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ABSTRACT

The present investigation was carried out to evaluate the sanitary conditions surrounding the food throughout the production stages in some food plants. Observation of the sanitary measures of the studied plants revealed that only 3 out of the 7 plants (42.9%) have acceptable sanitation that complies with the sanitary requirements specified by WHO. Personal hygiene and storage conditions were the most critical problems found in the

studied plants. Laboratory examination of nasal and throat swabs and stool samples of workers was carried out to uncover the chronic carriers. Among the food handlers examined 46.3% were positive for intestinal parasites. Bacteriological examination of stool specimens revealed that 4.3% of carriers of *Salmonella paratyphi* and none were carriers of *Vibreo* species. Nasal swabs were also positive for *Staph. aureus* in 29.8% of all the examined swabs. Analysis of the main products of the studied plants revealed generally that the bacterial load of the products of plants having acceptable sanitary conditions was lower than that of the products of the other plants. The frozen vegetable products had a total aerobic mesophilic plate count ranging from $8.1x10^4$ cfu/g in okra and $3.7x10^5$ cfu/g in mixed vegetables. The total aerobic plate count of the ice cream ($1x10^3$ cfu/g) complies with specified Egyptian standards. However, the coliform count ($9x10^1$ MPN) was higher than the recommended limit. Lead and cadmium levels were also investigated in all products. The maximum detected level of lead was that of cream wafer (0.94 ppm) followed by banana wafer (0.82 ppm). The two detected levels were higher than Egyptian standards. The lead level in ice cream (0.19 ppm) was also higher than the specified standards. The relatively high levels of lead in cream wafer and ice cream may be attributed to more than one factor; the added color and the old machinery used in some production steps are the most accursed factors. On the other hand, the observed level of cadmium ranged between 0.046 ppm in raw mil and 0.3 ppm in soft cheese.

INTRODUCTION

Good sanitation in production plants is a fundamental requirement for the production of hygienic products and is essential to prevent harmful contamination of products during production stages. Yet, poor sanitation practices, such as improper cleaning of facilities and equipments, are the most frequent deficiencies found in some food production plants specially in small businesses.

Many hazards can be added to the food during the production stages. A hazard is any factor which may be present in the product that can cause harm to the consumer either through injury or illness. Hazards may be chemical, biological or physical. Chemical hazards are often looked on as the most important by the consumer, but in reality they often pose a relatively low health risk at levels to be found in food, and in general cause long-term effects. Biological hazards, on the other hand, usually present the greatest immediate danger to the consumer (Mortimore & Wallace, 1995).

Food will always present some minimal biological risk and it is the task of the food industry to maintain the level of risk at a minimum which is practical and technologically feasible (FAO/WHO Expert Consultation, 19). The general environmental sanitation of the factory should be recognized as having a significant impact on the safety of the finished products. Food borne diseases remain one of the most widespread public health problems in Egypt and most developing countries. It is an important cause of reduced economic productivity, despite progress in food sciences and technologies. The world declaration on Nutrition, adopted by WHO (WHO, 1997), emphasized that hundreds of millions of people suffer from communicable diseases caused by contaminated food and water.

Setiabuhdi et al. (19) reported that one way to demonstrate a responsible approach to food safety is to understand the differences between sanitation and HACCP (Hazard Analysis and Critical Control Points) and to build approaches to food safety that use both of these systems. Although HACCP and sanitation share the same goal of producing safe food products, the focus of sanitation is on the environment surrounding the food to prevent contamination, whereas the focus of HACCP is on controlling hazards intrinsic of food materials.

We found that it is very important to look for the sanitary measures followed in our food industries and to assess their credibility for production of safe food products competitor to the products of developed countries in the markets. We, therefore carried out this study in seven of the small and medium size food production plants distributing their products in the Egyptian markets and one of them exporting their products to the Gulf countries. The objectives behind this study are to assess the sanitary measures followed in the studied plants through evaluation of the environmental sanitation in the production places, studying the health status and personal hygiene of the food handlers and their role in spreading food borne diseases and determining the hygienic quality and the fitness of their products.

MATERIAL AND METHODS

The present study included seven of the small and medium size food production plants located in semi urban communities, Kafr El-dawar district, Beheira Governorate. Their products are distributed all over the Egyptian markets and one plant (frozen vegetables) exports its products to the Gulf countries. The selected plants were divided into three groups according to their production:

1. Frozen vegetables: (plant No. I) one frozen vegetable production plant (100 workers) producing all types of frozen vegetables.

