-Density Polyethylene), HDPE (High-Density Polyethylene), PP (Polypropylene), and barrier films, which ensure resistance to moisture, temperature fluctuations, and external influences. When evaluating the protective function and suitability of packaging materials, special attention must be given to components such as water, easily oxidizable and reducible substances, aromatic compounds and gases, and water vapor, as well as the environmental factors (light, radiation, heat, etc.) that may cause changes in these components and their interactions. Packaging technology is of strategic importance for food producers, as it is crucial for ensuring product competitiveness in the market. Competitive advantage may be gained by tailoring packaging to consumer needs and preferences, opening new distribution channels, improving product appearance, reducing packaging costs and thus product price, strengthening market differentiation (branding), and enhancing product availability. Developers of packaging materials and formats must simultaneously address technological, marketing, regulatory, logistical, and environmental requirements (Stanisavljević, 2016). Packaging must protect products from various forms of mechanical stress, atmospheric influences, physico-chemical changes, and the action of microorganisms, insects, and rodents. Whether for frozen fruits and vegetables, bread bags, or pasta packaging, durable and practical solutions can be found from various manufacturers, with options for customization in size, thickness, and print. These manufacturers guarantee high quality, storage and transport safety, and the possibility of mass production according to customer specifications. Focusing on consumer needs, demands, and expectations is a fundamental principle that underscores the importance of understanding and meeting customer requirements (Soldo, 2024). ISO 9001 specifies the requirements for a quality management system for organizations that must demonstrate the ability to deliver products meeting customer and regulatory requirements, with the aim of increasing customer satisfaction (Poznavanje robe, 2016/2017). As an inseparable component of most industrial products, packaging occupies an important place both economically and environmentally (Đoković, 2011). Food producers and distributors continuously strive to achieve cost-effective packaging solutions that simultaneously meet consumer needs and expectations while prioritizing food safety and nutritional quality, and minimizing the environmental impact of packaging production and disposal. This challenge is continually reinforced by new legislation and political pressure. Overall, the trend is toward reducing both the quantity of packaging materials and the volume of waste they generate (Stanisavljević, 2016).

3. Storage - transport function of packaging

The storage and transport of raw materials, auxiliary materials, semi-finished goods, and finished products link and synchronize, both temporally and spatially, the procurement of raw and auxiliary materials with the production process, the various phases of production with each other, and production with the sale and consumption of goods. For this reason, storage and transport can be regarded as distinct phases of the production process, or more broadly, of the flow of goods. Distribution encompasses all stages of storage, loading, transshipment, unloading, and transport to which a product is subjected on its journey from manufacturer to consumer. A portion of raw materials, most auxiliary materials, part of semi-finished goods, and nearly all finished products are stored and transported in appropriate packaging. In addition, both new, empty packaging sent from the packaging producer to the goods manufacturer, and returnable empty packaging sent from the customer back to the producer, must also be stored and transported. The way in which raw materials, auxiliary materials, finished goods, and empty packaging are stored and transported-and the associated costs-depends, among other factors, on how effectively the storage and transport functions of packaging are implemented. Goods may be stored in open storage areas, covered spaces, closed facilities, or climate-controlled warehouses. The entire flow of goods from the manufacturer's final production site to retail shelves, or ultimately to the consumer's place of use, consists of internal and external transport. Internal transport includes the transfer of goods from the last stage in production to the manufacturer's finished goods warehouse, loading from that warehouse into external transport vehicles, transshipment between external vehicles, and unloading into the customer's storage facilities. External transport-maritime, rail, road, or air-serves to move goods along public transport routes, for example, from the manufacturer to a railway station, from the

production site to the customer's storage location, or from wholesalers to retailers (Stanisavljević, 2016). The costs of such transport depend on transport distance, vehicle type and freight rates, and the mass or volume of the goods. Every product completes its journey through purchase and consumption by the end user (Golob, 2009). During transport, goods are subject to various changes that may affect their quality, making it essential to identify the factors that contribute to quality degradation. Control procedures are regulated by appropriate legislation and standards. Export, import, and transit of goods are subject to compliance with sanitary, veterinary, and phytosanitary requirements where mandated by law. Imported goods must also comply with technical regulations and market authorization requirements (Štrbac, 2007). Given the vast diversity of goods and their equally diverse characteristics, which directly affect the logistics processes of storage, handling, and transport, there is a clear need to classify goods into homogeneous groups through the development of classification systems. The criteria for classification may be based on physical characteristics (liquids, gases, solids) or chemical composition (organic, inorganic, etc.). In logistics, however, goods are typically categorized according to attributes relevant to storage, handling, and transport, with the predominant criterion being their physical form. The physical form is a composite characteristic that encompasses a set of properties determining the technology required for handling (grasping, storing, preserving, etc.). Based on these criteria, goods are classified into the following categories: piece goods, bulk goods, liquid goods, and gaseous goods (Stanisavljević, 2016).

