

EVALUTION OF CONTAMINATION STATUSE IN IMPORTED AND LOCAL TABLE EGGS

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ABSTRACT

This study was conducted to detect the contamination in the local and imported table eggs, and the comparison between them of contamination. Samples were collected from local markets taking 60 samples of both types (30 local eggs and 30 imported eggs) these samples were sent to a laboratory of microbiology / College of Veterinary Medicine / University of Baghdad .then taking swabs from the different of eggs shells samples for both types (local and imported eggs) then bot swabs in nutrient broth to be grown bacteria in the nutrient broth). (After that samples were taken from the nutrient broth) and then cultured in the (nutrient agar, macconky agar). The results showed the presence of bacterial growth (*E. Coli* gram negative on the macconky agar) in the samples that have been taken from local eggs. While the results showed the samples that were taken from imported eggs indicate the presence of bacterial growth ((bacteria gram positive. *Staphylococcus spp.*), (*Streptococcus spp.*)) as well as bacteria bacilli gram negative growth on the nutrient agar. While the results of bacterial count showed the presence of bacterial growth more in imported eggs compared to local eggs ,Imported eggs(B) (8.6×10^6 log cfu / ml). Compared to the totals local egg (A) where the results (2.1×10^4 log cfu / ml). (Table no.1) .The results appear of high contamination in imported eggs compared with local eggs.

Ke words: local market, imported, veterinary, bacteria

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تحديد حالة التلوث ببيض الدجاج المحلي والمستورد

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المستخلص

اجريت هذه الدراسة للكشف عن مقدار التلوث الحاصل في بيض المائدة المحلي والمستورد والمقارنة بينهما في مقدار التلوث حيث تم اخذ 60 عينة من كلا النوعين (30 للبيض المحلي و30 للبيض المستورد) ونقلت العينات الى مختبر فرع الاحياء المجهرية/ كلية الطب البيطري/ جامعة بغداد. حيث تم اخذ مسح مختلفة من قشور عينات البيض (للبيض المحلي والمستورد) وتم تنمية البكتريا المراد الكشف عنها في ال (nutrient broth) بعدها تم اخذ عينات من ال (nutrient broth) وتم زرع العينات في (nutrient agar , macconky agar). حيث اظهرت النتائج وجود نمو بكتيري (لبكتريا نوع *E. Coli* gram negative على وسط ال (macconky agar) لعينات التي تم اخذها من البيض المحلي. بينما اظهرت النتائج للعينات التي تم اخذها من البيض المستورد وجود نمو بكتيري للبكتريا (نوع . *Staphylococcus spp.* gram positive) (*Streptococcus spp.*) بالإضافة الى بكتريا bacilli gram negative على وسط nutrient agar. بينما اظهرت نتائج العد البكتيري وجود نمو بكتيري بنسبة اكثر في البيض المستورد مقارنة بالبيض المحلي.

كلمات مفتاحية: المحلي، المستورد، بكتريا، البيطرة

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INTRODUCTION

Foodborne infection could be a noteworthy open wretchedness and furthermore the principle purpose behind diarrheic illnesses moving all created and creating nations (2). Table eggs zone unit the least difficult and basic supply of sustenance, containing quality protein, fundamental amino acids, basic vitamins and minerals required for a good wellbeing (14). Asia is that the biggest egg producing area with 65% of world yields (7). A joined offer of egg creation from China, Asian country and Japan territory unit over 46th. Notwithstanding, China itself is that the most loved of the most astounding 10 nations that have given 38th of the world's eggs request in 2011, (16) Eggs have normal weaponry against the polluting organisms, similar to fingernail skin, Ca relentless shell and shell film (11). The egg white contains numerous fixing proteins that have antimicrobial properties, especially the lysozyme. Ovomuroid is another proteinase that represses the energy of microorganism to utilize the protein in egg whites. Likewise, the pH in egg white that is concerning 9– 10 and furthermore the viscosities of the fixing don't appear to be suitable for microorganism development (8). Egg might be defiled at each egg shell and egg contents by variety of organisms with a wide range of pathogens like *Campylobacter jejuni*, *Escherichia coli*, and especially enterobacteria(3)(18). *Staphylococci* square measure commonest bacterium debasing eggshells. Sullyng is a considerable measure of most likely associated with split egg, messy shells and capacity in tainted environment. It might be sullied all through development and birthing technique (1) The regular covering tainting expanding the probabilities of egg substance pollution by infiltration (10). Microorganism tainting will occur at 3 fundamental segments of (egg supplement, egg whites and shell film/egg shell). *Salmonella enteritidis* is prepared to attack the cells of the follicles previously natural process and increase themselves when 2 h of contamination (10). Eggs square measure thought of to be a medium to okay sustenance for foodborne disorder which may wind up plainly polluted with bacterium, similar to enter bacteria and option enteric

