الميكروبات الكروية المعوية فى الجبن Enterococci

ع ٠ ا ٠ أحمد

تم جمع عدد ١٠٠ عينة من أنواع الجبن المختلفة من مدينة أسيوط وذلك لعد مجموعة الميكروبات الكروية المعوية وعزل ميكروب Strept. Faecalis

وأسفرت النتائج على مايلى :

الجبن الدمياطى يحتوى على ٣٠٫٩٤ × ١٠ ميكروب كروية معوية

الجبن القريش يحتوى على ١٢٦٫٠٣ × ١٠^{٣} ميكروب كروية معوية

الجبن الجاف (رومى) يحتوى على ٣٧٧٫١٦ × ١٠^{٣} ميكروب كروية معوية

وكانت النسبة المئوية لميكروب Strept. Faecalis فى الجبن الدمياطى والجبن القريش والجبن الرومى هى ٢٢٫١٤٫١٢ على التوالى ٠

كذلك نوقشت اهمية هذا النوع من حيث اهميته كدليل على الانتاج الصحى لمنتجات الالبان من حيث اهميته من الوجهة الصحية للمستهلك ٠

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ENTEROCOCCI IN CHEESE

(With 2 Tables)

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SUMMARY

For the enumeration of enterococci and isolation of Strept. faecalis from different types of cheese, 100 random samples Dammiatta (50), Kareish (25) and Hard (25), were used and collected from the local Assiut city markets.

The results obtained from this work revealed that the average Enterococci counts of cheese samples were 30.94 X 10 for Dammiata, 126.04 X 10 for Kareish and 377.16 X 10 for Hard cheese.

Moreover, the incidence percentage of strept. faecalis isolated from Dammiatta, Kareish and Hard cheeses was found to be 22,14 and 12,respectively.

The value of Enterococci count as a sanitary index for dairy products was emphasized as well as the public health significance of strept. faecalis was also be discussed.

INTRODUCTION AND LITERATURE

Determination of enterococci as index of faecal contamination has proved useful in the analysis of food, these types of organisms have been also implicated as aetiological agents of food-borne illness.

The enterococci were first recorded from cases of food poisoning by LINDEN et al. (1926) who could isolate such organisms from cheese that was incremineated in 2 human outbreaks. SHERMAN and STARY (1931) reported the presence of Strept. faecalis in Swiss cheese after one day from processing .

CARY et al. (1938) reported the appearance of food poisoning symptoms among volunteers given broth cultures of suspected enterococci. FOSTER et al. (1942) isolated enterococci from brick cheese. MATTICK and SHATTOCK (1943) found that an English hard cheese containing from 10^4 to 10^7 enterococci did not produce illness. WHITE and SHERMAN (1944) stated the presence of Strept. faecalis in milk is a definite proof of faecal contamination. TITTSLER et al. (1946) found that enterococci organisms were among the bacterial types most frequently isolated from ripened pasteurized milk cheese. OSLER et al. (1948) reported that symptoms of food-poisoning were produced by 2 of 4 strains of Strept. faecalis that have been grown for 5 hours in milk. The incubation periods of enterococci food-poisoning were reported to be 2 hours by BUCHBINDER et al. (1948) and 26 hours by DACK et al. (1949) DACK (1956) described the illness attributed to the enterococci as being milder than that caused by Staphylococci intoxication. The symptoms included nausea, colicy pain, diarrhoea and in some cases vomition. FOSTER et al. (1958) found enterococci in chedder cheese. They reported that these organisms are overgrown in raw milk cheese and as they survive ordinary pasteurization, they may reach considerable numbers and be detected in cheese made from pasteurized milk. In addition, they could isolated Strept. faecalis in great numbers. SHATTOCK (1962) remarked that in cases of enterococcal food-poisoning with short incubation periods vomiting was the dominant symptom, while cases with longer incubation period, the dominant symptom was diarrhoea. DIBBEL and SILLIKER (1963) reported that no instance were any of enterococcal strains fed to volunteers conducive to cause food poisoning symptoms. SLANETZ et al. (1963) stated that enterococci have been used as indices of microbiological quality

