قسم : المراقبة الصحية على الأغذية .
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تواجد الميكروبات المكورة العنقودية في اللبن وبعض منتجات الألبان

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أجريت الدراسة على عدد ١١٠ عينة من اللبن الخام، الجبن الدمياطي الجبن القريش ، والايس كريم، جمعت بطريقة عشوائية من أسواق مدينة أسيوط ومحلات البقالة ومزارع الألبان بالنسبة للبن الخام . وقد فحصت هذه العينات لمعرفة مدى تواجد الميكروب المكور العنقودي، وقد تبين من الفحص أن ٦٠، ٣ر٢٣، ٥ر٢٧، ٢٠٪ من العينات المفحوصة تحتوي على المكور العنقودي الذهبي، وكان متوسط عدده في هذا العينات ١×١٠^{٢}، ٩×١٠^{٤}، ٥×١٠^{٤}، ١×١٠^{٤} لكل مل جرام على التوالي .

وقد تم عزل ميكروب *Micrococci, staph. epidermdis* من العينات المفحوصة فيما عدا الايس كريم . وبدراسة الخاصة السمية للمكور العنقودي الذهبي المعزول من العينات ومدى قدرته على افراز السموم المعوية A & C . وجد أن كل العترات المعزولة من هذا الميكروب لاتفرز أي منها .

وقد تم مناقشة الشروط الصحية الواجب اتخاذها لمنع تلوث الألبان ومنتجاتها بهذا الميكروب وكذلك لمنع افرازه للسموم المعوية .

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OCCURRENCE OF STAPHYLOCOCCI IN MILK AND SOME MILK PRODUCTS

(With Two Tables)

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SUMMARY

A sum of 110 random samples of raw milk and some milk products, including raw milk, Damietta cheese, kareish cheese and ice-cream, were collected from Assiut City markets, groceries and dairy farms. The samples were examined for staphylococci and the isoalted S. aureus strains were tested for production of enterotoxins A and C_3. S. aureus could be isolated from 60, 23.3, 27.5 and 20% of the examined samples with an average count of $1x10^2$, $9x10^4$, $5x10^4$ and $1x10^4$ S. aureus/ml or G.respectively. While, Staph. epidermidis and micrococci could be isolated from the examined samples except ice-cream. All of the tested S. aureus strains failed to produce enterotoxins A and C_3. The public health hazard and the suggestive measures were discussed.

INTRODUCTION

Staphylococci have undoubtly caused food poisoning for centuries, and outbreaks were reported by several workers in the early 1900s. the role of staphylococci in food poisoning was rdiscovered by DACK et al. (1930), who demonstrated conclusively that contamination of food with S. aureus could cause gastroentritis. So far, and inspite of advances achieved in dairy technology, several outbreaks of staphylococcal food poisoning have been reported, involving large number of people throughout the world. Comperhensive reviews on staphylococal food poisoning and on the occurrance of S. aureus in milk and milk products have been published (ENHUBER, 1971; TATINI et al., 1971; MILJKOVIC et al., 1974; HOL and VINCENTIE, 1975; EL-BASSIONY, 1977; AHMED, 1978 & 1980; REYES et al., 1984; MAHMOUD, 1985 and GUPTA, 1986).

Althouh staphylococci are widely distributed in the environment, the increased incidence of staphylococcal mastitis has made the occurrence of S. aureus in milk and consequently in dairy products a problem of considerable significance. AHMED (1978) reported that 68, 42, 60 and 78% of examined raw milk, Damietta & Kareish cheese and ice-cream contained S. aureus in average counts of 668, 1546, 992 and 16354/ml or G.respectively. In 1980 the same author stated that 48.5, 44.5, 26 and 90% of the examined raw milk, Damietta & Kareish cheese and ice-cream contained S. aureus, respectively. He added that 68 out of 347 S. aureus strains isolated were enterotoxigenic. Furthermore, enterotoxigenic S. aureus strains producing enterotoxins A, B, C and D could be isolated from cheese samples examined by REYES et al. (1984); MAHMOUD et al. (1985) and NOUR et al. (1986).

Therefore, this work was done to assess the occurrence of S. aureus and other staphylococci in milk and some milk products available at retail levels in Assiut City, and to assess the ability of the isolated S. aureus strains to produce enterotoxins A and C_3.

MATERIAL and METHODS

A total of 110 random samples of raw milk and some milk products including 20 raw milk, 30 Damietta cheese, 40 Kareish cheese and 20 ice-cream samples, were collected from Assiut City markets, groceries and dairy farms. The samples were dispatched to the laboratory in clean dry and sterile containers with a minimum of delay. Preparation of samples for examination was carried out according to standard methods for the examination of dairy products (A.P.H.A., 1978).

