RESEARCH CONCERNING THE HYGIENIC STATUS OF SOME PACKING CATEGORIES

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Abstract

The research was performed in three alimentary industry units, A-1, A-2, and A-3, during 2001-2003 in the county of Cluj. The bacteriological examination was performed, using the following determinations: total germs number (NTGMA/1 cm^2), number of coliphorm, bacteria/10 cm^2, and number of yeast and moulds/1 cm^2. The results obtained after studying the hygiene of packages during analyzed period (years 2001, 2002, and 2003), in all three studied units A-1, A-2, A-3 show that these are within standards stipulated by OMS 976/1998 (for all analyzed parameters. During all analyzed period, the absence of coliphorm bacteria, yeast and moulds absence. The results obtained for NTGMA/ 1 cm^2 shows that this parameter was within admitted limits in all analyzed samples.

Introduction

The packing of alimentary products is a process as important as others involved in animal rough material processing in order to become a final product. Without packing, alimentary product cannot be "moved" from a place to another, cannot have an availability term, and cannot be put into the market if it does not correspond to all hygienic conditions.

However, for a long time, producers considered package and packing as a something "supplementary", which must be performed as simple and cheap possible. We consider this attitude as not correspondent, and in last decades, both product and package are considered together as "goods" in advantage of consumer.

The package represents totality of elements destined to comprise pack a product with the aim of supplying its hygienic quality in conditions of manipulation, transport, storage, and selling, up to consumption.

Usually, a distinction is performed between different levels of packing. Thus, could be speaking about primary, secondary and tertiary packing, and sometimes even quaternary (Robertson, 1993).

Experimental

The research performed aims to study the hygiene of materials (packages) used to hygienic packing of final products, as natural and artificial cutisine, polyamide membrane, paper for packing, plastic bags, plastic glasses, cheese packages etc. The research was performed in three alimentary industry units (A-1, A-2, A-3), during 2001-2003 in the county of Cluj. The bacteriological examination was performed, using the following determinations: total germs number (NTGMA/1 cm^2), number of coliphorm, bacteria/10 cm^2, and number of yeast and moulds/1 cm^2. The following materials were used: Petri dishes with diameter of 10 cm, droppers, scissors, sterilized clips, and culture media specific for analyzed organisms (Frazier agar, BBLV nutritive agar, potato agar, or malt agar).

The controlled packing sample was aseptically cut in many square pieces of different sizes, and introduced in a sterile Petri dish. In laboratory, samples were prepared in agar Petri dishes.

For all three types of determinations, the result interpretation was performed by counting colonies/1 cm^2, apparition of gas /10 % of tube height, incubation of Petri dishes at 35°C for 48 hours and 18 – 25°C, placed in dark place for 4 - 5 days.

Results and discussions

The results of our research concerning the hygiene of pickings were interpreted according to The Order of Healyth Ministry OMS 976/1998 (tables 1, 2 and 3) being emphasized by years, months and units.

In 2001 a number of 379 samples were examined in analyzed alimentary industry units A-1, A-2, A-3 during 12 months of the year (table 1). Coliphorm bacteria/10 cm^2 are absent. NTGMA/ 1 cm^2 presented monthly variation limits of 0.1 – 1.7. The highest variation was recorded in June (0.1-1.7), with an average of 0.90 ± 0.01, and the lowest in December (0.1-0.9), with an average of 0.50 ± 0.01, meaning

that all packages that were bacteriological examined are correspondent and within limits admitted by legislation, as OMS 976/1998 stipulates.

In 2002 a number of 350 samples were examined (table 2). Coliphorm bacteria/10 cm^2 are absent. NTGMA/ 1 cm^2 presented monthly variation limits of 0.1-1.4. The highest variation was recorded in August (0.1-1.4), with an average of 0.75 ± 0.02, and the lowest in February and December (0.50 ± 0.01), with an average of 0.50 ± 0.01, meaning that all packages that were bacteriological examined are correspondent and within limits admitted by legislation, as OMS 976/1998 stipulates.

Table 1. Results of research performed with bacteriological examination concerning hygienic status of some package categories used for packing animal products in alimentary units from the county of Cluj during 2001

No.	Issue	Total no. samples harv. and examined	Results of bacteriological examination			
			No. col. bacteria /10 cm^2	NTGMA/1 cm^2		Yeast, moulds/ cm^2
				Variation limits	Average	
1.	January	45	Absent	0.2-1.3	0.75±0.02	Absent
2.	February	38	Absent	0.1-1.1	0.60±0.01	Absent
3.	March	29	Absent	0.1-1.2	0.65±0.01	Absent
4.	April	30	Absent	0.1-1.3	0.70±0.03	Absent
5.	May	35	Absent	0.1-1.4	0.75±0.02	Absent
6.	June	30	Absent	0.1-1.4	0.75±0.02	Absent
7.	July	35	Absent	0.1-1.7	0.90±0.01	Absent
8.	August	40	Absent	0.1-1.6	0.85±0.04	Absent
9.	September	25	Absent	0.1-1.2	0.65±0.02	Absent
10.	October	27	Absent	0.1-1.1	0.60±0.02	Absent
11.	November	25	Absent	0.1-1.0	0.55±0.01	Absent
12.	December	20	Absent	0.1-0.9	0.50±0.01	Absent
	TOTAL	**379**	**Absent**	**-**	**0.68**	Absent

In 2003 a number of 340 samples were examined (table 3). Coliphorm bacteria/10 cm^2 are absent. NTGMA/ 1 cm^2 presented monthly variation limits of 0.1-1.4.The highest variation was recorded in June, July and August (0.1-1.1), with an average of 0.60 ± 0.01, and the lowest in December (0.10 - 0.70), with an average of 0.40 ± 0.01, meaning that all packages that were bacteriological examined are correspondent and within limits admitted by legislation, as OMS 976/1998 stipulates.