pathogens (5). the premier regular foodborne pathogens related with sustenance of creature cause unit enteric microscopic organisms, *Campylobacter*, *listeria*, *staph aureus* and *E. coli* O157 (9). In current examination a review was directed for identification of oxygen consuming creature stack and conjointly the pathogens on eggshells and in egg substance. The pathogens were what's more inspected for its antibiotic gram think about. The objective of this investigation was to 1-decide the sullyng of egg shell. 2-Copmared defilement amongst local and outside eggs. 3-Total life form check assurance ..

collection: A total of 60 random chicken table eggs as a sample (30 local eggs, 30 imported eggs) were collected from markets in Baghdad town. The samples were collected in sterile Plastic instrumentality and transported aseptically to the laboratory of dept. Microbiology/ within the college of veterinary medicine, University of Bagdad, and divided into 2 groups (local and imported groups). Each group of eggs examined.

Preparation of samples for microbiological examination :- There were 2 groups of the examined samples:-

Total bacterial count determination:- For surface bacterial contamination, a swab technique was applied. (12). The surface of whole egg was swabbed aseptically with sterile cotton swab then genteel on nutrient agar and incubated aerobically at 37°C for 24 hrs. For the enumeration of bacterium in egg shell, customary pour plate technique is employed .The samples were 1st swaybacked in 0.1% W/V buffered peptone water then incubated aerobically at 37°C for 24 hrs.. 1ml of genteel broth was serially diluted in 9ml (0.1%wt/v) buffered peptone, Take 0.1ml of 10^{-4} , and 10^{-6} dilutions in (duplicate) of inoculant within the petri plates to that culture medium having temperature around 45 -50°C and blend totally by rotating plate dextral and anticlockwise for five times .Allow the plates to solidify and so keep the plates for incubation at 37°C for 24-48 hrs. Colonies once period were counted.

Total Count of bacterium (CFU)/ml =mean colony culture X dilute factor⁻¹.

Physiological and organic chemistry characteristics of check organism gram staining:-

A clean glass slide was taken, a skinny smear of every culture was created and warmth mounted. The smear was accorion with crystal violet for one minute and washed with water. Then smear was flooded with Grams Iodine for 30 seconds and washed with water, decolorized with 95th alkyl radical alcohol and washed with water in real time and flooded with safranine for 30 seconds and once more washed with water. The smear was ascertained beneath the oil immersion objective.

RESULTS AND DISCUSSION

This results showed the presence of microorganism contamination in local and imported egg after it's been taking a swap from egg shells having done the event of bacterium within the (nutrient broth) and so placed in an exceedingly nutrient and Macconkey agar were development on agar Macconky agar as represented within the Ffigure (1) wherever the local eggs pollution was cleared bacterium (*E. coli* bacilli gram negative), results showed the presence of bacterial growth evident at the local egg shells bacterium from culture medium (bacillus spp.) Figure (2) whereas showed contamination with imported eggs results the presence of bacterial growth on the Agar (nutrient) it had been clearly the sort of contamination with bacterium (staphylococcus aureus) With relation to imported eggs, the results show the presence of microorganism growth and clear the sort of bacterium (staphylococcus & bacilli) Figure (3).while show bacterial contamination (streptococcus spp. gram positive) Figure (4.) Regarding the microorganism count local eggs and imported Table (1) wherever the results showed the presence of microorganism contamination is clear in imported eggs wherever the bacterial count for totals imported eggs (B) (8.6×10^6 log cfu / ml)and count of *E. coli*. (4.26 ± 0.096)Compared to the totals local egg (A)

