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## CONSUMPTION OF MILK AND MILK PRODUCTS IN POLAND IN THE YEARS 2004–2020<sup>®</sup>

### Konsumpcja mleka i jego przetworów w Polsce w latach 2004–2020<sup>®</sup>

**Key words:** consumption, milk, milk products, Poland.

*The aim of the research was to present changes in the consumption of milk and its dairy products in Poland. The research covered data for the years 2004-2020. The time interval of the research was determined by the availability of data in the database of the Central Statistical Office. The research material included literature on the subject, which contributed to the characterisation of the issue of consumption and on-going changes in the consumption of dairy products. Based on the literature, the factors that determine changes in the consumption of milk and its dairy products in dynamic terms were identified. The descriptive and cause-and-effect methods were applied in the presentation of research results. Based on the research analyses and the literature review, it was shown that changes in the level of milk consumption were small in relation to changes in prices expressed in current prices, as well as consumer income. In contrast, there were changes in dairy consumption. Between 2004 and 2020, the consumption of highly processed dairy products, i.e. yoghurts, cheeses, cottage cheese, increased, while the consumption of liquid milk decreased and the consumption of fat products, i.e. butter and cream, increased at a lower rate.*

**Słowa kluczowe:** konsumpcja, mleko, przetwory mleczne, Polska.

*Celem badań było przedstawienie zmian konsumpcji mleka i jego przetworów mleczarskich w Polsce. Badania obejmowały dane za lata 2004-2020. Przedział czasowy badań był determinowany dostępnością danych w bazie Głównego Urzędu Statystycznego. Materiał do badań obejmował literaturę przedmiotu, która przyczyniła się do scharakteryzowania zagadnienia konsumpcji oraz zachodzących zmian w spożyciu artykułów mleczarskich. W oparciu o literaturę wskazano czynniki, które determinują zmiany spożycia mleka i jego przetworów mleczarskich w ujęciu dynamicznym. Przy prezentacji wyników badań zastosowano metodę opisową oraz przyczynowo-skutkową. W oparciu o przeprowadzone analizy badawcze oraz przegląd literatury wykazano, że zmiany poziomu konsumpcji mleka były niewielkie w odniesieniu do zmian cen wyrażonych w cenach bieżących, a także dochodów konsumentów. Nastąpiły natomiast zmiany w konsumpcji nabiału. W latach 2004-2020 wzrosło spożycie artykułów mleczarskich wysokoprzetworzonych, tj. jogurty, sery, twarogi, przy jednoczesnym spadku konsumpcji mleka płynnego, a także mniejszej dynamice wzrostu spożycia produktów tłuszczowych, czyli masła oraz śmietany.*

## INTRODUCTION

Demand for the good produced is one of the important factors shaping changes in a given production in a free market economy. The specificity of agricultural production derives from the compulsion to consume and the associated constant demand for food, which is the source of changes in production [10]. According to Rembisz [2008], the magnitude of demand, including its direction of change, is determined by many diverse and interrelated variables [7]. Taking into account the specificity of food products, these can be variables of economic, social, cultural, biological nature [10]. Important economic determinants of food consumption include consumers' incomes, the prices of food items compared to these incomes, and the relationship of these prices to other prices. Economic theory indicates a relationship in that as consumer income

increases, an increase in demand for specific products or services is observed [6]. In the case of food products, as income increases, an increase in demand for food is observed, but only up to a certain level. A long-term increase in income does not result in a continuous increase in demand for foodstuffs, which would simultaneously be combined with an increase in food expenditure. Such a phenomenon is referred to in economic theory as Engel's law. In the case of poor societies, an increase in the income of the population can lead to an increase in demand for food. In rich societies, an improvement in citizens' income does not necessarily mean an increase in demand for foodstuffs. Instead, there may be a change in the structure of consumption towards a shift in demand from cheaper products to more expensive and processed products [10]. In addition to the income received by society, the volume

of demand for foodstuffs is shaped by changes in population. The demand for food in macroeconomic terms is the resultant of the population and the demand per capita [4, 14].

