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THE CONSUMER VERSUS INNOVATIVE DAIRY PRODUCTS

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Abstract: The market of dairy products is one of the most dynamically developing sectors of food products, offering consumers a broad and continuously growing range of products. Innovative products play an important part in this range, being an answer to changing market trends and expectations of ever more aware consumers. The aim of this study was to learn the consumers opinions and their positions towards innovative dairy products. The study was conducted using the CAWI survey method and an original survey form. The test group was made up of 195 residents of the Pomorski Voivodeship who declared they consumed dairy products. The study demonstrated that consumers consume such products frequently and consider them an important part of their diets. The most commonly consumed were traditional dairy products: butter, UHT milk and cheeses. At the same time, the study participants were positively predisposed towards novelty products. They showed the highest preference for flavoured milk-based drinks, yoghurts with additions, and cheeses with additions. When selecting innovative products, the participants mainly followed the health impact of the products, positive opinions and attractive prices, while promotion and advertisement were the least important. As the preferred location for purchasing such products, the participants specified hyper- and supermarkets, large self-service stores and local neighbourhood stores. The study results may be used in general innovative product management, particularly in planning marketing strategies for innovative dairy products.

Keywords: choice factors, innovations, preferences, product management.

1. INTRODUCTION

Milk and milk-based products are among some of the most popularly consumed food products. At a time of intense competition, changing consumer trends and growing awareness, with the consumer expectations that follow, producers of such products face a difficult task in meeting these requirements. One solution is to expand the product range and offer consumers new and innovative products. Innovation is defined as a series of actions leading to the creation of new or improved products, technological processes or organisational systems. This definition was proposed by Schumpeter, who specified five cases where innovation can be identified:

- creating a new product;
- using a new technology or production method;
- creating a new sales market;
- acquiring previously unknown materials;
- reorganising a sector of the economy [Wiśniewska 2013].

Dairy producers can use various innovations in their businesses, but for the consumer, product innovations are the most important. According to the Oslo Manual [2018], product innovation is a new or improved good or service that substantially differs from the previous goods or services of the company and which has been introduced to the market. The dairy product market offers the consumer a broad range of goods, and the range structure is similar to that of the Western European countries, leading in dairy production. Innovative products have a significant share in this range.

Product innovations may concern modifications to product composition by adding or removing ingredients. Locally available fruits (pears, apples, raspberries, strawberries, blueberries and forest fruits), exotic fruits (peaches, bananas, mangoes, passion fruit), vegetables (onions, bell peppers, chives, garlics, beetroots), herbs (lemon balms, peppermints, elderberry flowers, hemps), seeds (chias, linseeds), cereal products (crunchy, muslies, oats, brans), nuts and dried fruits can all be used as additives [Brodziak and Król 2016]. Substance like casein, whey, vitamins (e.g. vitamin C, D), microelements (e.g. magnesium, calcium, iron) and flavours (salt, sweetening substances) may also be added. As part of the innovation process, fat or lactose may be removed from the products, or in other cases, the content of these substances may be reduced [Gatarska 2013]. Additionally, these ingredients can be modified. For milk fat, new technologies are used to modify, fraction and enrich it, such as ultrasound, high-pressure treatments, supercritical liquid extraction, and fractioning. They improve the nutritional value and functional characteristics of milk fat [Mohan et al. 2021].

Innovation can apply to the health effects by increasing the functional potential of the products, for example by creating food based on milk components that provides brain health and general immunity by adding probiotics and postbiotics, with significant potential lying in the use of plant-based ingredients [Górska-Warsewicz et al. 2019; Śmigiel and Kowalik 2020; Baranowska 2022]. Functional food includes products where the bioactive substance content is increased, where dietary fibre may be added, quantities of probiotics or prebiotics are increased, the product is enriched with live lactic fermentation bacteria cultures, mineral ingredients or phytochemical substances [Olędzki and Hristova 2017]. When analysing consumer behaviour, Gutkowska et al. [2015] demonstrated that consumers are more willing to accept changes in food that involve reducing the content of certain nutrients that have negative health connotations, rather than enriching food.

