

## REASONS FOR DISQUALIFICATION OF FOOD OF ANIMAL ORIGIN IN THE KUJAWY AND POMERANIA PROVINCE

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Quality evaluation of selected foods of animal origin was based on the results made available by the Provincial Sanitary and Epidemiological Station in Bydgoszcz. Analyses involved a total of 24 289 samples collected in the years 1999-2003. Samples of drinking milk, milk products, butter, ice-cream, meat and meat products, tinned meat and animal fat were investigated for the occurrence of microbiological and chemical contaminations and poor organoleptic qualities. The main reason for disqualification of foods of animal origin was microbiological contamination (5.35-11.48%), which was followed by undesirable organoleptic traits (0.36-0.82%) and chemical contamination (0.38-0.92%). In the investigated period, the quality of the milk products and meat and meat products was observed to improve. The greatest improvement of the quality was reported in the case of meat and meat products, and drinking milk (ca. 10 and 8%, respectively).

### INTRODUCTION

Food safety is a matter of increasing concern for the public and different non-governmental and trade organizations. Ensuring that food products are safe to eat and contain no components detrimental to human health is the fundamental goal of food producers, food distributors and supervisory bodies [Molenda, 2004]. Safe foods are products that do not contain these components, regardless of whether they are of physical, chemical, biological or microbiological origin [Zduńczyk, 2004].

Food-safety experts believe that contaminated food causes up to 76 million of pathological cases, 325 000 hospitalizations and 5000 deaths each year in the US alone [Smith De Wall, 2003].

The aim of the present study was to determine the frequency of factors that rendered animal food samples unsuitable for the consumption in the Kujawy and Pomerania Province in 1999-2003 based on the analysis of data provided by the Provincial Sanitary and Epidemiological Station in Bydgoszcz.

### MATERIAL AND METHODS

Factors that render animal food samples unsuitable for the consumption were analysed based on data provided by the Provincial Sanitary and Epidemiological Station (WSSE) in Bydgoszcz. To this end, we used the document "Laboratory studies of foodstuffs and articles and sanitary studies" for

the years 1999-2003, containing information on the number of samples of particular food products tested and rejected on microbiological, chemical or organoleptic grounds, as well as those tested for labelling and the presence of biological pests and foreign bodies. The samples of the following animal food products were investigated: drinking milk, milk products, butter, ice-cream, meat and meat products, tinned meat and animal fat. For all these groups of food products, based on the number of samples tested and samples rejected in each year, we calculated the proportion of total samples rejected on microbiological (contamination with *E. coli* bacteria, pathogenic bacteria including *Salmonella*, and other bacteria), chemical (the presence of lead, cadmium, preservatives, pesticides, nitrates and nitrites) and organoleptic grounds.

### RESULTS AND DISCUSSION

Based on the results compiled in Table 1, it was found that in the analysed period the overwhelming majority of the samples were those of milk products (8088) and meat and meat products (6763), with only 331 samples of animal fats. For most of the analysed food products, the number of samples tested by the WSSE in Bydgoszcz showed a downward trend of varying intensity, which is particularly evident in 2003.

A decrease in the number of samples tested is due, among other things, to the restructuring of the State Sanitary Inspection, which began in 2002. As part of the restructuring,

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TABLE 1. Frequency of occurrence of factors disqualifying food samples of animal origin.

Samples	Year	Number of samples examined	Disqualified samples (%)			
			In general	Microbiological	Chemical	Organoleptic
Drinking milk N=1460	1999	340	14.70	12.94	1.17	0.88
	2000	318	13.83	12.89	0.31	0.94
	2001	367	14.71	13.62	1.63	0.54
	2002	282	12.41	10.99	0.35	0.71
	2003	153	6.53	4.54	-	1.31
Milk products N=8088	1999	2430	10.90	9.38	0.33	1.19
	2000	1832	10.91	9.38	0.11	1.36
	2001	1548	8.96	8.46	0.13	0.71
	2002	1497	6.41	5.87	0.13	0.27
	2003	781	6.65	6.27	-	0.38
Butter N=774	1999	171	26.90	23.97	1.75	0.58
	2000	139	23.02	21.58	1.44	1.44
	2001	193	20.72	18.65	-	0.52
	2002	203	24.13	20.68	2.46	1.97
	2003	68	22.05	22.05	-	-
Ice-cream N=5505	1999	887	20.96	20.63	0.11	-
	2000	1815	7.82	7.8201	-	-
	2001	1212	5.77	5.77	-	-
	2002	1068	6.83	6.64	-	0.09
	2003	523	19.69	19.69	-	-
Meat and meat products N=6763	1999	1415	13.78	10.38	1.69	0.77
	2000	1719	11.80	9.25	1.69	0.76
	2001	1268	8.91	6.54	1.02	1.26
	2002	1593	3.20	2.07	0.69	0.31
	2003	768	3.64	1.95	-	1.04
Tinned meat N=1368	1999	282	2.48	0.70	1.41	0.70
	2000	312	6.73	3.52	1.28	3.20
	2001	461	0.43	0.43	-	-
	2002	225	0.44	-	-	0.21
	2003	88	2.27	2.27	-	-
Animal fat N=331	1999	92	10.86	-	8.69	-
	2000	61	1.63	-	1.64	-
	2001	78	8.97	-	1.28	6.41
	2002	85	4.70	-	-	1.17
	2003	15	-	-	-	-
Total	1999	5617	13.51	11.48	0.92	0.82
	2000	6196	10.37	8.95	0.62	0.43
	2001	5127	8.34	7.25	0.42	0.68
	2002	4953	6.23	5.35	0.38	0.36
	2003	2396	8.76	7.63	-	0.54

laboratories were centralized and branch laboratories at the District Sanitary and Epidemiological Stations were closed down. In keeping with the guidelines of the Chief Sanitary Inspector, out of 14 Branches for the Testing of Food, Nutrition and Articles operating in 2002 in the Kujawy and

Pomerania Province, only 4 were left by the end of 2004 [General Sanitary Inspector Directive, 2003].