The key food product is milk and dairy products, which is related to their share in agricultural production, their importance for the income of the agricultural population, and their nutritional properties. Milk has about 500 chemical compounds, 240 of which are low molecular weight fatty acids [5]. In addition to this, it should be emphasised that milk protein is a source of essential amino acids. Regular consumption of milk and dairy products contributes to the supply of well-absorbed immune components. Due to its good source of calcium, which is crucial for the proper development of the skeletal system, milk is an essential product used in the nutrition of children [15]. The virtues of milk as a foodstuff contribute to an increase in its demand, which is evident in analyses of food consumption [10].

**The aim of this study was to present changes in the consumption of milk and its dairy products in Poland between 2004 and 2020.**

## MATERIAL AND METHOD

The study took into account data from the years 2004–2020. The time interval used in the analyses was determined by the availability of data on the consumption of milk and its products in the database of the Central Statistical Office (CSO).

The study used materials from published Agricultural Statistical Yearbooks for the years 2005–2020, as well as market analyses of the milk market published by the Institute of Agricultural and Food Economics of the National Research Institute for the years 2001–2021.

The research material included also literature on the subject, which contributed to characterisation of the issue of consumption and indication of factors determining consumption of milk and its products in Poland.

Descriptive and cause-and-effect methods were used to present the results of the study and were supported by graphical and tabular presentation of the results.

## RESULTS AND DISCUSSION

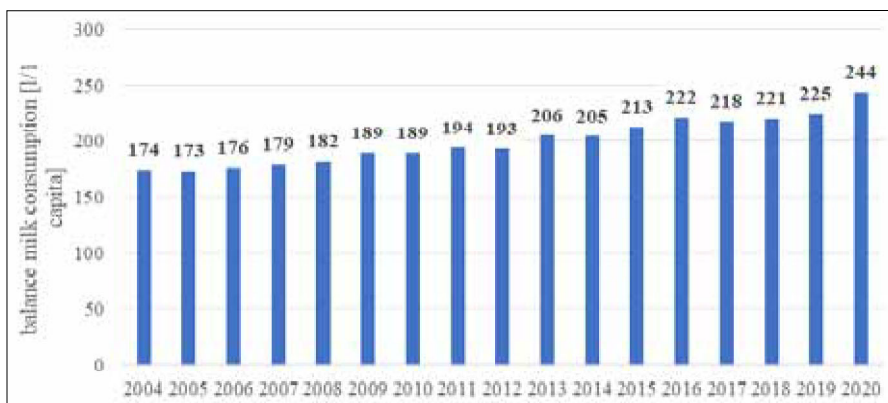
Household consumption and balance sheet data are used to assess domestic demand for milk and dairy products [11]. The increase in milk consumption in balance sheet terms between 2004 and 2020 was 40%, from 174 l/capita per year to 244 l/capita per year (Figure 1). Factors stimulating an increase in the

consumption of milk and milk products in Poland include [8]:

- an increase in consumer purchasing power, which was strengthened by the progressive economic development taking place after Poland's accession to the EU,
- the convergence of consumption patterns to Western European countries.

It is estimated that the balance consumption of milk, including milk for processing, excluding milk processed into butter, in Poland in the years 2004–2020 increased from 174 l/capita per year to 244 l/capita per year (Figure 1). Total raw milk consumption in Poland in 2020 was indicated at around 11.1 billion litres. This was 22% more than in 2004 [3].

Analysing the CSO data on unit butter consumption, one can observe an increase in butter consumption by 34%, from 4.4 kg/capita per year to 5.9 kg/capita per year between 2004 and 2020 (Figure 2). The highest levels of balance butter consumption in Poland were in 2016 and 2018 (4.7 kg/inhabitant) and 2019 (5.4 kg/inhabitant) and 2020 (5.9 kg/inhabitant) (Figure 2). The reasons for the increase in butter