Innovation is used in all dairy product groups present on the market: in milk, flavoured milk-based drinks, fermented milk-based drinks (yoghurts, kefirs, buttermilks), in quarks, cheeses, flavoured process cheeses and ice cream, etc. Flavoured mascarpone, crème fraiche sour cream dips, cocktails with whey protein, lactose-free chocolate milk with reduced sugar content and added vitamins A, D, and E and dietary fibre, Caucasian kefir, cheese stick snacks in crunchy breading, and quark bars in different flavours, and flavoured yoghurts are all examples of innovative dairy products [Piekut 2019; Dykiel et al. 2021].

In recent years, plant-based equivalents to animal milk-based products have emerged on the market, such as soy milk, almond milk, vegan plant-based cheeses [Leialohilani and de Boer 2020; Schiano et al. 2020], which arouse significant consumer interest, but also much uncertainty and controversies. These products are an answer to the changing trends and needs of consumers who reject products of animal origin or seek healthier alternative products.

In relation to the trends detected in previous years, some innovative development directions have become the standard in food production (e.g. clean labels), while some are subject to continuing change [Baranowska 2022].

The above deliberations suggest the question: what is the consumers' position concerning innovation in the dairy product market and concerning innovative dairy products? Consequently, the aim of this study was to learn the consumers opinions and their positions towards innovative dairy products.

2. STUDY METHODOLOGY

The study was conducted according to the CAWI survey method. The measurement instrument was an original survey form which, following preliminary preparation, was verified in a trial study and subsequently validated. The form contained eight questions concerning the subject of the study and three concerning the study on the participant's demographic information (sex, age and education). This paper uses the results from certain questions only. The form used closed questions in which the possible answers were presented as positional scales. The scales were used to investigate consumer opinions on product innovations, frequency of dairy product consumption, how much the products were liked, and determining the importance of factors that decide product choices while shopping.

Furthermore, a closed multiple-choice question was used to determine the preferred place for purchasing innovative dairy products. The study results are presented as percentages of responses and as average values ($\overline{x}$). In the statistical processing of the results, the impact of sex and age on the differences was analysed (Chi^2 test), but the differences were not statistically significant, so only the results for all the participants are presented in this paper.

The study population was 195 people, of which 109 were women and 86 were men. The test sample was selected intentionally – the survey form was delivered to residents of the Pomorskie Voivodeship who consume dairy products. A detailed profile of the study population is shown in Table 1.

Table 1. Characteristics of the study population

Demographic distinguishing factor		No. of replies	Percentage of declarations
Sex	Women	109	56
	Men	86	44
Age	15–25	68	35
	26–45	53	27
	46–65	43	22
	Above 66	31	16
Education	Basic	8	4
	Vocational	18	9
	Average	89	46
	Higher	80	41

Source: original study.

3. STUDY RESULTS AND DISCUSSION

Initially, the surveyed were asked about their stance on dairy products (Fig. 1).

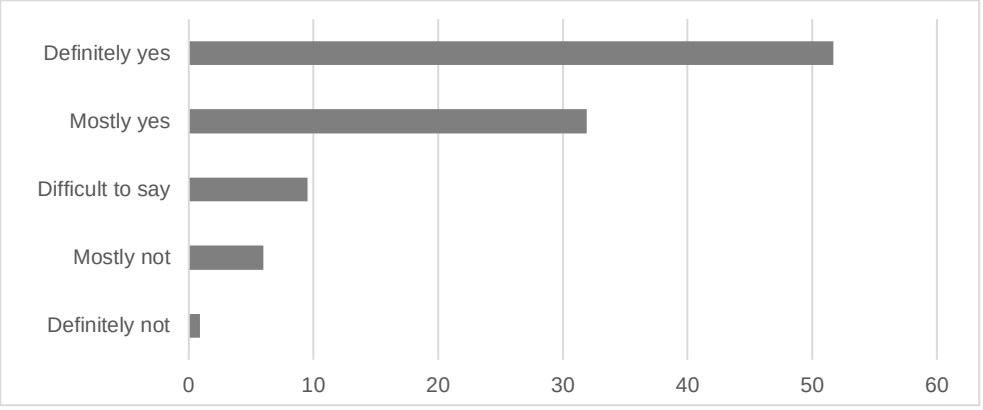

Fig.1. Declared importance of dairy products in the diet of the surveyed [%]

Source: original study.