Of the animal food products analysed in this paper, the lowest quality was characteristic of butter as well as drinking milk and ice-cream. Each year, over 20% of butter samples

were rejected for microbiological and chemical contamination and for unwanted organoleptic traits (from 20.72% in 2001 to 26.90% in 1999). The quality of drinking milk improved between 1999 and 2002, although 12.4-14.7% of the samples tested were rejected each year during this period. Drinking milk showed a considerable improvement in the last year of study (2003), as evidenced by a decrease to only 5.5% of the samples rejected.

The lowest proportion of the samples rejected was noted for tinned meat. Except the year 2000 when 6.73% tins were rejected, the rejection level did not exceed 2.5% in the other years.

The analysis of the results presented in Table 1 indicates that microbiological contamination (bacteria, moulds, fungi) was the most frequent reason for the rejection of animal food samples, followed by poor organoleptic quality and chemical contaminants (heavy metals, preservatives, pesticides, nitrates and nitrites).

Quality assessment of food of animal origin in the aspect of biological, chemical and physical contamination was the object of ample studies [Barłowska *et al.*, 2003; Teratanavat & Hooker, 2004].

The highest proportion of the samples rejected for microbiological contamination was found for butter (18.6-23.9%), with no regular improvements in the quality in the successive years. A similar relationship held true for ice-cream, which was characterized by the lowest microbiological quality in 1999 and 2003 (approx. 20% of the rejected samples vs. 6-8% in the other years). The most steady improvement of the microbiological quality was shown for meat and meat products (a decrease of rejected samples from 10.4% in 1999 to 1.9% in 2003) and milk products (from 9.4 to 6.3%, respectively). A considerable improvement in the microbiological quality concerns also drinking milk, for which the number of rejected samples decreased from 14.7% in 1999 to 6.5% in the last year of the study. The results obtained are more favourable than those provided by Jakubczyk [2001], who reported that in 1999, approx. 20% of the 6485 tested milk samples were rejected. No samples of animal fats were rejected for microbiological reasons.

In general, the proportion of products rejected on organoleptic grounds in each group of products did not exceed 1-2% except for tinned meat and animal fats (3.2 and 6.4% of the samples rejected in 2000, respectively). The good organoleptic quality of ice-cream and the small number of ice-

cream samples rejected in 2002 (less than 0.1%) are worth emphasizing.

The presence of unwanted chemical substances was the least frequent reason for rejecting the samples of food of animal origin. In the case of ice-cream, the only samples (0.1%) rejected for the presence of harmful chemical substances were in 1999. The low proportion of samples rejected on the basis of chemical contamination concerned also milk products (0.1-0.3%) and drinking milk (0.3-1.6%). It is worth noting that in 2003, no animal food samples were rejected on the basis of chemical contamination.

## CONCLUSIONS

The decisive effect on the rejection of the analysed samples was exerted by microbiological factors, followed by organoleptic traits and chemical contaminants.

In the analysed period, a marked tendency towards improved quality was found of the milk products and meat and meat products, as evidenced by the fact that the percentage of rejected samples decreased as the years went by. The greatest improvement of the quality was found for meat and meat products and drinking milk.

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## PRZYCZYNY DYSKWALIFIKACJI ŻYWNOŚCI POCHODZENIA ZWIERZĘCEGO W WOJEWÓDZTWIE KUJAWSKO-POMORSKIM

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Na podstawie wyników udostępnionych przez Wojewódzką Stację Sanitarно-Epidemiologiczną w Bydgoszczy analizowano przyczyny dyskwalifikacji żywności pochodzenia zwierzęcego. Dane dotyczyły 24 289 próbek mleka spożywczego, przetworów mlecznych, masła, lodów, mięsa i produktów mięsnych, konserw mięsnych oraz tłuszczów zwierzęcych przebadanych w latach 1999-2003 w kierunku występowania zanieczyszczeń mikrobiologicznych, chemicznych i złej jakości organoleptycznej. Stwierdzono, że główną przyczyną dyskwalifikacji były zanieczyszczenia pochodzenia mikrobiologicznego (w zależności od roku od 5,35 do 11,48%), następnie niepożądane cechy organoleptyczne (od 0,36 do 0,82%) i zanieczyszczenia szkodliwymi substancjami chemicznymi (od 0,38 do 0,92%). W kolejnych latach wykazano stopniową poprawę jakości przetworów mlecznych oraz mięsa i produktów mięsnych, o czym świadczy fakt zmniejszania się udziału próbek dyskwalifikowanych. Największą poprawę jakości stwierdzono w przypadku mięsa i produktów mięsnych oraz mleka spożywczego (obniżenie udziału próbek dyskwalifikowanych odpowiednio o ponad 10 i 8%).