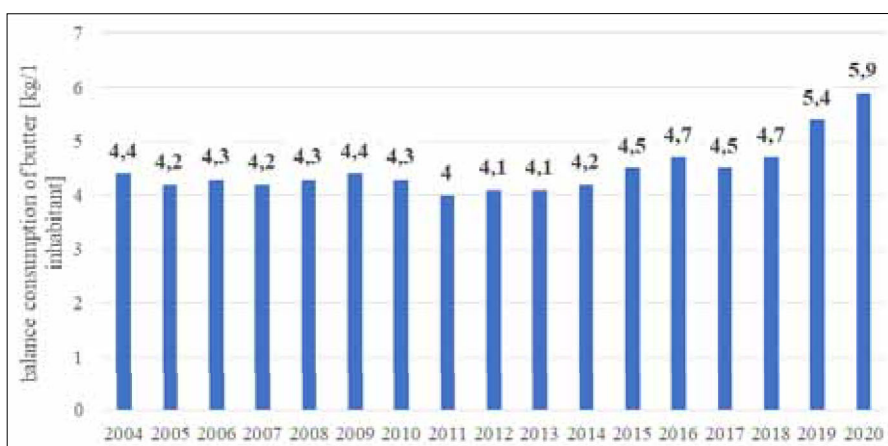


**Fig. 1. Balance consumption of milk in Poland in the years 2004–2020 expressed in [l/capita/year].**

**Rys. 1. Spożycie bilansowe mleka w Polsce w latach 2004–2020 wyrażone w [l/mieszkańca/rok].**

**Source:** Own elaboration based on data from the BDL [2]

**Źródło:** Opracowanie własne na podstawie danych pochodzących BDL [2]



**Fig. 2. Balance consumption of butter in Poland in the period 2004–2020 expressed in [kg/capita/year].**

**Rys. 2. Spożycie bilansowe masła w Polsce w latach 2004–2020 wyrażone w [kg/mieszkańca/rok].**

**Source:** Own elaboration based on data from the BDL [2]

**Źródło:** Opracowanie własne na podstawie danych pochodzących BDL [2]

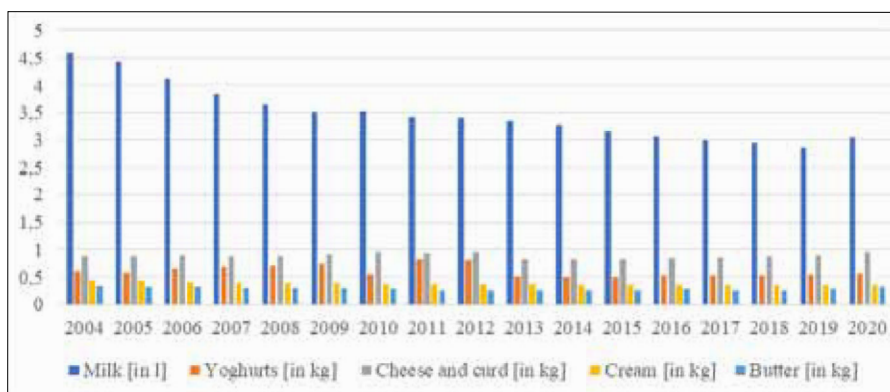
consumption over the analysed period are the improvement in the income situation of households, the decrease in retail prices, the decrease in consumption of oils and fats in general, and the change in consumption patterns [1]. The demand for butter on the internal market is determined by the level of household consumption of dairy products, but also by consumption in secondary food processing, which includes food industry companies, including internal turnover in the dairy sector, the feed industry and the HoReCa sector. Butter is both consumed in households and used as a raw material component in the production of processed foods, which increases the demand for this product [12].

Changes in the dairy sector since 1990, both in the scale and structure of production of dairy products and in the level of retail prices, were reflected in the volume of consumption of dairy products in Poland. Considering the consumption of milk and milk products and butter in Poland in the years 2004–2020 in monthly terms per 1 person in households, it can be observed (Figure 3):

- a 33% decrease in milk consumption in the analysed years, from 4.60 litres per person in households to 3.06 litres per person in households,
- a decrease in yoghurt consumption in the years under study by 7%, from 0.61 kg per person in households to 0.57 kg per person in households,
- an increase in the volume of cheese and cottage cheese consumption by 9%, from 0.87 kg per 1 person in households to 0.95 kg per 1 person in households,
- a decrease in cream consumption of around 20%, from 0.44 kg per 1 person in households to 0.36 kg per 1 person in households,
- a slight decrease in butter consumption of around 3%, from 0.33 kg per 1 person in households to 0.32 kg per 1 person in households.