wherever the results (2.1×10^4 log cfu / ml) and count of *E. coli* (2.23 ± 0.036) respectively. Total ranges of bacterial were isolated from the samples eggshells. The egg shell isolates were known as happiness to the Enterobacteriaceae family. The 1 isolates were from local egg and 3 from imported egg, severally, wherever the 2 isolates were Gram's positive and one Gram's negative. Gram's positive bacterium will tolerate dry and harsh conditions and is gift in mud, soil and excretion that is that the major reason of its presence on eggshells (6). The total aerobic count vary of bacterium on eggshell was (2.1×10^4 log cfu/ml) in local egg, whereas (8.6×10^6 log CFU/ml) in imported egg samples. Only 1 egg sample contents from imported egg was found contaminated with 3.0 log CFU/ml of aerobic bacterium. All isolates were happiness to totally different genus, enclosed *E. coli*, staphylococcus spp., strep spp., Bacillus spp., Staphylococcus spp. was preponderantly found associated to eggshell. (4)Rajmani reported bacterium of an equivalent genus from eggs in their studies. Abdullah (1) reported the very best degree of eggshell contamination with gram-positive bacterium notably coccus spp. foreign Eggs in clean surroundings contained a lot of bacterium than native eggs in dirty surroundings (17). The encompassing surroundings and storage condition together with temperature and storage length will influence the amount of bacterial contamination (19). Board and Tranter (7) reported that the amount of contamination on egg shells have a good vary of variation from log 2 to log 7 colony forming unit (cfu) of bacterium per shell. during this study the samples from imported egg were found preponderantly contaminated with aerobic bacterium. Our results are agreement with the results of (15) Less contamination of *E. coli* spp. was found in egg shell in local egg compared with imported eggs during this study. (Table 2)

Table 1. The means of total bacterial count in local and imported Chicken egg shell samples

Treatment	Chicken egg samples	NO. of samples	Means of total bacterial count log c.f.u. / g.
1	Local A	10	2.1×10^4
2	Imported B	10	8.6×10^6

Table 2. The means count of *E. coli* in local and imported Chicken egg shell samples

Treatment	Chicken egg samples	NO. of samples	The Means count of <i>E. coli</i> log c.f.u. / g. Mean \pm S.E.
1	Local A	10	2.23 \pm 0.036
2	Imported B	10	4.26 \pm 0.096



Figure 1. Local and imported egg appear *E. coli* gram negative bacilli from macconkey agar. (100X)

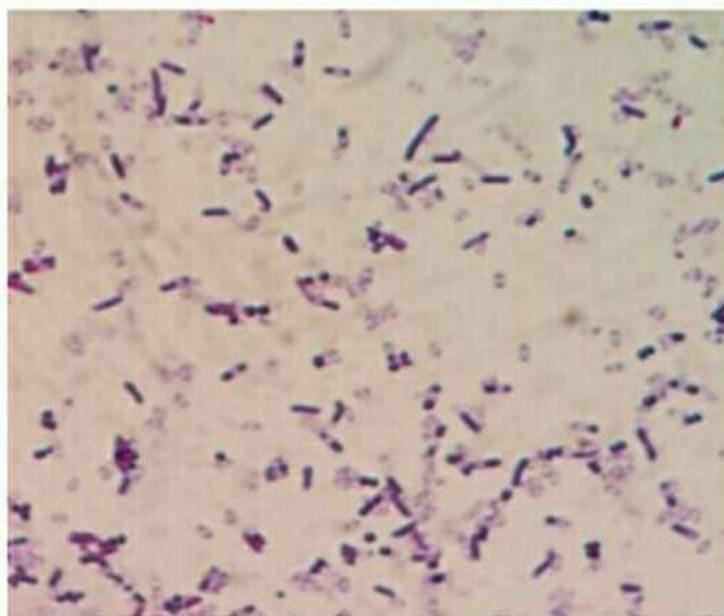


Figure 2. local egg appears bacillus spp. we see some bacteria from spore. (100X)