2. Confectionery products: this group included two plants, the first one (plant No. II) produces biscuits, chocolates and wafers (110 workers). The other plant (plant No. III) produces only biscuits fortified with iron for the Ministry of Education through the iron fortification program of the UNICEF (25 workers).

3. Dairy products: this group included one cheese production plant (plant No. V - 3 workers), one ice cream production plant (plant No. IV - 30 workers), and two milk separators (plant No. VI - 6 workers and plant No. VII - 3 workers).

A checklist was constructed to assess the housekeeping of the plants and their environmental sanitation based on the code of practice for such places (FAO/WHO Codex Alimentarius Commission, 1992). Every question on the checklist was scored and every checklist as well as the different parameters within it were given grades ranging from (A) to (F) depending on their scores as follows:

Acceptable levels: A=85-100%	B=75-84%	C=65-74%
Unacceptable levels: D=55-64%	E=45-54%	F<45%.

Samples were collected for chemical, bacteriological and parasitological examinations as follows:

1. Food samples were collected for both chemical and bacteriological examinations to assess the hygienic quality of the final products and their compliance to the specified standards.

2. Drinking water samples from taps and storage tanks (whenever available) in each plant were collected for bacteriological and parasitological analysis to determine its suitability for food production.

3. Stool samples were collected from all food handler in the production lines for bacteriological and parasitological examinations.

4. Nasal swab specimens from food handlers working in the production lines were collected for bacteriological examination. The health certificates of all workers were revised during swabs collection.

Bacteriological examination of samples:

1. *Bacteriological examination of food and water samples:* microbiological examination was carried out for the food products and water samples. Aerobic plate count was obtained by Spread-drop plate count (Collins & Lyne, 1995) on nutrient agar. This was done by spreading standard volume drops (0.05 ml) from different decimal dilutions of the food homogenate on quadrants marked out on the bottom of the dish. Counts were done from dilutions ≤ 50 colonies and calculation was done by the weighted means methods (BSI, 1991).

   Coliforms and faecal coliforms were enumerated by the Most Probable Number (MPN) method (APHA, 1986). One ml of each of the prepared decimal dilutions was inoculated into each of the 3 lauryl sulfate tryptose (LST) broth fermentation tubes (Difco). Confirmation was done using Brilliant Green Lactose Bile (BGLB) broth (Oxoide). All positive LST tubes were subcultured into EC broth (Biolife) and incubated at 44±0.2°C for 48 hrs. to test for gas production, which indicates faecal coliform.

2. *Stool culture for isolation of pathogenic bacteria:* a loopful of stool sample was inoculated onto XLD agar, selenite F broth and alkaline peptone water, then incubated overnight at 37°C. Subculture was done on SS agar and TCBS agar and suspected colonies were subjected to biochemical reactions for further investigation and identification (Wilson & Miles, 1987).

3. *Nasal swab culture for isolation of Staph. aureus:* swabs were inoculated onto blood agar plates, incubated overnight at 37°C. Characteristic hemolytic colonies were picked and subcultured on mannitol salt agar and DNAse agar medium. Coagulase test was done for complete identification (Bryan, 1988).

Parasitological examination of samples:

Stool examination: Stool samples were processed by quantitative kato-katz technique (Katz et al., 1972) to identify helminthic eggs. Two slides were processed from a single stool sample 41.7 mg each. To detect intestinal protozoal infections, each stool sample was further processed by merthiolate iodine formaldehyde concentration techniques (MIFC) (WHO, 1980). Among the total 94 food handlers working at the 7 plants, 80 workers provided stool samples. All the 80 samples were processed by the kato-katz technique, whereas in 73 samples, stool specimens were examined by both techniques.

1. Water samples examination: tap water and/or tank water samples were collected from each plant. Five liters of water was processed by filtration technique (Chang & Kabler, 1956), the pore size of the filter was 5 μm. After filtration was completed the filter was washed in 2-5 ml of deionized water. After centrifugation (2000 rpm for 5 minutes), the whole sediment was examined microscopically, helminthic eggs and protozoal cysts were counted.