The sustained upward trend in the consumption of cheese and cottage cheese in Poland was caused, among other things, by an increase in the supply of dairy products, making the assortment of products more attractive, the improving income situation of society, as well as changes in lifestyle and related eating habits [9]. The continuing downward trend in the consumption of fresh milk in Poland was conditioned by an increase in the price of fresh milk and yoghurt, changing dietary trends and an increasing number of people who eliminate milk from their diet for various reasons [9, 13].

Changes in the average monthly consumption of milk and its products and butter between 2004 and 2020 were mainly due to an increase in consumer awareness of nutrition, which consequently contributed to a decrease in the consumption of milk and cream in favour of fermented milk drinks, including yoghurt. The increase in the income level of Polish society in the analysed years contributed to an increase in the consumption of more processed dairy products, i.e. cheese



**Fig. 3. Average monthly consumption of milk, selected dairy products and butter in Poland in the years 2004–2020 per person per household.**

**Rys. 3. Przeciętne miesięczne spożycie mleka, wybranych artykułów mleczarskich i masła w Polsce w latach 2004–2020 w przeliczeniu na 1 osobę w gospodarstwie domowym.**

**Source:** Own elaboration based on data from the BDL [2]

**Źródło:** Opracowanie własne na podstawie danych pochodzących BDL [2]

and cottage cheese. An increase in the retail price of butter and low prices of substitute goods, e.g. margarine, resulted in a decrease in the average monthly consumption of butter in the analysed years.

Between 2000 and 2020, the highest amount of milk was consumed on a monthly basis in farmer households and pensioner households. At the same time, in dynamic terms, these households showed the largest decrease in milk consumption. In the case of farmer households, the decrease in monthly milk consumption over the years under study was 59%, and 49% in pensioner households (Table 1). The least milk was consumed in employee and self-employed households (Table 1).

Between 2000 and 2020, an increase in monthly yoghurt consumption was noticeable in all household types, ranging from 32–207% (Table 1). Monthly yoghurt consumption in 2020 was highest in self-employed households and pensioner households, at around 0.60–0.62 kg per person. In contrast, monthly yoghurt consumption in 2020 was lowest in farmer households at 0.46 kg per person (Table 1). The higher consumption of yoghurt in self-employed households than in other households may be related to this group's receipt of a monthly income that enables them to purchase dairy products such as yoghurt and other fermented milk drinks. In addition to this, other factors determining yoghurt consumption may include a change in consumer food preferences, an increase in consumer awareness of the nutritional value of dairy products, and convenience of consumption.

Between 2000 and 2020, all household types showed an increase in cheese and curd consumption, except for farmer households, where a 9% decrease in cheese and curd was evident. The highest average monthly consumption of cheese and cottage cheese in the years under study was found in pensioner households (1.12 kg of cheese per person per month was consumed in these households in 2020) (Table 1). The higher consumption of cheese and cottage cheese in pensioner households was related to their food preferences and habits.

In the years analysed, a decrease in the average monthly consumption of cream was visible in all household types. The

**Table 1. Average monthly consumption of milk and milk products in households from 2000 to 2020 expressed in [l/kg per person]**

**Tabela 1. Przeciętne miesięczne spożycie mleka i jego przetworów w gospodarstwach domowych w latach 2000–2020 wyrażone w [l/kg na osobę]**

	2000				2010				2020			
	employees	farmers	self-employed	pensioners	employees	farmers	self-employed	pensioners	employees	farmers	self-employed	pensioners
Milk [in l]	3,92	8,71	4,27	6,91	3,03	5,3	3,09	4,42	2,90	3,57	2,86	3,50
Yoghurts [in kg]	0,39	0,15	0,47	0,39	0,55	0,35	0,6	0,55	0,57	0,46	0,62	0,60
Cheese and curd [in kg]	0,78	0,79	0,91	0,96	0,91	0,78	1,01	1,08	0,92	0,72	0,97	1,12
Cream [in kg]	0,35	0,69	0,37	0,58	0,33	0,43	0,31	0,54	0,31	0,38	0,30	0,50
Butter [in kg]	0,28	0,29	0,35	0,39	0,23	0,25	0,28	0,38	0,29	0,25	0,33	0,45

Source: Own compilation based on [1]

Źródło: Opracowanie własne na podstawie [1]

highest consumption of cream on a monthly basis in 2020 was recorded in pensioner households and amounted to 0.50 kg per person (Table 1).