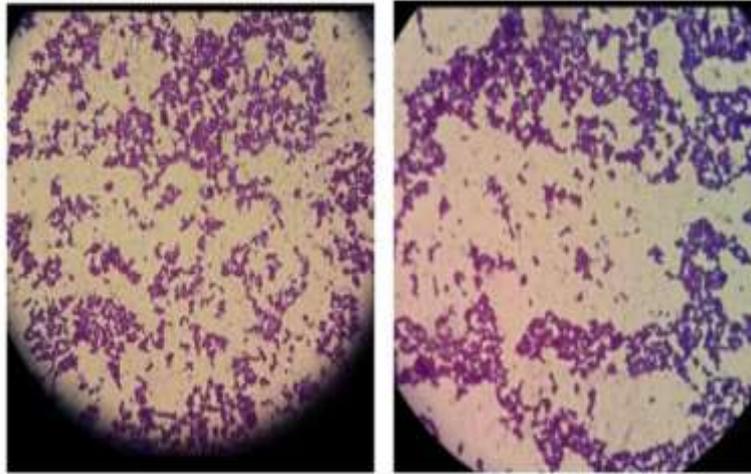


Figure 3. bacilli gram negative *Staphylococcus aureus* from imported egg (grape like)

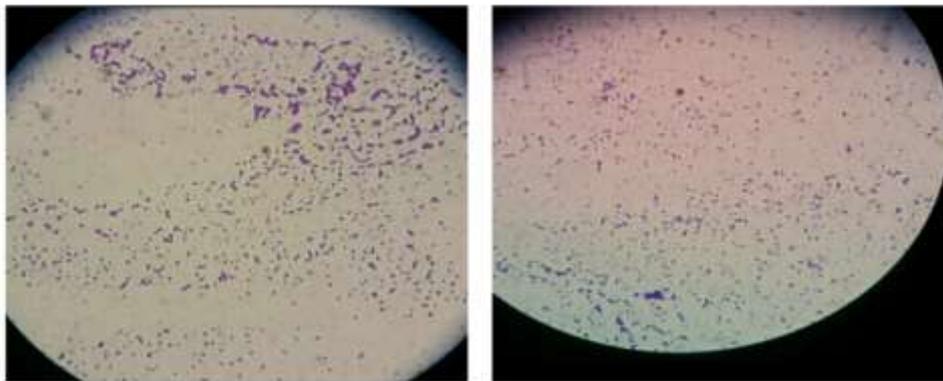


Figure 4. imported egg have result from nutrient agar appear *streptococcus* spp. gram positive. (100X)

It was closed inside the examination that eggshells are prevalently defiled with Gram's certain and Grams negative bacterium .The pollution was to a great extent from cultivating environment and capacity conditions. Amid this examination found the local eggshells were less defiled when contrasted with imported eggs. Bacterium likes Bacilli, staphylococcus spp. what's more, streptococcus spp. found in imported eggs.

REFERENCES

1. Abdullah, I. N. 2010. Isolation and identification of some bacterial isolates from table egg. *Journal of Veterinary Science*. 3(2): 59–67
2. Akbar, A. and K. A. Nal, 2014. Zinc oxide nanoparticles loaded active packaging a challenge study . of *Salmonella* and *Staphylococcus aureus* in poultry meat. *Asian Pacific Journal of Tropical Biomedicine*. 3(2): 163–168
3. Board, R.G. and H.S. Tranter, 1995. The Microbiology of Eggs. In: W. J. Stadelman

and Cotterill O. J. (eds). *Egg Science and Technology*. 4th ed. Haworth Press Inc. New York.

