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STUDY OF THE PRODUCT DESIGN AND PACKAGING DESIGN FOR CHOCOLATE COOKIES

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ABSTRACT

Cookies are one of the most essential products in the pastry and confectionery sector. Their aesthetic and nutritional importance are significant for customers. Thus, the nutritional importance attributed to the composition, combined with the attractive appearance provided by the product design and packaging, results in an extremely varied range of products.
The creation of the food-packaging biocomponent system for the product chocolate cookies starts with obtaining the constituent elements (biscuits, cream) according to the classic recipe and creating an entirely new, innovative packaging, resulting in the creation of an attractive bi-component ensemble based on quality, which meets current consumer demands in terms of nutritional labeling, modern graphics, company logo, viewing window, and other elements of food importance.

INTRODUCTION

Nowadays, the production of pastry and confectionery products has progressed from traditional, simple methods to methods based on advanced technology, automation, and innovative science. Cookies are a key component of the pastry and confectionery product category, appreciated by customers for their versatility, taste, nutritional value, energy content, and sensory properties. They can be purchased for various occasions, serving as a nutritious food source for daily energy, as gifts, special products for children, dietetic products, and items that enhance the appearance of other finished products, among other uses (Manley, 2011, He et al., 2025).

To become a profitable product, creating a package that incorporates attractive packaging is an important and ongoing process, one that involves creativity and delivering all product data while satisfying consumer needs (Raj et al., 2024). There is a direct correlation between the visual aspect of the packaging and the process of selling the product, so the packaging concept for cookies has been tested and validated (Ronyastra et al., 2021, Abadi et al., 2025).

The primary raw materials used in the composition of cookies are white wheat flour, sugar, fat, and other auxiliary ingredients (especially raising agents). Compliant adherence to the production stages and the use of quality ingredients in accordance with the established production parameters will result in a finished

product with physical and chemical characteristics that meet the standard (Misra and Tiwari, 2014).

Biscuits/cookies are the most popular products worldwide because they are easy to obtain, allow the addition of valuable ingredients, are easy to transport and combine from a culinary perspective, and are also cheaper than other products in the same category. Biscuits also have a longer shelf life and are enjoyed by a large number of customers across various age groups (Karklina et al., 2012). The material used to make the packaging also has a significant influence on the shelf life (Romani et al., 2015, Alehosseini et al., 2020).

The nutritional importance of cookies stems from their nutritional value, a complex concept that includes the nutritional, organoleptic (Zoulias et al., 2000, Han, 2009), and energy properties of the product, as well as its degree of assimilation. The main physical and chemical characteristics of biscuits are determined by their content of water, salt, total sugar, fat, ash, peroxide index (Căpruciu, 2023), etc.

This research can guide manufacturers in identifying critical control points in the production process and help customers choose biscuits with a more environmentally friendly impact (Konstantas et al., 2019).

Determining the level of attractiveness of packaging design is an essential aspect for customers, as they associate the packaging with the product, thus achieving brand familiarity (Ye et al. 2025). In this regard, studies are conducted on respondents who answer questionnaires and visually check the packaging (Hidayanto et al., 2023, Asmin & Alam, 2025). The primary purpose of packaging design is to meet consumer needs, with a target fulfilment rate of over 70% (Malešević and Stančić, 2021, Ronyastra et al., 2021).

The purpose of this study is to highlight the sweet, unmistakable taste of chocolate cookies, while also examining the nutritional and energy intake requirements of various age groups, and to offer an attractive product and packaging design that meets the quality standards of the food industry.

MATERIAL AND METHODS

Chocolate cookies are ready-to-eat products made from a combination of ingredients, including flour, vegetable fats, raising agents (such as baking powder), sweeteners (sugar), and sometimes flavour enhancers and other additives (Almoraie, 2019).

The following raw and auxiliary materials were used to make the cookies in this study (Table 1).

Table 1

Raw and auxiliary materials used in the production of cookie ingredients

No.	Constituent elements	Ingredients
1.	Biscuits	wheat flour, vegetable fats, sugar, baking powder, E282, salt
2.	Cream	cocoa, vegetable fats—palm oil, fondant, sugar, E202, essence

To create the product design and packaging design ensemble for the chocolate cookies product, the product design was developed based on the basic idea of classic cookies, which had already been established in the pastry shop where the study was conducted. After establishing the product design and its manufacturing process, we proceeded to design and obtain packaging that would both protect the product and be visually appealing.

The packaging design was made more attractive to attract customers' attention and, at the same time, through simple but visually striking elements, to familiarize them with the brand, as studies in the field show that customers visually assimilate the packaging with the product (according to Gorman et al., 2024). The color, graphics, and overall design elements were complemented by the company's slogan and logo, designed to convey the idea of quality and also to evoke memories of childhood, such as the cookies your grandmother made for the holidays.

The study was conducted at S.C. SWEET SEPTEMBER, a pastry and bakery company, and at the Research Centre for Life Resources and Applied Biotechnology, Faculty of Horticulture, University of Craiova.