On the other hand, in the case of average monthly butter consumption between 2000 and 2020, an increase in butter consumption was observed in pensioner households, with an increase of 15%, and in employee households, with an increase of 4%, while other household types experienced a decrease in consumption of 6–14% (Table 1). The highest consumption of butter on a monthly basis in 2020 was seen in pensioner households at 0.45 kg per person (Table 1). The higher consumption of cream as well as butter in pensioner households was related to their dietary preferences and habits.

One of the factors that determine the consumption of food items, including milk and milk products, is the size of the average monthly disposable income per person in the household [10]. Between 2004 and 2020, the average monthly disposable income per person in households in Poland

increased almost 3 times (Figure 4). In 2020, it amounted to approximately PLN 1919.21 in Poland (Figure 4). The upward trend in average monthly disposable income per person in households, which has continued since 2004, may have been one of the reasons for the increase in the consumption of dairy products, i.e. cheese, cottage cheese, yoghurt.

Another factor identified in the literature that is important in shaping the consumption of dairy products is their share in average monthly household expenditure [10]. Between 2010 and 2020, expenditure on milk and dairy products accounted for 2.7–3.1% in total expenditure, while expenditure on butter accounted for 0.4–0.6% (Table 2). Expenditure on milk and dairy products in expenditure on food and non-alcoholic beverages in the years studied ranged from 10.8–12.2%, while expenditure on butter was 1.7–2.3% (Table 2). It can be seen that as the population's income increased, the share of expenditure on milk and dairy products in total expenditure and food expenditure decreased, which is in line with Engel's law. In contrast, during the years under study, there was an increase in expenditure on butter in total fat expenditure, from 39.1 to 53.3% (Table 2). This was related, among other things, to the increase in society's income, which contributed to a shift in the structure of demand away from margarine and other vegetable fats, which are substitutable goods to butter, towards consuming more butter despite the increase in the retail price.



**Fig. 4. Average monthly disposable income from 2004 to 2020 per person per household.**

**Rys. 4. Przeciętny miesięczny dochód rozporządzalny w latach 2004–2020 w przeliczeniu na 1 osobę w gospodarstwie domowym.**

Source: Own elaboration based on data from the BDL [2]

Źródło: Opracowanie własne na podstawie danych pochodzących BDL [2]

The volume of consumption of milk, milk products and butter is also determined by retail prices of dairy products. In the years 2004–2020, an increase in retail prices of such products as drinking cow's milk, semi-skimmed cottage cheese, ripened cheese, cream and fresh butter in Poland was noticeable (Figure 5). Between 2004 and 2020,

**Table 2. Share of average monthly expenditure on milk and milk products and butter in household expenditure in Poland in 2010–2020 expressed in [%]**

**Tabela 2. Udział przeciętnych miesięcznych wydatków na mleko i jego przetwory oraz masło w wydatkach gospodarstw domowych w Polsce w latach 2010–2020 wyrażone w [%]**

Years	Expenditure on milk and milk products as % of total expenditure	Expenditure on milk and milk products as % of expenditure on food and non-alcoholic beverages	Expenditure on butter as % of total expenditure	Expenditure on butter as % of expenditure on food and non-alcoholic beverages	Expenditure on butter as % of total expenditure on fats
2010	3,0	12,2	0,5	1,8	39,1
2011	3,1	12,2	0,5	1,8	38,7
2012	3,0	12,0	0,4	1,7	36,0
2013	2,9	11,5	0,4	1,8	39,8
2014	2,9	11,7	0,5	1,9	41,8
2015	2,7	11,3	0,4	1,8	43,6
2016	2,7	11,0	0,5	1,9	46,2
2017	2,7	11,0	0,6	2,3	50,7
2018	2,7	11,1	0,6	2,3	53,0
2019	2,7	10,8	0,5	2,1	53,2
<b>2020</b>	<b>3,1</b>	<b>11,3</b>	<b>0,6</b>	<b>2,1</b>	<b>53,3</b>