In the study group of people who consumed dairy products, the majority (almost 84%) agreed that these products were an important part of their diet. However, there were also people in this group for whom these products rather were not or definitely were not important in their diet. This group constituted less than 7% of all the surveyed.

Despite this view, all of the surveyed did consume dairy products, according to the declaration made before the induction to the study, although the frequency of consumption differed (Table 2).

Table 2. Frequency of dairy product consumption in the study population [%]

Product	Daily	2–3 times a week	Once a week	Once a month	Less than once a month	I do not eat this product
Natural yoghurt	14.6	41.4	22.6	13.0	7.8	0.9
Drinking yoghurt	7.0	23.3	17.2	19.8	22.4	11.2
Kefir	3.4	8.6	8.6	19.0	19.8	40.5
Butter	61.6	11.9	9.5	4.3	6.0	6.0
Buttermilk	0.9	11.3	10.3	20.7	24.1	33.2
Pasteurised milk	13.8	18.9	7.8	11.2	15.5	33.8
UHT milk	37.1	25.9	14.2	6.0	8.6	8.6
Flavoured homogenised soft cheese	6.0	13.8	19.6	25.5	19.8	14.7
Cheese	25.9	47.4	14.7	5.2	5.2	1.7
Sour cream	3.5	20.7	29.3	25.2	17.2	4.3
Cream	3.5	12.0	19.0	25.3	20.7	19.6
Quark	5.3	23.3	24.1	27.7	12.1	7.8

Source: original study.

The dairy products most commonly consumed by the surveyed included butter, which was consumed daily by over 60% of the participants, UHT milk (over 37%) and cheese (close to 26%). Most dairy products were consumed less frequently. The surveyed declared that 2–3 times a week they consume cheese (almost 48% of the participants gave this answer), natural yoghurt (41%), UHT milk (almost 26%), as well as drinking yoghurt and quark (23% each). Once a week the participants consumed sour cream and quark, once a month quark, sour cream, cream and flavoured homogenised soft cheese, and less than once a month mainly buttermilk, drinking yoghurt, kefir and flavoured homogenised soft cheese. There was a group of people among the surveyed who never consumed certain dairy products. The most of the surveyed never consumed kefir (over 40% of declarations), buttermilk, pasteurised milk or cream. For other products, the percentages of declarations were lower, but for all the listed products there were consumers who never consumed them.

The dairy products offered consumers a broad range of products, a large part of which were new and innovative products. The surveyed were asked about their position on such products (Table 3).

Table 3. Position of the surveyed concerning dairy products [%]

Statement	Definitely yes	Mostly yes	Difficult to say	Mostly no	Definitely no
I am open to new dairy products	33.6	45.7	14.6	5.2	0.9
I pay attention to new dairy products on store shelves	18.1	36.2	20.7	22.4	2.6
I gladly buy innovative dairy products	24.1	33.6	29.3	11.2	1.7
I am willing to pay more for an innovative dairy product of high quality in a functional packaging	22.1	35.5	21.3	18.8	2.3
Product innovations are needed in the dairy industry	21.5	34.1	28.3	12.3	3.8
The amount of innovative dairy products on the market is too high	15.1	11.6	45.2	21.3	6.8

Source: original study.

A vast majority of the participants declared openness to new dairy products (almost 80%), although there were people who did not share this opinion (approx. 6%). Despite such declarations, only a little over half of the participants paid attention to new dairy products, and a similar percentage of them willingly purchased such products. At the same time, over half of the participants stated that they were ready to pay more for an innovative product of good quality in a functional package. 21% of the participants were of a different opinion, being unwilling to pay higher prices for such a product. A readiness to pay higher prices for innovative products was also shown in the study by Guiné et al. [2020].

