PROBLEM OF STAPHYLOCOCCOSIS IN POULTRYPROCESSING PLANTS

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ABSTRACT

A total of 180 swabs were collected from broilers in two poultry processing plants in Kaliobia Governorate and examined for the presence of Staph. aureus. The positive isolates of S. aureus from living broilers were 26 (28.88%) including, 9 (30%) from anterior nares, 6 (20%) cloacal swabs and 11 (36.66%) feather swabs. 28 (31.11%) were isolated from slaughtered broilers, from skin of neck, under wing and defeathering machine isolates percentages were 36.66, 16.66 and 40 respectively. Out of 50 swabs gathered from apparently healthy human workers in these poultry processing plants, S. aureus was isolated from 13 (26%), 7 (28%) and 6 (24%) from palm of hands & anterior nares respectively. Enterotoxigenic S.aureus isolates from broilers and man were 29 (53.70%) and 7 (53.84%) of respectively. Enterotoxins were identified by using indirect fluorescent antibody test as 22 strains single producer, 8 (A), 5 (B), 3 (C) and 6 (D) and 7 multiple producer, 2 (A + B + C), 4 (A + C + D) and 1 (B + C) isolated from broilers. While those isolated from human were typed as 6 strains single producer, 3 (A), 1 (B), 1(C) and 1(D) in addition to 1 (A + C + D) as multiple producer.

INTRODUCTION

Staph. aureus strains of that produce enterotoxins are coagulase positive and very few coagulase negative strains are enterotoxigenic. The toxin is performed in the food involved. To date, six types of enterotoxins are known; A, B, C, D, E and F (Bergdoll et al. 1981). Human carrier is the principal reservoir of Staph. aureus (Acha & Szyfres 1989). In Czechoslovakia infected poultry is thought to be one of principal sources of staphylococcal food poisoning (Raska et al. 1980).

Poultry & poultry meat products are consumed in large amounts in all countries. The hygienic measures and microbial status of poultry and poultry product is very interested especially those produced in large quantities in the modern processing plants.

On account of this importance, this study was done to clarify the problem of Staphylococcus in poultry processing plants and human in contact and the relation between enterotoxigenic strains isolated from poultry and human .

MATERIALS AND METHODS

Sampling :

In the present study 180 swabs were collected from (30) apparently normal broilers in two poultry automatic processing plants in Kaliobia Governorate. The swabs were collected from broiler chickens and classified into two groups, I living bird samples (90),

swabs from anterior nares (30), cloacal swabs (30) and feather (30) & II carcass processing samples (90), 30 swabs each from skin of neck after defeathering, under wing and defeathering machine swabs. The swab sampling technique was used after Petterson (1971).

As well as swabs for bacteriological examination were taken under aseptic condition in sterile tube containing brain heart infusion broth from palm of hands and anterior nares of (25) apparently healthy human workers in those poultry processing plants. The collected swabs were labelled & transferred to the laboratory without delay according to Sheila et al. (1967).

Isolation & Identification of Staph. aureus :

The collected swabs were undergone cultivation on Baird - Parker agar (Oxoid) and incubated at 37°C for 48 hrs (Baird - Parker, 1962). Colonies of typical growth were black surrounded by faint yellow zone were picked up and streaked onto brain heart infusion slants for further identification according to Cruickshank et al. 1975) and Baird - Parker (1979).

Detection of Enterotoxins of the Isolated Staph. aureus by Using Indirect Immunofluorescent Technique (IIF) :

1- **Enterotoxin production** : By using the method outlined by Casman & Bennett (1963). The identified Staph. aureus isolates were cultured in trypton soya broth then incubated at 37°C for 24 hours followed by centrifugation at 3000 r.p.m. for ½ hour.

2- **Serodiagnosis by indirect immunofluorescent antibody (IFA)** :
The clear culture supernatant fluids were examined for toxin production using antiserum for detecting individual enterotoxins A, B, C & D. A positive reaction was indicated by fluorescence, visible under an ultraviolet microscope, according to Cohen & Oeding (1962). The reagent used for indirect fluorescent antibody technique was provided by Bio Merieux, France.

RESULTS AND DISCUSSION

Staph. aureus was isolated from 26 (28.88%) of living chicken broilers in poultry processing plants . The positive isolates were 9 (30%) from anterior nares, 6 (20%) cloacal swabs and 11 (36.66%) feather swabs, table (1).

The obtained results were higher than those recorded by *Nahed et al. (1987) and Bertolattii et al. (1996)* and lower than those isolated by *Saitoh et al. (1994) and Eman - Shawki (1998).*

Table (2) showed the isolated Staph. aureus from slaughtered broilers in poultry processing plants was 28 (31.11%), including skin of neck, under wing and defeathering machine as 36.66, 16.66 and 40% respectively.