Chemical analysis of food samples:

1. Chemical examination: lead and cadmium were analyzed in all food samples collected from the final products of the studied plants using atomic absorption spectrophotometer Schimadzu model AA-680 flame system. The samples were prepared by wet oxidation method using nitric acid and hydrogen peroxide for digestion and oxidation of the samples. Spectrosol metals (BDH) were used as standards and ultra pure deionized water was used for dilution of the digested samples and standards.

RESULTS & DISCUSSION

The present investigation was carried out to evaluate the environmental sanitation surrounding the food throughout the production stages in some food production plants. We were concerned in assessing the hazards surrounding the food during production stages based on studying the sanitation inside the establishment, the health status and personal hygiene of the food handlers and the fitness of the final products.

Observation of the sanitary measures of the studied plants revealed that only three out of the seven plants (42.9%) had acceptable sanitation complying with the sanitary requirements specified by WHO. Out of the three acceptable plants, two had grade B (plants No. II and IV) and one had grade C (plant No. III). All dairy production plants (V, VI and VII) except the ice cream plant had unacceptable sanitation (grade F). The bad sanitation in the three dairy plants is most probably attributed to the very small business that cannot tolerate the cost of good sanitation requirements. The effect of bad sanitation of these plants on the final products is obvious. The total aerobic plate count and coliform count were significantly high in all of their products (table 5). This may encourage us to think carefully about the way of handling of raw milk in the Egyptian markets. Pasteurization of all raw milk before selling is a fundamental request in Egypt, as it is in developed countries. Frozen vegetables plant (I) had also a general unacceptable sanitation, although it has a very good storage operation (table 1).

Personal hygiene and storage conditions were the most critical problems found in the studied plants. Unacceptable personal hygiene was observed in four out of the seven studied plants (57%) and no grade (A) score were given to any plant. It was also evident that dairy plants V, VI and VII had very poor grade of personal hygiene. This did not only reveal bad personal hygiene, but it also revealed insufficient training and education of the workers. Food handlers should be aware that personal hygiene is of the utmost importance, as any minor breakdown could directly lead to food contamination.

The second critical problem found in the studied plants was the storage operations. Only two plants (ice cream and frozen vegetables production plants) had acceptable storage conditions, because the storage temperature is very critical for the fitness of their products. It is assumed that the temperature of the food in deep freezers should never rise above -18°C (Christie & Christie, 1977). All other plants had insufficient storage conditions. On the other hand, four of the studied plants were applying an acceptable system of vector control and the highest grade (A) was only observed in one of the confectionery producing plants (plant No. III).

All plants had public water supply which was either used directly or stored in tanks for use in the preparation of the products and in all cleaning practices. We examined the tap water and some storage tanks (whenever available) for parasitic and bacterial contamination to evaluate its fitness for food production. All tap water samples (except samples of the ice cream plant) contained very few numbers of *E. coli* and *E. histolytica* cysts. *Ascaris* eggs in a small number were also detected in the storage tank of the frozen vegetable production plant. A higher number of *Ascaris* eggs (5 eggs/5 liters) were detected in plant II.

The role of food handlers in the spread of food borne diseases is well known and studied (Harrington, 1992). We therefore carried out laboratory examinations (stool and nasal swabs specimens) for the workers in the studied plants i order to uncover the chronic carriers. The number of employees working in the studied establishments ranged from 3 in the milk separator and 110 in a confectionery producing plant. Among this number, only 94 workers were considered as food handlers according to the nature of their work. All food handlers possessed valid health certificates renewed annually except 2 handlers (2.13%) working at one of the milk separators (plant No. VI).

Although the availability of mandatory health certificates with food handlers working at food industries was thought to be very important to guarantee their freedom from pathogenic microorganisms, however, examination of stool specimens collected from the food handlers for parasitic infestations revealed that 46.3% were positive for intestinal parasites. *Schistosoma mansoni* ranked first (31.3%), this percentage of the infection matches that recorded for similar age group in highly endemic communities in the Nile Delta (Barakat et al., 1995). Infection with *Fasciola* species ranked second (11.3%, followed by round worm infection (*A. lumbricoid* and *T. trichura*). These percentages also match those reported for this age group in rural Abis area near Alexandria (El-Sahn et al., 1995). Although these types of intestinal helminthic infections are not transmitted directly therefore carrying no risk for final product contamination, yet it is possible that they would affect the working ability of the workers. As regards intestinal protozoal infections, five cases were found positive, *E. histolytica* cysts were found in four cases, and *G. lamblia* was present in one case. These parasites are transmitted directly from person to person or through consumption of contaminated final products. This is especially favored with the prevailing low personal hygiene in the studied plants (43%). It is worth mentioning that all the health certificates of the study subjects were valid indicating either negligence in examining and recording of samples or inefficiency in microscopic stool examination. Both of these factors should be analyzed carefully.