Following up on the above subjects, the participants were asked if product innovations were needed in the dairy industry. Most of them agreed with this statement (over 55%), although there were those who believed that there were too many such products on the market already - almost 27% of the people agreed with this statement. In the results from the Bierzuńska, Kaczyński and Cais-Sokolińska [2016] study, the participants wished that innovation mainly applied to yoghurts, kefirs, quarks and powder concentrates. The products that should remain unchanged were: milk, quark and buttermilk.

The next question was addressed to the participants who asked about the qualities that characterised innovative dairy products (Fig. 2).

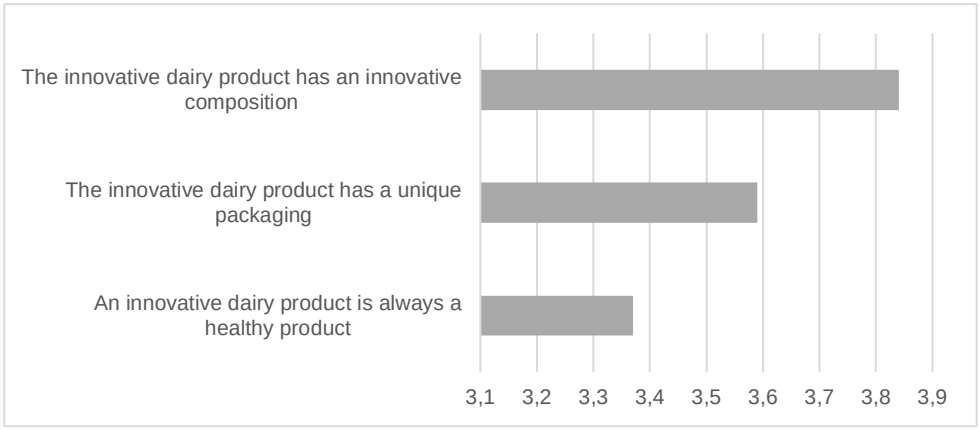

Fig. 2. Qualities that characterise innovative dairy products ($\bar{x}$)

Source: original study.

The results obtained shown that, in the consumers' opinion, such products have a unique composition and unique packaging. Similar results were obtained by Bierzuńska, Kaczyński and Cais-Sokolińska [2016] in a study where consumers associated dairy product innovation with new product appearances, new tastes and improved health values.

The participants also agreed with the statement that an innovative dairy product was always a healthy product, but in this case, the opinions were divided, as indicated by the average value from the responses ($\bar{x}$ = 3.3).

The participants of the study conducted by Grębowiec and Korytkowska [2017] were of a similar opinion, believing that an innovative product was characterised by a new flavour, an additional pro-health effect, reduced fat content or a new packaging appearance.

The consumers' openness to product novelties could be noticed in their opinions concerning innovative dairy products. The participants were asked how much they liked such products (Fig. 3).