1- S. aureus count:

Numbers of S. aureus were determined by using Baird Parker agar plates (Difico). Duplicate plates were prepared and incubated 48h. at 37°C. Some of the colonies were randomly selected for confirmation as S. aureus according to FINEGOLD and MARTIN (1982), and were tested for their ability to produce heat stable deoxyribonuclease (DNase) as described by LACHICA et al. (1971).

2- Isolation and identification of staphylococci was carried out according to FINEGOLD and MARTIN (1982).

3- Detection of enterotoxigenicity of isolated S. aureus strains.

The isolated S. aureus strains were teted for their ability to produce enterotoxins A and C_3, the available two types kindely supplied by Dr. M.S. BERGDOLL, Food Research Instiute. Madison, Wisconsin, USA. Extraction of enterotoxins was done by using cellophane over agar technique recommended by HALLANDER (1965) and modified by JARVIS and LAWRENCE (1970). Optimum sensitivity plate (OSP) descriped by ROBBINS et al. (1974) was used for detection of enterotoxins.

RESULTS

All the results were recorded in Tables 1 and 2.

Table (1): S. aureus count/ml or g of examined raw milk, Damietta & Kareish cheese and ice-cream samples.

Samples	No. of samples examined	Positive samples No	%	Count/ml or g Min	Max	average
Raw milk	20	12	60	*∠ 10	$4X10^4$	$1x10^2$
Damietta cheese	30	7	23.3	*∠ 100	$5x10^5$	$9x10^4$
Kareish cheese	40	11	27.5	*∠ 100	$6x10^6$	$5x10^4$
Ice-cream	20	4	20	∠ 10	$2x10^4$	$1x10^4$
Total	**110**	**34**	**30.9**			

* : No colonies could be detected on the plate.

Table (2): Frequency distribution of isolated strains recovered from examined milk and milk products samples.

Samples	No. of isolates	S. aureus		Staph. epidermids		Miscrococci	
		No.	%	No.	%	No.	%
Raw milk	33	12	36.4	17	51.5	4	12.1
Damietta cheese	29	7	24.1	21	72.4	1	3.5
Kareish cheese	50	11	22	38	76	1	2
Ice-cream	4	4	100	-	-	-	-
Total	**116**			**76**		**6**	

DISCUSSION

Table 1 shows that 60, 23.3, 27.5 and 20% of the examined raw milk, Damietta cheese, Kareish cheese and ice-cream contained S. aureus with an average count of $1x10^2$, $9x10^4$, $5x10^4$ and $1x10^4$/ml or G. respectively. Higher incidence of S. aureus was previously reported by AHMED (1978 & 1980). While, EL-BASSIONY (1985) recorded that 53.3 and 30% of the examined raw milk and kareish cheese samples were positive for S. aureus. The average count of S.aureus/ml or g of our examined samples was higher than that recorded by AHMED (1978). MAHMOUD et al. (1985) recorded $2.4x10^6$ S. aureus/g of examined cheese samples as an average count. furthermore, 80 and 50% of the examined cheese samples contained 10^5 and 10^4S. aureus/g., respectively as stated by NOUR et al. (1986).

The results in Table 2 reveal that Staph. epidermidis represented 51.5, 72.4 and 76% of the isolated staphylococci from raw milk, Damietta and Kareish cheese, respectively. While, Micrococci were found to be 12.1, 3.5 and 2% of the isolated strains recovered from the examined samples respectively. Staph. epidermidis and micrococci could not be isolated from ice-cream samples. Several research papers previously reported the isolation of Staph. epidermidis and micrococci from milk and milk products (PISANO, 1970; DABROWSKA and ORANTWITYK, 1973; EL-BASSIONY, 1977, AHMED, 1978 and NOUR et al., 1986).

Regarding the enterotoxigenicity of S. aureus, all of the isolated strains failed to produce enterotoxins A & C_3. The probability of these strains to produce other enterotoxins is expectable. AHMED (1980) reported that the tested S. aureus strains recovered from milk and milk products different types of enterotoxins. Higher incidence of enterotoxigenic S. aureus strains (41.25%) were obtained by REYES et al. (1984), while MAHMOUD et al. (1985) found that 8 out of 60 S. aureus strains isolated from cheese were entertoxigenic.