Nasal *Staph.* was also positive in 29.8% of all the examined swabs. The percentage of nasal *Staph.* carriers among workers ranged from 20% to 66.6% in the ice cream and milk & cheese producing plants, respectively. Persons who carry *Staph. aureus* in their noses are considered the main sources of food outbreaks of *Staph.* food poisoning when they are handling food (Bryan, 1988).

Additionally, bacteriological examination of stool specimens collected from 94 food handlers in the studied plants revealed that 4.3% were carriers of *Salmonella paratyphi* and none were carriers of *Vibreo* species. The isolation rate of *S. paratyphi* was 4.0%, 33.3%, 33.3%, and 33.3% in production plants numbers I, V, VI and VII, respectively. The small number of food handlers in some plants may have contributed to this high prevalence, however, this carriage represents a great risk for transmitting these organisms to food products. This means that mandatory medical certificates do not essentially prove that the handlers of food are healthy workers but it may be misleading. Cockburn (1962) reported that when medical examination of dairy workers is carried out and even if laboratory examination of specimens of blood, faeces and urine is included, it should be clearly recognized that it does not guarantee that workers will remain free from infection with dangerous pathogens n the intervals between examinations. Unless this limitation is appreciated by employers, employees and health authority alike, a false sense of security may be engendered and lapses from the strict practice of hygienic measures with ensue.

In order to assess the capability of the studied plants to produce safe products, we carried out bacteriological examinations and some trace metals analysis for the main products as well as some of the used ingredients. The results of table 5 reveal that the frozen vegetable products have a total aerobic mesophilic plate count ranging from $8.1x10^4$ cfu/g in okra and $3.7x10^5$ in mixed vegetables. Spinach showed the highest coliform count ($2.1x10^4$) followed by green beans ($1.8x10^4$). The total aerobic mesophilic plate count was higher than the limit specified in Egyptian standards ($1x10^5$/g) (Egyptian Organization for Standardization and Quality Control, 1969) in all types of frozen vegetables except frozen okra. Also coliform count was also higher than the specified limit (<10/g) in all samples. These levels of bacterial contamination may probably be considered higher than the level which can withstand the handling and storage for the assumed one year expiration period.

Comparison of the total aerobic plate count and coliform counts of the two milk separators showed higher count of the raw milk produced in the dairy plant VII compared to plant VI. The differences in milk quality is most probably attributed to the difference in environmental sanitation in the two plants. Separator VII lacked all sanitation requirements, in addition to lack of personal hygiene of the food handlers who did not possess any health certificates. Soft cheese produced at this plant had also higher aerobic mesophilic plate count ($1.8x10^6$ cfu/g) and coliform count ($1.3x10^4$ MPN) compared to soft cheese produced in the other dairy plant (plant No. V) ($1.7x10^5$ cfu/g and $1.1x10^3$ MPN, respectively). The total aerobic plat count of the ice cream (IV) complied with specified Egyptian standards ($1x10^3$ cfu/g). However, coliform count was higher than the recommended limit (90 MPN) (Egyptian Organization for Standardization and Quality Control, 1993).

Two confectionery plants (plants No. II and III) were also studied, the first one produces different varieties of biscuits and chocolate, while the other one is currently producing only iron fortified biscuits to be distributed in primary schools through the fortification programs of the Ministry of Health to control iron deficiency. The total aerobic plate count ranged between $3x10^2$ and $1.5x10^3$ cfu/g and coliforms were found only in banana wafers (50 MPN).

Lead and cadmium levels were also investigated in all products to determine any contamination which may reflect the bad sanitation during production. The maximum detected level of lead was that of cream wafers (0.94 ppm) followed by banana wafers (0.82 ppm). The two detected levels were higher than the level recommended by the Egyptian standards (0.5 ppm). Lead level in ice cream (0.19 ppm) was higher than the specified standards (<0.1 ppm). The relatively high levels of lead in cream wafers and ice cream may be attributed to more than one factor. The added color and the old machinery used in some production steps are the most accused factors. On the other hand, the observed level of cadmium ranged between 0.046 in raw milk (VI) and 0.3 ppm in soft cheese (VII). It is evident from the results that the bacterial load of the products of plants having acceptable sanitary conditions (plants No. II, III and IV) were very low compared to the products of the other plants. This means that proper sanitation is very critical to the quality of the final products.