and sanitary condition of many different foods. SARASWAT et al. (1965) emphasized the value of enterococcus count as a sanitary index for dairy products. RIEMANN (1969) stated that determination of enterococci as an index of faecal contamnation has proved useful in the analysis of foods. FACKLAM et al. (1970) found that the most accurate presumptive test for recognizing enterococci was with bile-esculin medium. EFTHYMIOU and JOSEPH (1974) found that the enterococci count in chedder cheese was 50×10^3, while in other types of cheese the counts varied from 44×10^5 to 19×10^7 EFTHYMIOU et al. (1974) enumerated the enterococci in different types of cheese, they found that the counts ranged from 13×10^1 to 13×10^4 in chedder cheese and from 30×10^1 to 73×10^7 in other types of cheese.

The main object of the present investigation is to asses the incidence and sanitary significance of enterococci in cheese, marketed in Assiut City.

MATERIAL AND METHODS

Collection of Samples:

One hundred random samples of different types of cheese, (Dammiatta, 50; Kareish, 25 and Hard cheese 25), were used in this investigation for isolation and enumeration, of existing enterococci. Incidence of Strept. faecalis was determined.

All cheese samples were collected from Assiut City markerts. The samples were transferred directly and under sanitary precautions to the laboratory. Each sample was prepared by thorough mashing of soft cheese and cuttting of hard cheese.

Enumeration of Enterococci:

In a sterile morter, II g of the prepared cheese samples were triturated with 99 ml. sterile normal saline solution (40°C) containing 2% sodium citrate, to make a dilution 1:10 (A.P.H.A., 1972). Sterile sand was used for the trituration of hard cheese samples. Ten-folds serial dilutions were prepared.

After through mixing, one ml. of each dilution was carefuly mixed with about 10 ml. of melted and cooled (45°C) Pfiizr Selective Enterococcus medium (PSE) (GELDREICH, 1975).

After solidification, inoculated plates were incubated 36°C for 48 hours. The brownish black colonies that appeared after incubation were counted according A.P.H.A. (1972).

Isolation of Strept. Faecalis:

Strept. faecalis broth tubes (BAILY and SCOTT,1974) were inoculated with cheese samples and incubated at 37°C for 24 hours, before being streaked on both blood and Mcconkey agar plates and incubated for 24 hours at 37°C.

Pure cultures from suspected colonies were prepared for further identification according to BAILY and SCOTT (1974).

From the results obtained, it is evident that the average enterococci counts in different cheese samples examined were 30.94 X 10 for Damiatta, 126.04 X 10^3 for Kareish and 377.16 X 10^3 for Hard cheese (Table 1).

RESULTS AND DISCUSSION

The results obtained are recorded in Table 1 and 2.

As the enterococci organisms grow well in raw milk and can survive ordinary pasteurization process, they were recovered from different types of cheese prepared from raw or pasteurized milk. This finding is in agreement with what has been reported by FOSTER et al. (1942), MATTICK and SHATTOCK (1943), TITTSLER et al. (1946), FOSTER (1958), EFTHYMIOU and

JOSEPH (1974) and EFTHYMIOU et al. (1974).

The incidence percentage of Strept. faecalis isolated from Damiatta, Kareish and Hard cheese samples was found to be 22, 14 and 12 respectively.

The presence of enterococci is considered to have the same significance as Coliforms. The resistance of enterococci to heat, their ability to grow at low temperatures (10°C) as well as their comaratively resistance to salt, concentrations makes them more suitable than Coliforms as indicative of faecal contamination in food products (SLANETZ et al., 1963 and REIMANN, 1969).

Moreover, presence of enterococci in large numbers may at times constitutes a public health hazardf (DACK, 1956; SHATTOCK, 1962 and DEIBEL and SILLIKER, 1963).

REFERENCES

A.P.H.A. (1972): Standard Methods for Examinations of Dairy Products. "13th Ed., American Public Health Association, Washington, D.C.

Baily, W.R. and Scott, E.G.(1974): "Diagnostic Microbiology." 4th Ed., The C.V. Mosby Co., Saint Louis.