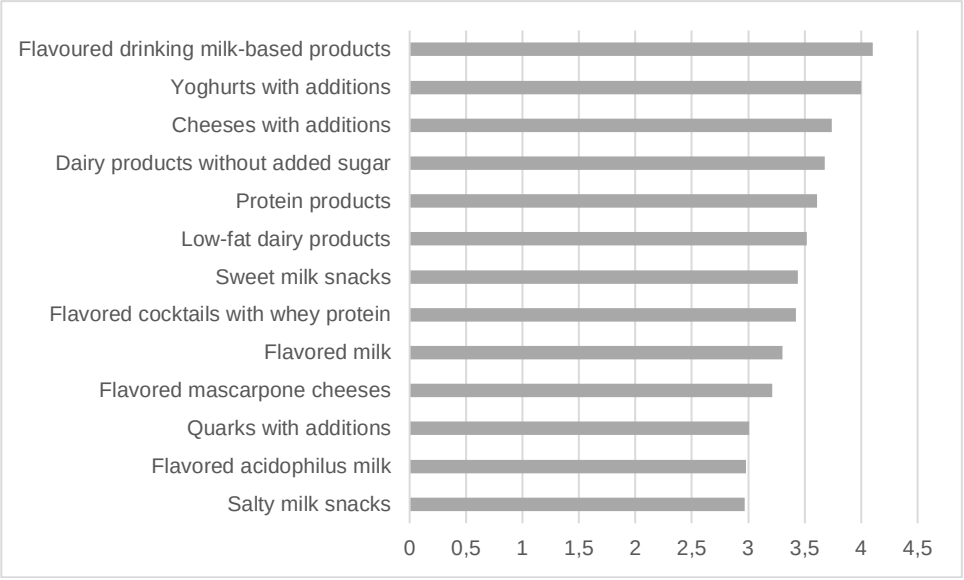

Fig. 3. Degree of liking selected innovative dairy products ($\overline{x}$)

Source: original study.

The most liked products were milk-based drinks (e.g. drinking vanilla skyr, strawberry kefir, drinking fruit yoghurts) ($\overline{x}$ = 4.1) and yoghurts with additions (e.g. added porridge, fruits, chia seeds, linseed) ($\overline{x}$ = 4.0).

The next positions were taken by cheeses with additions, milk-based products without added sugar, protein products and milk-based products with a reduced fat content. The least liked were quarks with additions, acidophilus drinks and salty milk-based snacks (e.g. cheese sticks).

Individual products were characterised by a highly variable degrees of likeability. This product group also included those towards which many participants were neutral - they neither liked nor disliked them (for example, milk-based products without the addition of sugar), as well as products that few participants were familiar with (e.g. flavoured acidophilus milk or salty milk-based snacks).

Detailed data are shown in Table 4.

Table 4. Degree of liking selected new and innovative dairy products in the study population [%]

Product	Like very much	Like	Neither like nor dislike	Do not like	Very much do not like	Not familiar
Yoghurts with additions (e.g. oatmeal, fruits, chia seeds, linseed)	41.4	35.3	16.4	6.03	0.9	0
Flavoured milk (chocolate, strawberry)	21.5	30.2	19.8	15.5	8.3	4.3
Milk-based products without added sugar	23.3	37.06	54.3	4.3	1.7	2.6
Milk-based products with a reduced fat content (kefir 0% fat, yoghurt 0% fat)	23.3	34.5	21.1	11.2	1.7	5.2
Protein products (high-protein)	29.3	30.2	25	7.7	1.7	6.0
Sweet milk-based snacks (e.g. quark bars)	23.3	31.9	22.4	35.3	4.3	6.0
Salty milk-based snacks (e.g. cheese sticks)	15.5	25.9	25.9	15.5	7.7	9.5
Cheeses with additions (e.g. herbs, pesto, nuts, nigella, fungi)	33.6	32.7	17.2	9.5	4.3	2.6
Flavoured cocktails with whey protein (with added fibre, fruits, oats)	27.6	26.7	24.1	8.6	6.0	6.9
Flavoured acidophilus milk (strawberry, forest fruits)	12.6	30.2	27.6	11.2	7.8	10.3
Flavoured drinking milk-based products (vanilla drinking skyr, strawberry kefir, fruit drinking yoghurts)	37.9	37.9	8.6	7.8	3.4	4.3
Flavoured mascarpone cheeses (chocolate, strawberry)	20.7	28.4	26.7	9.5	5.2	9.5
Quarks with additions (vegetables, vanilla, dried fruits)	10.1	25	25.8	13.8	7.8	9.5

Source: original study.

The results of the studies by other authors indicated slightly different consumer preferences towards dairy products, including innovative products. In the study by Bierzuńska, Kaczyński and Cais-Sokolińska [2016] it was found that a consumer who displays a pro-innovation position and consumes innovative dairy products prefers and most commonly consumes cheeses and fermented milk.

At the same time, they prefer that the products should be made by major concerns rather than local diaries.

