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Studies on Arcobacter species in table eggs and some egg-based products

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Summary

In the present study the prevalence of ***Arcobacter*** spp. was determined in 150 egg samples including balady hen's eggs and farm hen's eggs (75 samples each as every 5 eggs constitute one sample) and in 90 samples of egg-based products including mayonnaise, cream cake and crème caramel (30 each) that were collected from different localities in Assiut City, Egypt.

Arcobacter was recovered from 18.7% of balady hens' egg shells and could be isolated from egg content in a percentage of 13.3% using Arcobacter selective agar (ASA) supplemented with CAT supplement. The identified species were ***A.butzleri*** which could be isolated only from 5.33% of egg shell samples and failed to be detected in egg contents, ***A. skirrowii*** with a percent of 8% from each of egg shell and egg contents and ***A. cryaerophilus*** which could be isolated from 5.33% of each egg shell and egg contents.

In case of farm hens' eggs, ***Arcobacter*** spp. isolates represented 9.3 and 2.7% from egg shells and contents, respectively. The recovered isolates were ***A.butzleri*** with a percentage of 1.33% from egg shell samples and not detected in egg contents, ***A. cryaerophilus*** was detected in both shell and contents in a ratio of 1.33% for each and ***A. skirrowii*** with percentages of 6.7 and 1.33% from egg shell and contents, respectively.

Regarding to egg-based products, ***Arcobacter*** spp. were existed in in 5 (16.7%) of the examined mayonnaise samples. In addition, ***A.***

cryaerophilus and ***A. skirowii*** were isolated from the positive samples in incidences of 6.7 and 10%, respectively. While ***A. butzelri*** was not detected in the examined samples.

The incidence of ***Arcobacter*** in the examined cream cake samples was 6.7%. However, ***A. cryaerophilus*** was the only identified species from positive samples (6.7%).

Moreover, ***A. skirowii*** was the only identified species of the isolated ***Arcobacter*** strains from the examined crème caramel samples with a ratio of 10%.

The identified ***A. butzleri*** strains were subjected to confirmation by using PCR and the results were compatible with the biochemical identification.

In the present study, PCR was carried out for screening of some putative virulence genes in the isolated ***A. butzleri*** strains. The obtained data revealed that the detected genes were cadF and pldA in one strain and cadF only in another strain. The gene ciaB gene could not be recovered from any tested strain, while, there were 3 isolates did not carry any of the studied virulence genes.

The effect of propolis and chitosan on survival of ***A.butzleri*** was evaluated by coating of egg shells with different concentrations of both (4 and 8% propolis; 2 and 4% chitosan) following the shells inoculation with the previously isolated and identified ***A.butzleri*** carrying cadF and pldA genes to yield a concentration of 1×10^8 cfu/egg shell. The eggs stored in refrigerator at 5 ± 1^0C. ***A.butzleri*** counts were determined at 0,

2, 4, 7, 9, 11, 13 and 15 days. Propolis 8%, chitosan 2% and propolis 4% caused significant ($P < 0.05$) drop in ***A. butzleri*** count and propolis 8% effect was the highest.

The results indicated high potential of propolis and chitosan as antibacterial and disinfectant agents, suggesting their potential application as egg decontamination and disinfection for safe prolonged storage shelf life.

The public health hazards and the recommended measures required to prevent contamination of eggs and its products by ***Arcobacter*** were discussed.