Buchbinder, L.; Osler, A.G. and Steffen, G.S. (1948): Studies on enterococcal food poisoning. I- The isolation of enterococci in several outbreaks of food poisoning. Publ. Hlth. Rep. U.S., 63. 109 - 118.

Cary, W.E.; Dack, G.M. and Davison, E. (1938): "Alpha type streptococci in food poisoning. "J. infect. Diseases, 62, 88 - 91.

Dack, G.M. (1956): "Food poisoning. The University of Chicago Press, Chicago.

Dack, G.M.; Niven, C.F.; Kersen, J.B. and Marshall, H.(1949): "Feeding tests on human volunters with enterococci and tryamine." J. Infect. Diseases, 85, 131 - 138.

Diebel, R.H. and Silliker, J.H. (1963): "Food poisoning potentian of the enterococci. "J. Bact., Vol. 85 , April 1963 3No. 4 827 - 832.

Efthymiou, C.J. and Joseph, S.W. (1974): "Development of a selective enterococcus madium based on Manganese ion deficiency, sod. acid and alkaline pH; "App. Microbiol. Vol. 28, No. 3, 411 - 416.

Efthymiou, C.J.; Baccash, P.; Labombardi, V.J. and Epitein, D.S. (1974): "Improved isolation and differentiation of enterococci in cheese. "App.Microbiol.,Vol. 28, No. 3, 417 - 422.

Facklam, R.R. and Moody, M.D. (1970): "Presumptive identification of Group D streptococci, the bile esculine test App.Microbiol., Vol. 20, 245 - 250.

Foster, E.M.; Nelson, F.E.; Speck, M.L.; Doetsch, R.N. and Olson, J.C. (1958): "Dairy Microbilogy. " Macmillan & Co. Ltd. London.

Geldrich, E.E. (1975): "Handbook for evaluating water bacteriollogical laboratories, "2nd Ed. U.S. environmental protection Agency Cincinati, OHIO, 45268.

Linden, B.A., Turner, W.R. and Thom.C. (1926): "Food poisoning from a streptococcus in cheese. "Publ.Hlth. U. S., 41, 1647 - 1652.

Mattic, A.T.R. and Shattock, P.M.F. (1943): "Monthly Bull Emergency public Health Lab. Serv. 2, 73.

Osler, A.G.; Buchbinder, L. and Steffen, G.S. (1948): "Experimental enterococcal food poisoning in man. "Proc. Soc. Exptl. Biol. Med. 67, 456 - 459.

Riemann, H. (1969): "Food-Borne Infections and Intoxication." Academic Press, New York and London. (1969).

Saraswat, D.S.; Reinbold, G.W. and Clark, W.S. (1965): "The relationship between enterococci, coliform and yeast, mold counts in butter." J. Milk Food Technol., 28, 245 - 248.

Shattock, P.M. (1962): "Chemical and biological hazard in foods." (Ayres, J.C.; Snyder, H.E. and Walker,H.W., eds.) pp 303 - 309. Iowa State University Press, Ames, Iow.

Sherman, J.M. and Stark, Pauline (1931): "Streptococci which grow at high temperatures. "J.Bact., 22, 275 - 285.

Slanetz, L.W. et al. (1963): "Microbiological quality of foods." Academic press, New York, N.P.; Walter, H. E.; Sagr, O.S. and Lochry, H.R.(1946): "The effect of quality and pasteurization of milk on the bacterial flora and quality of chedder cheese. J.Bect. ,51, 590.

White, J.C. and Sherman, J.M. (1944): J. Bact., 48, 262 (Cited after Riemann, H., 1969).

Table 1

Average counts of enterococci in different cheese samples

Type of cheese	No.of samples	Incidence of isolation	Count / gm cheese		
			Min.	Max.	Average
Dammiatta	50	70	0	268X10	30.94X10
Kareish	25	100	$30X10^2$	$288X10^3$	$126.04X10^3$
Hard	25	100	$33X10^3$	$111X10^4$	$377.16X10^3$

Table 2

Incidence of Strept. faecalis in cheese samples

Type of cheese	No. of samples	No. of isolates	Incidence %
Damiatta	50	22	44
Kareish	25	14	56
Hard	25	12	48