Although the concernment with good sanitation is vital in most if not all the small and large food industries in many developed countries, it is still strange and less important to most of our food industry establishments. The globalization of trade and the opening of the markets should enforce our food production establishments to consider the sanitary measures in our food industries. These measures are not only to reduce the incidence of food borne diseases and to ensure a safe food supply for the population, but also to promote trade in food products and also to promote tourism. The World Trade Organization (WTO) members retain the right to take sanitary measures necessary for the protection of human life or health. They are committed to accepting the sanitary measures used by other members as being equivalent measures, even if they are different from their own requirements. The exporting country needs, of course, to demonstrate that its measures will achieve the appropriate level of sanitary protection laid down by the importing country. It is however to be noted, that sanitary measures are not more trade-restrictive than required to achieve their appropriate level of sanitary protection (WHO, 1997).

The food industry today tends to focus on employee education and training. The industry has taken the lead in promoting and implementing this strategy of making sure that managers and workers are well-versed in the principles of food protection. Personal hygiene of food handlers should be one of the main objectives of training programs conducted by the managers of food establishments. Great assurance of food safety can be achieved by training and educating food handlers about safe food handling practices, even if they do not undergo clinical examination. Food handlers should understand the principles of food safety and the importance of specific food handling practices necessary to the job (Harrington, 1992).

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Table 1: Scores of the check-list parameters of the studied food production plants

	Plant No. I (Frozen vegetable)		Plant No. II (Confectionery)		Plant No. III (Confectionery)		Plant No. IV (Ice cream)		Plant No. V (Dairy)		Plant No. VI (Dairy)		Plant No. VII (Dairy)		Acceptable plants	
Parameters	Score %	grade	Score %	grade	Score %	grade	Score %	grade	Score %	grade	Score %	grade	Score %	grade	No	%
Construction and utilities	66.7	C	94.4	A	88.9	A	94.4	A	33.3	F	33.3	F	44.4	F	4	57.1
washing operations	33.3	F	91.7	A	66.7	C	75	B	33.3	F	33.3	F	66.7	C	4	57.1
Vector control	50.0	E	78.3	B	86.7	A	65	C	20.0	F	67	C	33.3	F	4	57.1
walls and floors	38.1	F	83.3	B	81.0	B	90.5	A	38.1	F	38.1	F	61.9	D	3	42.9
Personal hygiene	40.0	F	60.0	C	80.0	B	76.7	B	33.3	F	26.7	F	26.7	F	3	42.9
storage operation	93.3	A	43.3	F	20.0	F	97.7	A	26.7	F	33.3	F	13.3	F	2	28.6
Ventilation and lightening	50.0	E	91.7	A	83.3	B	83.3	B	33.3	F	33.3	F	50	E	3	42.9
Environmental sanitation	33.3	F	83.3	A	75.0	B	77.8	B	27.8	F	27.8	F	44.4	F	3	42.9
Average score	**50.6**	**E**	**78.3**	**B**	**72.7**	**C**	**82.6**	**B**	**30.7**	**F**	**36.6**	**F**	**42.6**	**F**	**3**	**42.9**

Table 2: Parasitological examination of tap water and water from storage tanks used in food production in the studied plants

Factories	Parasitic infestation (No. of Eggs/ 5 liters)*					
	E. coli		E. Histolitica		Ascaris	
	Tap water	tank	Tap water	tank	Tap water	tank
Plant No.I (Frozen vegetable)	< 5		ND†		ND	
Plant No. II (Confectionery)	ND	< 5	ND	< 5	ND	5
Plant No.III (Confectionery)	< 5		< 5		ND	
Plant No. IV (Ice cream)	ND		ND		ND	
Plant No.V (Dairy products)	ND		ND		ND	
Plant No.VI (Dairy products)	< 5		< 5		< 5	
Plant No.VII (Dairy products)	< 5		ND		ND	