4. The role of packaging in product sales

Packaging today represents a "silent salesperson" and an important marketing instrument in attracting customers (Stanisavljević, 2016). The extent to which the brand of agri-food products will be successful depends on how its positioning was performed and, among other things, the possibility of the brand's influence on emotions and senses, adequate choice of visual identity elements, and the like. The fundamental functions of packaging, which it must fulfill regardless of the type of product, are the following: protective, storage-transport, sales, and usage functions. Packaging is a means whose primary function is the protection of the packaged contents (Stanisavljević et al., 2020). Packaging acts as an intermediary between the buyer and the manufacturer. It is both the seller of the product and a form of advertising-i.e., the primary means of promotion at the point of sale-since the first contact between the buyer and the product is visual. The essential criteria that packaging on the territory of the Republic of Serbia must fulfill are defined by the Law on Packaging and Packaging Waste. The Law provides the essential criteria that packaging present on the territory of the Republic of Serbia must meet on Packaging and Packaging Waste. The Law on Packaging and Packaging Waste (Official Gazette of RS, No. 36/09, 95/2018) regulates the management of packaging and packaging waste, which carries pronounced environmental, social, and economic significance. Well-designed packaging is crucial for the appropriate positioning of products on the market, among wholesalers and retailers, and then among consumers, which is the goal. It should be said that design arose from a need to create a visual identity of the product (Spahić, 2008). In Serbian retail stores, the offer of goods has never been greater than it is today. In a time when shelves are increasingly filled with products, the primary goal is to ensure that a product stands out from competing offerings. One of the most important functions of well-designed packaging is precisely this-to influence the consumer to notice, pick up, and ultimately purchase the product in the presence of similar and approximately equal-priced alternatives. According to Jobber and Ellis-Chadwick (2019), the elements that constitute packaging design include structural design, graphic design, and color. Design must be visually attractive to potential consumers and must genuinely add value to the product in their perception. A well-executed design elevates the prestige of the product. Good design appeals to the emotions of potential buyers, who in a large majority of cases will choose the product with more appealing packaging-unless there is a significant price difference. According to Kotler and Keller (2016), well-conceived visual interpretations of packaging can further strengthen a brand and enhance sales. The packaging industry is distinguished by its innovativeness and its ongoing need for the development of new materials and packaging conditions, in order to keep pace with changes in people's lifestyles and to ensure the production of safe food (Han et al., 2018). The Law on General Product Safety ("Official Gazette of RS," No. 41/2009 and 77/2019) regulates general product safety, criteria for assessing the conformity of products with the general safety requirement, obligations of manufacturers and distributors, conditions and manner of information and exchanging information regarding the risks that the product poses to the health and safety of consumers and other users, as well as performing supervision to make products placed on the market safe. This law also regulates the prohibition of production, import, export, and trade of deceptive products, which, with their deceptive appearance, endanger consumers' health and safety. Another key function of packaging is that it serves as the carrier of product labeling, i.e., it provides the necessary information to the consumer and functions as a link between the manufacturer and the user. The accuracy and completeness of information stated on the label are also very important in customs clearance procedures, since customs authorities may carry out any form of inspection, they deem necessary (Article 33, Customs Law, 2022). There has never been a more substantial offer of goods in stores in Serbia than today. When more and more goods are on the shelves, the priority goal is to separate products from the competition. One of the essential roles of well-designed packaging is precisely to influence the customer to notice, pick up, and then buy precisely that product in the presence of similar and approximately equal products. The design must be visually attractive to potential consumers and add value to the product in the eyes of consumers. The design contributes to increasing the prestige of the product. Good design targets the emotions of a potential buyer, who, in a considerable number of cases, will choose a product whose packaging is more beautiful, unless there is a drastic price difference. The packaging industry is characterized by innovation and a permanent need for the development of new materials and packaging conditions, in order to follow the changes in people's life habits and ensure the production of safe food (Han et al., 2018). The Law on General Product Safety ("Official Gazette of RS,"

No. 41/2009 and 77/2019) regulates general product safety, criteria for assessing the conformity of products with the general safety requirement, obligations of manufacturers and distributors, conditions and manner of information and exchanging information regarding the risks that the product poses to the health and safety of consumers and other users, as well as performing supervision to make products placed on the market safe. This law also regulates the prohibition of production, import, export, and trade of deceptive products, which, with their deceptive appearance, endanger consumers' health and safety.

5. Conclusion

Packaging in the function of product containment plays a crucial role. The consideration of packaging choice is a key step in preserving the quality and taste of food. As already noted, the role of packaging is to protect the packaged product from mechanical, physico-chemical, microbiological, and biological changes that may arise due to environmental factors and storage time. There is a distinction between the historical role of packaging and its modern function. Throughout history, packaging primarily served to protect and store goods, but today its purpose has evolved. Modern packaging must not only accept and preserve the product unchanged until use, and deliver it safely to the consumer, but also attract buyers through design while simultaneously providing essential information about the product and the producer. The materials used for packaging must be manufactured and designed in such a way that, throughout their life cycle, they meet the requirements of environmental protection, human safety and health, health safety of the packaged product, conditions for product transport, and proper waste management (Pavlović et al., 2021). Food products follow progress in existing packaging processes as well as the application of new achievements in the field of packaging.

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