RESULTS AND DISCUSSIONS

Customers' choice of cookies is influenced by their qualitative preferences, the nutritional, functional, and sensory characteristics of the product, as well as the way the product is presented. In this context, the packaging, with all its elements, becomes an essential factor. To meet these requirements, modern packaging was developed, adapted to the prevailing standards, and in compliance with relevant environmental legislation. This resulted in cookies with a classic appearance but improved organoleptic and nutritional properties.

Therefore, this study developed a product aimed at several age groups, called Chocolate Cookies, which is attractive from both a nutritional and aesthetic point of view, in terms of its shape and packaging graphics.

Based on these considerations, the study addressed two objectives: obtaining the biscuits and cream, and developing the product design and packaging design ensemble.

Obtaining the product chocolate cookies

The recipe for manufacturing the product involves the production of two main components: biscuits and cream, as outlined in the technological scheme established within the company (Figure 1).

Following the steps in the technological scheme in Figure 1, the raw and auxiliary materials were dosed according to the manufacturing recipe, using a series of measuring and control devices.

Mixing the raw materials in the stainless steel mixer tank involved homogenising the raw materials in the flour by mixing until a homogeneous, slightly crumbly dough was obtained. The dough was left to rest at refrigeration temperature (approx. 2 hours), and the biscuit dough was rolled out into thin sheets and placed in pre-designed, elongated oval rotating moulds to determine the final design of the biscuit. This was followed by the baking process, during which the shaped dough was placed in stainless steel trays and baked in the oven at 180°C for 15 minutes with ventilation.

Figure 1 Stages of the technological process for obtaining the product chocolate cookies

The biscuits were cooled after baking in a room at a temperature of 30–40 °C and a relative humidity of 60–70 % for 30 minutes. The cooled biscuits were filled manually with the filling cream—the stage of sticking the biscuits together to form the actual cookie.

The decoration was completed using fondant prepared in advance, as specified in the manufacturing process, resulting in the finished product, chocolate cookies.

Achieving the product design-packaging design ensemble

Chocolate cookies are a traditional product of S.C. SWEET SEPTEMBER SRL. Changes in current consumer behaviour have made it necessary to intervene in the current packaging. Following a preliminary market study, the packaging design was established to enhance its external appearance, making it more attractive to customers and environmentally friendly. When selecting the packaging, the primary consideration was the product's compositional requirements. A thin duplex cardboard-type E (with a corrugation thickness of 1.70 mm), waxed on the inside, was selected for this purpose. In addition to protecting against physical and mechanical shocks, this type of cardboard provides the product with a tight and airtight seal, allows for modern label printing, and the creation of a viewing window.

Packaging in cardboard boxes was carried out in four stages: forming the folded packaging, lining the packaging with waxed paper, filling the packaging with the product, and closing the box.

Each box features a nutritional label and mandatory information, including the expiry date, product name, manufacturer's name, barcode, and suggestive graphics (Figure 2). The graphics were produced in both Romanian and Italian, as the packaged products were intended for export.

Figure 2. Creation of packaging and mandatory labelling elements

To create the labelling elements, the following steps were taken: creation of the company logo and emblem, and establishment of the product's compositional information (nutritional label) - Table 2.

Table 2

Establishing nutritional information—nutritional labelling

Energy value:611kcal / 2556kj	
Protein 4,5g.	
Carbohydrates	60g
of which sugars	35g
Lipids	34g
of which saturated fatty acids	8,3g
Fiber	0,2g
Salt	0,6g

Each set thus produced contains 250 g of product: chocolate cookies, a finished product. A comparative overview of the classic and modern designs of the finished product packaging is shown in Figure 3.

The final product was stored under standard conditions until delivery to the beneficiary.

a) b)

Figure 3 Comparison of packaged products: a) classic; b) modern

To maintain the quality of the "Chocolate Cookies" product during storage, it is recommended that storage conditions be observed at all stages of the supply chain, from the manufacturer to the consumer. Baele et al. 2021 also evaluated packaging concepts for two dry food products with a long shelf life, focusing on recycling (single-layer materials) and performance (multi-layer materials with high barriers). Similarly, Caruso et al. 2025 and Rachman et al. 2025 demonstrate in their studies that food packaging serves multiple functions, the most important of which are protection, transport, distribution, presentation, and marketing. Alem et al. 2024 demonstrate that a strategic approach to packaging can be achieved by considering both intrinsic and extrinsic factors, which can lead to increased sales while also enhancing visibility and performance for the company.

CONCLUSIONS

The creation of the product "Chocolate Cookies" can serve as an alternative to the plain cookies currently available on the market, offering added aroma and flavour, with diverse uses, ranging from everyday consumption to preparations for special events, such as candy bars.

The creation of a new, modern, innovative product design and packaging design for the classic "Chocolate Cookies" product reinvents an authentic product that is in high demand on the food market.

The choice of high-quality ingredients for the constituent elements of the product under study was a decisive factor in selecting the packaging material (thin E-type duplex cardboard, waxed on the inside).

Creating modern packaging in terms of graphics, color, logo, and other elements that comply with the quality standards set by the food and environmental industries can lead to increased consumer and producer satisfaction, with the latter seeking to establish a visible presence on the European food market.

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