It is worth to mention that, the presence of S. aureus in milk and dairy products even in low numbers must be regarded as a public health hazard, because it has been established that S. aureus may lose its vrability in food but enterotoxins still exist. Strict hygienic measures, pasteurization of milk and proper cooling are recommended to avoid contamination by S. aureus and to prevent enterotoxins production.

REFERENCES

Ahmed, A. A-H. (1978): A survey of the incidence of coagulase positive staphylococci in milk and milk products. M.V.Sc. Thesis, Fac. Vet. Med. Assiut Univ.

Ahmed A. A-H. (1980): Studies on the enterotoxigenicity of S. aureus isolated from milk and milk products. Ph.D. Thesis, Fac. Vet. Med., Assiut Univ.

A.P.H.A. (1978): Standard methods for the examination of dairy products. E.H. Marth (ed). American Public Health Association 14th Ed. Washington D.C.

Dabrowska, A. and Orant-Wityk (1973): Sensitivity of bacterial strains isolated from milk of Cowon state of Ople province. Modycna Veterynaryina. 29, 9: 546 DSA, 36, 4 (1974).

Dack, G.M. Cary, W.E., Woolpert, O.C., and Wiggers, H.S. (1930): An outbreak of food poisoning proved to be due to yellow haemolytic staphylococcus. J. of preventive medicine 4: 167.

El-Bassiony, T.A. (1977): Incidence of pathogenic microorganisms and viability of some food poisoning bacteria in kareish cheese during storage. Ph.D. Thesis Fac. Vet. Med. Assiut Univ.

El-Bassiony, T.A. (1985): Enumeration of S. aureus in milk and some dairy products. Assiut Vet. Med. Journal 13 (25) 125-135.

Enhuber, E. (1971): Staph. food poisoning from ice-cream. A count of a group infection off. Gesundh. Vesen. 33, 7: 393-396. (DSA, 34, 3: 1972).

Finegold, S.H. and Martin W.J. (1982): Bailly and Scott Diagnostic microbiology. 6th ed. C.V. Mosby Co. St. louis, Toronto, London.

Gupta, R.S. (1986): Bacteriological analysis of buffaloe's milk. Indian Vet. Journal 63, 3: 254-255.

Hallander, H.O. (1965): Production of large quantities of enterotoxins B and other staphylococcal toxins on solid media. Aceta Microbiol scandineav., 63, 293: 305.

Hal, H. and Vincentie, H.M. (1975): Staphyloccci in cheese made from milk. Tijdschrift voor-piergeneeskund. 100, 18: 991-994 (DSA, 38, 3, 1976).

Jarvis, A.W. and Lawrence, R.C. (1970): Production of high titres of enerotoxin for routine testing of staphylococci. Appl Microbiol, 19, 4: 698.

Lachica, R.V.; Genigeorgis, C. and Hoeprich, P.D. (1971): Metachromatic agar diffusion methods for detecting slaphylococcal nuclease activity. Appl Microbiol. 21: 585-587.

Mahmoud, S.Z.; Naguib, H.M.; El-Nockrashy, S.; Rifaat, A.A.; Tawfeek, N. and Naguib, K. (1985): Survey of S. aureus in market Egyptian Ras cheese and the presence of enterotoxins type A & B. Egyptian J. of food Sci. 13 (2): 154-155.

Miljkovic, N.; Sirka, M.; Stojanovic, L. and Otenhajmer, T. (1974): Characteristic of staphylococci isolated from milk of healthy and mastitic cows and the incidence of enterotoxigenic strains. XIX International Dairy Congress IE 140 (DSA. 37, 5, 1975).

Nour, M.A.; El-Hendawg, N.A. and Noeman, Z. (1986): Staphylococci in Arab cheese. 1- Incidence and enterotoxigenicity. Egyptian J. of Dairy Sci. 14, 1: 11-18.

Pisano, A. (1970): Pathogenic (staphylococci in Pacrino Romano cheese reproduced in sardinia. Latte, 44, 2: 103-105. (DSA. 32, 8, 1970).

Reyes, L.; Motal, L.; Costaririca, L. and Phrrilla, C. (1984): Revista latinodmericana de Microbiologia. 26 (3) 277-283 (DSA. 47, 9, 1985).

Robbins, R.; S. Gould and M.S. Bergdoll (1974): detecting the enterotoxigenicity of staphylococcus strains. Appl. Microbiol 28: 946-950.

Tatini, S.R.; Jejeski, J.L.; Moris, H.A.; Olson, J.C. and Casman, E.P. (1971): Production of staphylococcal enterotoxin A in chedder and colby cheese. J. Dairy Sci, 54, 6: 815-825.