



Assiut University



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# **Staphylococci in table eggs and some egg based products**

*Thesis presented  
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## Summary

A total of 70 random eggs samples (each 5 eggs) collected from balady and farm hens eggs, 35 from baladi hens, and 35 from poultry farms and 150 samples of egg-based products including cream caramel, cream cake and mayonnaise (50 each) were collected from different localities in Assiut City, Egypt. These samples were examined for the occurrence of *Staphylococci*.

The present study revealed that table eggs were contaminated with a high rate of *Staphylococci*, which were isolated from balady eggs shells and contents, poultry farm eggs shells and contents in 28 (80%), 17(48.57%), 32 (91.43%) and 22 (62.86%), respectively. On the other hand, egg-based products were contaminated with *Staphylococci*, which the contamination in cream caramel samples was in a percentage of 84% and in cream cake samples was 100%, respectively. In contrast mayonnaise samples were free from *Staphylococcus* contamination.

Coagulase positive in the examined samples were isolated from 22 (78.57%), 15 (88.24%), 5(15.63%), 3 (13.64%), 8 (19.05%) and 23 (46%) samples recovered from balady hen's eggs shells , balady hen's eggs contents, farm hen's eggs shells and contents , cream caramel and cream cake, respectively. It was clear that higher percentage of CPS contamination than coagulase negative *Staphylococci*.

The results revealed that coagulase positive *S. aureus* contamination in balady hen's eggs shells were 62.86% , and in balady eggs contents were 42.86% , with mean values  $2 \times 10^4$  and  $6.3 \times 10^2$  cfu/g, respectively.

In case of farm hens' eggs the results indicated that *S. aureus* contamination was 14.29% , 8.57% in shells and contents, respectively. The mean values in shells and contents were  $1.5 \times 10^3$  and  $1.6 \times 10^2$  cfu/g , respectively. These results revealed that *S. aureus* contamination in farm eggs were higher than balady eggs.

Regarding to egg-based products, *S. aureus* contamination in cream caramel samples was in a percentage of 16% and in cream cake samples was 46%, with a mean values  $3.1 \times 10^3$  and  $6.1 \times 10^4$  cfu/g. On the other hand, mayonnaise samples were free from *S. aureus* contamination. It was clear from the current study that cream cake samples were the highest contaminated with *S. aureus*.

Using PCR, the obtained results revealed that all isolates taken from samples of balady hen's eggs shells and contents, farm hen's eggs shells and contents , cream caramel and cream cake ,respectively were confirmed to be *S. aureus* by identification of 16S rRNA gene in a percentage of 100%.

Also by using PCR, the identified *S. aureus* strains were then examined for the presence of SEA and SED enterotoxin genes as they are the most common ones. It was clear that 3 out of 18 strains harbored SEA and SED genes which, 2 (11.11%) carry SEA gene in which 1(33.33%) from balady eggs samples and 1(33.33%) from cream cake samples. In addition to cream cake samples harbor SED gene in a percentage of 1(33.33%) .

Concerning the incidence of MRSA it was found that 2 (5.71%), 1(2.86%), 1(2.86%), 3 (6%) and 9 (18%) of balady hen's eggs shells, contents, farm hen's eggs shells , cream caramel and cream cake ,respectively using ORSB medium .

The results of PCR identification of MRSA strains *mecA* gene from examined eggs and some egg based products samples were 1(6.25%) strain which recovered from farm hen's eggs shells samples. The molecular confirmed MRSA strain recovered from farm hens eggs shells was examined for detection of enterotoxin genes (A & D) by PCR. The results indicated that it was enterotoxogenic to SEA encoding gene .

In the experimental part it was clarified, that boiling eggs for 12 minutes was enough to destroy the inoculated *S. aureus* . Applying the open frying on one side, *S. aureus* could be destroyed at 12 minutes and could be isolated when fried for 1 and 4 minutes.

The public health hazards of *Staphylococci* including *S. aureus* were discussed and the suggestive measures to protect the consumers and to produce high quality eggs and egg products were also discussed.