When selecting innovative dairy products, consumers tend to follow various criteria (Fig. 4).

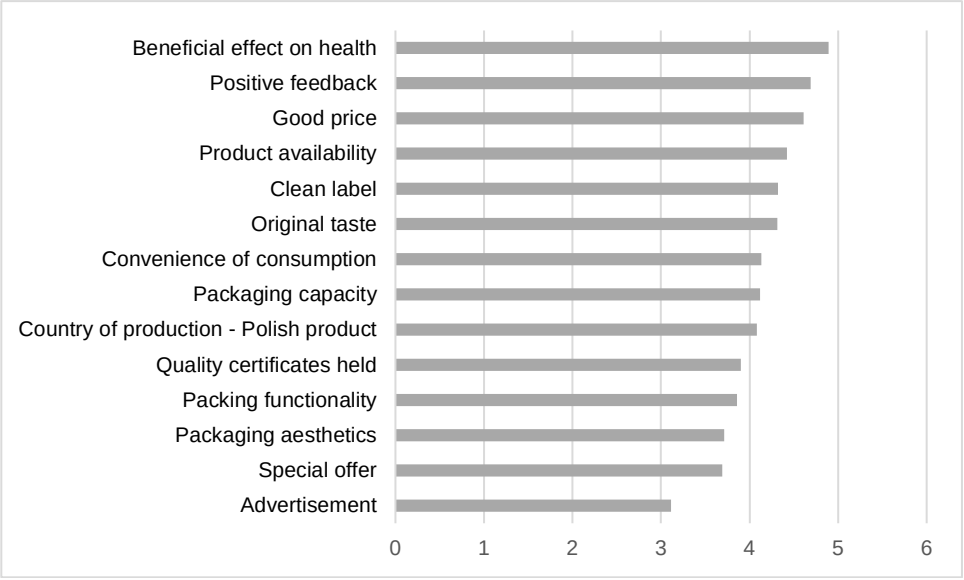

Fig. 4. Determinants for choosing innovative dairy products ($\bar{x}$)

Source: original study.

The most important choice determinants were beneficial health effects of the product ($\bar{x}$ = 4.89), followed by positive opinions ($\bar{x}$ = 4.69) and attractive price ($\bar{x}$ = 4.61). Lower on the list were product availability and factors related to its composition and taste. The country of production and quality certificates held were also important for the surveyed. When choosing products, the participants also paid attention to the packaging, where volume was the most important, followed by functionality and lastly aesthetics. Promotion and advertisement proved the least important when choosing products. As Świątkowska and Krajewski [2015] demonstrated, dairy product adverts were noticed by consumers, but were rarely remembered. Adverts for these products were most often noticed on TV, on billboards and at points of sale. In the study conducted by Grębowiec [2021], it was shown that consumers primarily pay attention to the product price, which had to be adequate for the quality, and to a high product quality. These dairy product choice factors were also important for foreign consumers, as shown in the study by Bytyqi, Muji and Rexhepi [2020]. Lenart [2021] showed that consumers prefer cardboard packages, but more than 50% of them would be willing to buy dairy products in ecological, reusable packages (e.g. milk in glass bottles). For dairy products without innovative qualities, the determinants were different. The most important factors were product taste and odour, its composition and expiry date [Nieżurawski et al. 2012]. The results of the study conducted in 2010 by Chudzian showed that when selecting products, consumers mainly followed their previous purchase experiences

and shopping habits. Certain product attributes, such as quality, composition, health value, price and brand were also important. The least important were promotion and advertisement [Chudzian 2012]. At present, similar factors also affect the choice of innovative dairy products [Grębowiec 2021; Ilie et al. 2021; Bahety et al. 2022]. Furthermore, an important choice factor was product availability [Bahety et al. 2022]. The results show changes in the criteria that consumers followed when choosing dairy products. An extensive analysis of these factors has been given by Bimbo et al. [2017].

The last question concerned the preferred place for buying innovative dairy products (Fig. 5).