*All the recorded E.coli E. Hist. and Ascaries were very few (2-3 eggs/ 5 liters).
†Not detected

Table 3: Nasal and stool bacteriological examination for food handlers

Factories	Number of examined workers	Nasal staph.		Salmonella in stool	
		No.	%	No.	%
Plant No.I (Frozen vegetable)	25	6	24 %	1	4.0 %
Plant No. II (Confectionery)	25	7	28 %	0	0.0 %
Plant No.III (Confectionery)	25	9	36 %	0	0.0 %
Plant No. IV (Ice cream)	10	2	20 %	0	0.0 %
Plant No.V (Dairy products)	3	1	33.3 %	1	33.3 %
Plant No.VI (Dairy-products)	3	2	66.6 %	1	33.3 %
Plant No.VII (Dairy products)	3	1	33.3 %	1	33.3 %
Total	94	28	29.8%	4	4.3%

Table 4: Distribution of parasitic infections among food handlers

Infection	Number positive (n = 80)	% positive
Helminthic infection		
Schistosoma	25	31.3
Fasciola	9	11.3
Round worm *(A. lumbericoides & T.trichinia)*	8	10.0
Protozoal infection	5*	6.3
Total	37	46.3
Combined infection	10	12.5

* Four cases were positive for E histolytica and one case was positive for G. lamblia.

Table 5: Bacteriological examination of some products in the studied factories

Factories	Products	Aerobic Mesophylic plate count (CFU/g)	Coliform count (MPN)
Plant No.I (Frozen vegetable)	Spinach	2.2×10^5	2.1×10^4
	Okra	8.1×10^4	7.5×10^3
	Beans	1.7×10^5	1.8×10^4
	Green peas	3.1×10^5	2.1×10^3
	Mixed vegetables	3.7×10^5	7.0×10^1
Plant No. II (Confectionery)	Biscuit	-	-
	Orange biscuits	1.5×10^3	-
	Banana biscuits	3.0×10^2	-
	Marry biscuits	-	-
-	Wafer cream	1.0×10^3	-
	Orange wafer	-	-
	Banana wafer	5.0×10^2	5.0×10^1
	Milk chocolates	-	-
Plant No.III (Confectionery)	Leux biscuit	5.0×10^2	
	Marry biscuit	-	-
Plant No. IV (Ice cream)	Chocolate ice cream	1.0×10^3	9.0×10^1
	Wafer for ice cream	1.0×10^3	5.0×10^1
Plant No.V (Dairy products)	Domatti cheese	1.7×10^5	1.1×10^3
Plant No.VI (Dairy products)	Raw milk	6.5×10^5	1.8×10^4
	Cream	2.1×10^5	5.1×10^3
Plant No.VII (Dairy products)	Raw milk	9.1×10^5	3.1×10^4
	Domatti cheese	1.8×10^6	1.3×10^4

Table 6: Lead and cadmium contamination of the products of the studied plants

Production plant	products	concentration mg/kg *	
		Lead (Pb)	Cadmium (Cd)
Plant No. I (Frozen Vegetables)	Spanich		
	Okra	0.23±0.10	0.084±0.015
	Green beans	0.12±0.02	0.099±0.01
	Green peas		
	Mixed vegetables	0.26±0.04	0.082±0.006
Plant No. II (Confectionary)	Orange biscuits	0.65± 0.11	0.062±0.41
	Banana biscuits		
	Mary biscuits	0.73±0.22	0.065±0.01
	cream of wafers	0.94± 0.18	0.06±0.01
	Banana wafer	0.82 ± 0.026	0.07±0.01
	Coconut flavor	0.39± 0.052	0.08±0.003
	Milk chocolate	0.64 ± 0.07	0.11±0.017
Plant No. III (Confectionary)	Biscuits	0.56 ± 0.112	0.18±0.034
Plant No. IV (Ice cream)	Ice Cream	0.19±0.032	0.059±0.01
	Wafer	0.23±0.029	0.06±0.006
Plant No. V (Dairy products)	Raw milk	0.29±0.095	0.11±0.04
	Domatti cheese	0.13±0.029	0.32±0.035
Plant No. VI (Dairy products)	Raw milk	0.119±0.029	0.046±0.005
	Milk cream	0.16±0.05	0.062±0.025
Plant No. VII (Dairy products)	Domatti cheese	0.14±0.025	0.106±0.016

* Mean ± SD