**Source:** Own compilation based on [1]

**Źródło:** Opracowanie własne na podstawie [1]

an increase in the price of drinking cow's milk by 24% was visible (Figure 5). In the period under study, the increase in the retail price of semi-skimmed cottage cheese in Poland was 58% (Figure 5). In the case of the price of ripened cheese, there was an increase in its price in the analysed period for Poland, at the level of 35% (Figure 5). On the other hand, a noticeable increase in the price of cream in Poland amounted to 54%, while that of butter was 82% (Figure 5).

## CONCLUSIONS

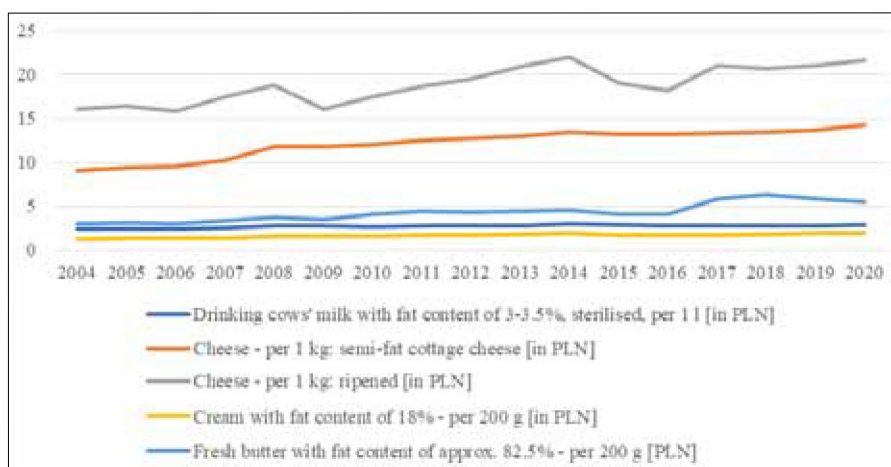
Analysing changes in the consumption of milk and milk products in Poland in the period 2004–2020, it can be concluded that:

- changes in the level of milk consumption were small in relation to changes in prices expressed in current prices, as well as consumer income. This confirms low income and price elasticity of consumption of this group of food products,
- changes occurred in the consumption of dairy products. In the years under study, the consumption of highly processed dairy products, i.e. yoghurts, cheeses, cottage cheese, increased, while the consumption of liquid milk decreased, and the consumption of fat products, i.e. butter and cream, increased at a lower rate.

## WNIOSKI

Analizując zmiany w spożyciu mleka oraz jego przetworów w Polsce w latach 2004–2020 można wywnioskować, że:

- zmiany poziomu konsumpcji mleka były niewielkie w odniesieniu do zmian cen wyrażonych w cenach bieżących, a także dochodów konsumentów. Jest to potwierdzenie niskiej dochodowej oraz cenowej elastyczności spożycia tej grupy artykułów żywnościowych,
- zmiany nastąpiły w konsumpcji nabiału. W badanym latach wzrosło spożycie artykułów mleczarskich wysokoprzetworzonych, tj. jogurty, sery, twarogi, przy jednoczesnym spadku konsumpcji mleka płynnego, a także mniejszej dynamice wzrostu spożycia produktów tłuszczowych, czyli masła oraz śmietany.



**Fig. 5. Retail prices of milk and dairy products in Poland 2004–2020 (current prices).**

**Rys. 5. Ceny detaliczne mleka i artykułów mleczarskich w Polsce w latach 2004–2020 (ceny bieżące).**

**Source:** Own elaboration based on data from the BDL [2]

**Źródło:** Opracowanie własne na podstawie danych pochodzących BDL [2]

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