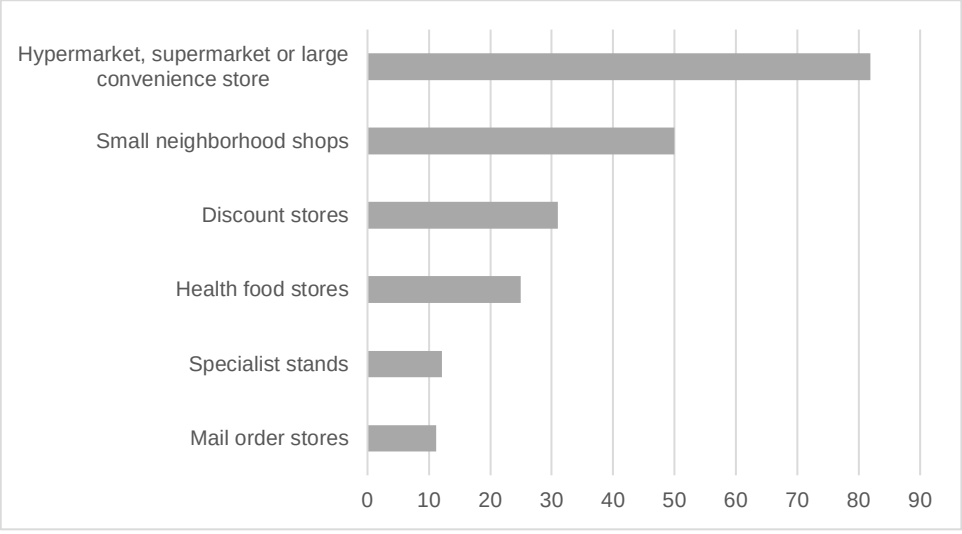

Fig. 5. Preferred place for buying innovative dairy products [%]

Source: original study.

The participants bought or would like to buy innovative dairy products primarily in hyper- and supermarkets and in large self-service stores (more than 80% of declarations), as well as in small local stores (50%).

Furthermore, the purchase location could be a discount store or a health food store. The least suitable sales points were specialist stands and mail order sales, which were declared by 12% and 11% of the surveyed, respectively.

Similar results were obtained by Grębowiec [2021] in a study where the participants declared that super- and hypermarkets were the most important places to buy dairy products, but such products were also purchased online. Supermarkets were the preferred place for purchasing milk and processed milk products, as declared by foreign consumers as well [Bytyqi, Muji and Rexhepi 2020].

In the study by Angowski, Kijek and Skrzypek [2019] it was shown that the place where dairy products were purchased were discount stores, but this was mostly where young people shopped.

4. CONCLUSIONS

The dairy product market offers the consumer a growing selection of products, often ones with an innovation potential. The study conducted shows that consumers who consume milk and its processed products were open to novelty and believe that it was important for the development of the dairy industry. Consumers believed that innovation products had a unique composition, a new packaging, and that they were healthy.

At the same time, the surveyed declared openness to new dairy products, they noticed them on store shelves and bought them gladly, and they were even willing to pay more for such products.

Nevertheless, there were also people in this group who believed that there were too many innovative dairy products on the market. Consumers of innovative dairy products most enthusiastically consumed milk-based drinks and cheeses. When choosing products, they followed the positive health effects of such products, positive opinions about the product, and attractive price, most of all. Promotion and advertisement did not affect the purchasing decisions of the participants. The place for buying the products, preferred by the surveyed, were hyper- and supermarkets and local stores.

The results obtained are supported by studies conducted by other researchers, and at the same time it reveals the changes occurring in the opinions and behaviour of consumers, compared to earlier studies.

The analysis leads to the conclusion that consumers are now open to innovation on the dairy product market, but they have specific expectations towards them in terms of their composition, health benefits, price and packaging.

The study results may be of advantage to producers when designing products and product management strategies, including marketing strategies. They may also be important for salespeople, who can use this knowledge to manage products in retail sales to determine the product point of sale and to make promotion and advertisement more attractive.

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