4. Bruce J. and E.M. Drysdale. 1994. Trans-shell transmission. *Microbiology of the Avian Egg* (Board RG and Fuller R, eds), Chapman and Hall, London. UK. pp: 63–91
5. Chousalkar K.K., P. Flynn , M. Sutherland , J.R. Roberts . and B.F. Cheetham F. 2010. Recovery of *Salmonella* and *Escherichia coli* from commercial egg shells and effect of translucency on bacterial penetration in eggs. *International Journal of Food Microbiology*. 142: 207–213
6. De Reu K., M Heyndrickx, K. Grijspreedt., B Rodenburg, F Tuytens., M Uyttenaere., J Debevere. and L Herman. 2007. Estimation of the Vertical and Horizontal Bacterial Infection of Hen's Table Eggs. XVIII European Symposium on the quality of Poultry Meat XII European Symposium on the Quality of Eggs and Egg Products-Conference

proceedings, Prague. Czech Republic pp : 55-56

7. Ernst C. 2009. Asia dominates in egg consumption. Sanovo Staalkat group, Sjanghai, China. <http://www.worldpoultry.net/Layers/Eggs/2009/8/Asia-dominates-in-egg-consumptionWP006947W/>.

8. Froning G.W. 1998 . Recent Advances in Egg Products Research and Development. University of Nebraska-Lincoln

9. Ghasemian S. 2011. The prevalence of bacterial contamination of table eggs from retails markets by *Salmonella* spp., *Listeria monocytogenes*, *Campylobacter jejuni* and *Escherichia coli* in Shahrekord, Iran. Jundishapur Journal of Microbiology. 4(4): 249–253

10. Howard Z .R., R.W.Moore., I.BZabala-Diaz., K.L.Landers., J.A Byrd.,L.F. Kubena., D.J Nisbet ., S.G Birkhold, and S.C.Ricke., 2005. Ovarian laying hen follicular maturation and in-vitro *Salmonella* internalization. Veterinary Microbiology, 108: 95–100

11. Jerzy R. and Dagmara, S.P. 2009. Antimicrobial Defense Mechanisms of Chicken Eggs and Possibilities for their Use in Protecting Human and Animal Health. Division of avian diseases, Institute of Biological Bases of Animal Diseases University of life Sciences in Lublin.

12. Loongyai W.,b Wiriya. and N. Sangsawang . 2011. Detection of *Salmonella* and *Escherichia coli* in egg shell and egg content from different housing systems for laying hens. International Journal of Poultry Science. 10(2): 93–97

13. Messens W., K.Grijpspeerdt and L Herman. 2006. Eggshell penetration of hen's eggs by *Salmonella enteric* serovar enteritidis upon various storage conditions. British Poultry Science. 47: 554–560

14. Ministry of Agriculture, Fisheries and Food (MAFF, UK). 2009. The Egg Quality Guide. Department for Environment Food and Rural Affairs(DEFRA),<http://archive.defra.gov.uk/oodfarm/food/industry/sectors/eggspoultry/eggs.htm>.

15. Nordenskjöld, J. 2010. Study of Microflora on Egg Shells in Egg Production in Jordan. Independent Project/Degree Project in Food Science Uppsala Biocenter University of Agricultural Sciences

16. Peter B. 2011. Majority of Eggs Worldwide Produced by 15 Countries. Executive Guide to World Poultry trends.pp : 31–35

17. Rajmani R.S. and S.P.Verma 2011. Microbial flora of eggs and egg contents from organized and unorganized poultry farms. Indian Journal of Veterinary Research. 20(1): 73–76

18. Ricke S.C., S.G Birkhold and R.K.Gast .2001. Eggs and Egg Products. In Compendium of Methods for the Microbiological Examination of foods, 4th E.D. Downs F. P. and Ito K. eds. American Public Health Association ,Washington, D.C.pp: 473–479

19. Stepien P.D. 2010. Occurrence of Gram-negative bacteria in hens' eggs depending on their source and storage conditions. Polish Journal of Veterinary Sciences. 13(3): 507 – 513.