Table 2. Results of research performed with bacteriological examination concerning hygienic status of some package categories used for packing animal products in alimentary units from the county of Cluj during 2002

No.	Issue	Total no. samples harv. and examined	No. col. bacteria /10 cm^2	NTGMA/1 cm^2 Variation limits	Average	Yeast, moulds/ cm^2
1.	January	25	Absent	0.1-1.0	0.55±0.01	Absent
2.	February	22	Absent	0.1-0.9	0.50±0.01	Absent
3.	March	28	Absent	0.1-1.1	0.60±0.01	Absent
4.	April	30	Absent	0.1-1.0	0.55±0.02	Absent
5.	May	35	Absent	0.1-1.2	0.65±0.02	Absent
6.	June	38	Absent	0.1-1.3	0.70±0.02	Absent
7.	July	37	Absent	0.1-1.3	0.70±0.01	Absent
8.	August	36	Absent	0.1-1.4	0.75±0.02	Absent
9.	September	28	Absent	0.1-1.1	0.60±0.02	Absent
10.	October	26	Absent	0.1-1.0	0.55±0.02	Absent
11.	November	25	Absent	0.1-0.9	0.50±0.01	Absent
12.	December	20	Absent	0.1-0.9	0.50±0.01	Absent
	TOTAL	**350**	**Absent**	-	**0.59**	Absent

Table 3. Results of research performed with bacteriological examination concerning hygienic status of some package categories used for packing animal products in alimentary units from the county of Cluj during 2003

No.	Issue	Total no. samples harv. and examined	No. col. bacteria /10 cm^2	NTGMA/1 cm^2 Variation limits	Average	Yeast and moulds/ cm^2
1.	January	23	Absent	0.1-0.8	0.45±0.01	Absent
2.	February	24	Absent	0.1-0.8	0.45±0.01	Absent
3.	March	23	Absent	0.1-1.0	0.55±0.01	Absent
4.	April	27	Absent	0.1-1.0	0.55±0.01	Absent
5.	May	30	Absent	0.1-1.0	0.55±0.02	Absent
6.	June	35	Absent	0.1-1.1	0.60±0.01	Absent
7.	July	39	Absent	0.1-1.1	0.60±0.01	Absent
8.	August	38	Absent	0.1-1.1	0.60±0.01	Absent
9.	September	31	Absent	0.1-0.9	0.50±0.02	Absent
10.	October	24	Absent	0.1-0.8	0.45±0.02	Absent
11.	November	24	Absent	0.1-0.8	0.45±0.01	Absent
12.	December	22	Absent	0.1-0.7	0.40±0.01	Absent
	TOTAL	**340**	**Absent**		**0.51**	Absent

The variation of NTGMA/1 cm^2 in all three studied units (fig. 2) shows the highest values for A3 with an average maximum in July ($0.60/cm^2$) but within standards.

Concerning NTGMA/1 cm^2, very significant differences were recorded by months in majority of analyzed cases, by months, as compared to 2001 (table 4 and table 5).

Table 4. Significance of differences between NTGMA/1 cm^2 between 2001-2002

No.	Issue	Differences	df	t	significance
1.	January	0.2	68	10.00	***
2.	February	0.1	58	10.00	***
3.	March	0.05	55	5.00	***
4.	April	0.15	58	5.00	***
5.	May	0.1	68	5.00	***
6.	June	0.05	66	2.50	*
7.	July	0.2	70	20.00	***
8.	August	0.1	74	2.50	*
9.	September	0.05	51	2.50	*
10.	October	0.05	51	2.50	*
11.	November	0.05	48	5.00	***
12.	December	0	38	0.001	ns

* - P> 0,01; ***, P < 0,001, ns – p > 0,05

Table 5. Significance of differences between NTGMA/1 cm^2 between 2001-2003

No.	Issue	Differences	df	t	significance
1.	January	0.2	66	8.16	***
2.	February	0.1	60	5.77	***
3.	March	0.05	50	2.89	**
4.	April	0.15	55	4.01	***
5.	May	0.1	63	2.89	**
6.	June	0.05	63	1.67	ns
7.	July	0.2	72	11.55	***
8.	August	0.1	76	2.18	*
9.	September	0.05	54	1.44	ns
10.	October	0.05	49	1.44	ns
11.	November	0.05	47	2.89	**
12.	December	0	40	0.001	ns

* - P> 0,01; ** - P < 0,01, ***- P < 0,001, ns – p > 0,05

Conclusions

The results obtained after studying the hygiene of packages during analyzed period (years 2001, 2002, and 2003), in all three studied units A-1, A-2, A-3 show that these are within standards stipulated by OMS 976/1998 (for all analyzed parameters. During all analyzed period, the absence of coliphorm bacteria, yeast and moulds absence. The results obtained for NTGMA/ 1 cm^2 shows that this parameter was within admitted limits in all analyzed samples. Very significant differences were recorded in majority of analyzed months for 2002 and 2003 as compared to year 2001.

References

Robertson, G.L. (1983). *Food Packaging, Principles and Practice*, Marcel Decker INC, New – York

*** HG nr. 1197/24.10.2002 PRIVIND APROBAREA NORMELOR PRIVIND MATERIALELE ŞI OBIECTELE CARE VIN ÎN CONTACT CU ALIMENTELE

*** DIRECTIVELE ce 89/109/CE, 90/128/CE, 92/39/CE, 93/9/CE, 95/3/CE, 96/11/C3

*** HG nr. 512/2004 PRIVIND COMPLETAREA NORMELOR CUPRINSE ÎN HG nr. 1197/2002, TRANSPUSE LA NIVELUL LEGISLAŢIEI NAŢIONALE