The positive isolates were higher than those identified by *Bertolatii et al. (1996)* while were lower than those recovered in Cairo from slaughtered chicken by *Eman - Shawki (1998).*

From the results achieved, it is obvious that the defeathering machine was the major site for S. aureus contamination an observation supporting what was noticed by *Dodd et al. (1988).*

Samples were collected from apparently healthy human workers to detect the carrier of Staph. aureus, table (3). Out of 50 swabs Staph. aureus was isolated from 13 (26%), as 7 (28%) and 6 (24%) from palm of hands and anterior nares respectively.A result was higher than that reported by *Goda et al. (1981)* but lower than that found by Williams (1963).

Enterotoxigenic typing was conducted in this epidemiological study to detect the enterotoxigenic strains recovered from man and poultry, table (4) proved that 36 (53.73%) of isolated S.aureus were positive for enterotoxin production. 29 (53.70%) and 7 (53.84%) of S. aureus isolated from chicken broilers and man respectively was enterotoxigenic.These findings were nearly similar to those tested by *Baird - Parker (1971),* and lower than those identified by *Eman - Shawki (1998).*

Enterotoxins were identified by using indirect fluorescent antibody as 22 strains single producer, 8 (A), 5 (B), 3 (C) and 6 (D) and 7 multiple producer, 2 (A + B + C) 4 (A + C + D) and 1 (B + C) isolated from broilers. While those isolated from human were typed as 6 strains single producer, 3 (A), 1 (B), 1 (C) and 1 (D) and 1 (A + C + D) as multiple producer.

These findings substantiate what had been reported by *Bergdoll et al. (1981).* From results achieved it is obvious that enterotoxin A was predominant in Staph. aureus isolated from chicken broilers & man which are in accordance with those reported by *Gibbs et al. (1978)* and *Bergdoll et al. (1981).*

One of the complicating feature associated with staphylococcal food poisoning is that when the organism grow in foods they produce no pronounced odour or taste (*Nickerson and Sinskey, 1972).*

Good hygienic measures are very important at each stage in poultry processing plants to prevent microbial contamination .

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Table (1): Staph. aureus isolated from living chicken broilers in poultry processing plants.

Source of Samples	Swabs number	Positive isolates	
		number	percent
- Anterior nares	30	9	30
- Cloacal swabs	30	6	20
- Feather	30	11	36.66
Total	**90**	**26**	**28.88**

Table (2): Staph. aureus isolated from processed carcass in birds.

Source of Samples	Swabs number	Positive isolates	
		number	percent
- Skin of neck	30	11	36.66
- Under wing	30	5	16.66
- Defeathering machine	30	12	40
Total	**90**	**28**	**31.11**

Table (3): Staph aureus isolated from human workers in poultry processing plants

Source of samples	Swabs number	Positive isolates	
		number	percent
Palm of hands	25	7	28
Anterior nares	25	6	24
Total	**50**	**13**	**26**

Table (4):Enterotoxigenic S.aureus strains isolated from chicken broilers and workers in poultry processing plants.

Staph. aureus	Broilers		Workers		Total	
Tested strains	(54)		(13)		(67)	
	No.	%	No.	%	No.	%
Enterotoxigenic strains	29	53.70	7	53.84	36	53.73
Type of toxins						
A	8	27.58	3	42.85	11	30.55
B	5	17.24	1	14.28	6	16.66
C	3	10.34	1	14.28	4	11.11
D	6	20.68	1	14.28	7	19.44
A + B + D	2	6.89	0	0	2	5.55
A + C + D	4	13.79	1	14.28	5	13.88
B + C	1	3.44	0	0	1	2.77

الملخص العربى

مشكلة مرض الميكروب العنقودى فى مجازر تصنيع الدواجن

نشوى عثمان خليفه

تم تجميع عدد ١٨٠ مسحه من الدواجن فى مجازر التصنيع بمحافظة القليوبيه وأجريت التجارب لعزل الميكروب العنقودى . عزلت عترات من الميكروب العنقودى من الدواجن الحيه والمذبوحه بنسبة ٢٦ (٢٨,٨٨%) و ٢٨ (٣١,١١%) على التوالى . تم تجميع ٥٠ مسحه من العمال بهذه المجازر وصنفت ١٣ (٢٦%) عتره من الميكروب العنقودى .

تم الكشف سيرولوجيا لهذه العترات المعزولة من الدواجن والإنسان باستخدام اختبار الفلورسنس غير المباشر لتصنيف أنواع السموم المنتجة . وجدت نسبه ٢٩ (٥٣,٦٠%) و ٧ (٥٣,٨٤%) من الميكروب العنقودى المعزولة من الدواجن والإنسان على التوالى كانت منتجه للسموم ووجد أن بعض الميكروبات أنتجت نوع واحد من السموم وأخرى أنتجت عدة أنواع .