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Some quality characteristics of eggs marketed in North of West Bank (Palestine)

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SUMMARY

A total of 720 eggs were purchased from three different places : supermarkets, public markets, and broiler selling shops, were examined for shell cleanliness, Haugh unit, yolk color, and shell thickness. Price per kg egg mass was also calculated for the three different consumer channels mentioned above.

Source of eggs found to have a significant effect on egg weight, Hugh unit and price per kg egg mass. Eggs obtained from super markets had significantly ($P < 0.05$) the lowest weight, the highest ($P < 0.01$) percentage of weight class 'small' and 'pewee[1], and stained, checked eggs. Similarly, eggs from super markets had the lowest interior quality. However, these eggs were of more shell thickness and the more prices per egg mass unit.

Most of the eggs tested were of grade (AA) in regard to the interior quality. However, eggs obtained from the broiler selling shops had the highest percentages of the 'jumbo' and the 'extra large' grades.

KEY-WORDS : eggs - consumer channels - interior quality - egg grades.

RESUME

Qualites des teufs commercialises dans le West Bank (Palestine). Par J.M. ABO OMAR et R.O. AREF.

Sept cent vingt ceufs ont ete achetes dans trois reseaux de distribution differents : supermarches, marches et volaillers, afin d'etudier les caracteristiques suivantes : proprete et epaisseur de la coquille, couleur du jaune d'ceuf ainsi que le prix au kilo.

II existe une difference significative pour le poids et le prix au kilo selon la provenance des ceufs. Les œufs de supermarche etaient les plus petits, les plus sales et de moins bonne qualite. Cependant ces ceufs avaient la coquille la plus epaisse et le meilleur prix.

La plupart des œufs etaient de categorie A, les œufs des volaillers etant les plus gros.

MOTS-CLES : oeufs - reseaux de distribution - qualite des oeufs.

Introduction

Quality variations of eggs available to consumers have been reported by many investigators [11, 12, 15, 10, 7, 1, 9, 3]. However, little is known about the quality of eggs offered to consumers in Palestine.

Locally, there are many sources where eggs can be purchased. However, the most important consumer channels are the super markets, the public (central) markets that located in local cities, and the shops that keep broilers for slaughter.

The objective of this study was to shed light on the quality of eggs offered to consumers in the north part of the West Bank. The quality components taken into consideration were egg weight, shell cleanliness, Haugh unit, yolk color, and shell thickness.

Materials and Methods

A total of 720 eggs were purchased from three consumer channels : super markets, public markets and broiler selling shops. A random sample of 120 eggs was obtained twice from each source at one-week interval during winter. Eggs were mainly sold per tray (30 eggs each) with no grade indicated on them. All eggs collected were immediately weighed individually to the nearest gram and checked for shell cleanliness.

Eggs were thereafter broken and Haugh unit values [6] were directly calculated using micrometer adjustable to egg weight and directly gives Haugh unit value [14]. The color scale measured yolk color [4], which contains 15 graduations from very pale yellow to deep yellow. Shell thickness, expressed in millimeter was obtained at the middle part of the shell using a dial touch micrometer.

Eggs were graded according to USD A standards [13] in respect to the studied quality components.

The price per kg eggs in US dollars was also calculated for each source.

Data collected were subjected to statistical analysis using (SAS) general linear procedure [5] and chi-square test was performed on two-way tables of grade percentage.

Results and discussion

Statistical analysis showed a significant source effect on eggs weight, Haugh units, shell thickness and price per kg egg mass.

Eggs purchased from broiler selling shops and pupil markets had significantly ($P < 0.01$) higher means weight than those purchased from supermarkets (Table I). These results were similar to those reported by ALSOBAYEL [3] and NORTH [9], and higher than that of ALSOBAYEL [3] for commercial layers.

The percentage distribution of weight classes and shell

Parameter	Consumer Channels		
	Supermarkets	Public markets	Broiler selling shops
Egg weight (g)	59.8 (.34)b	60.8 (.29)b	61.4 (.30)b
Haugh unit	77.8 (.60)a	82.8 (.50)b	85.9 (.50)c
Yolk color	10.7 (.10)a	10.5 (.05)a	10.4 (.09)a
Shell thickness (mm)	39.5 (.26)a	37.6 (.10)b	37.2 (.19)b
Price/kg egg ($)	1.93 (.06)b	1.86 (.10)b	1.87 (.04)b

Means within the same row with different superscripts differ significantly ($P < 0.01$).

TABLE I. — Means and standard errors of weights, Haugh units, yolk color, shell thickness and price per kg mass of eggs.

Egg weight classes %*	Consumer Channels			Mean
	supermarkets	Public market	Broiler selling shop	
Jumbo	3.3	2.5	4.16	3.32
x-large	12.08	13.3	15.14	13.51
Large	31.25	36.6	43.33	37.08
Medium	35.0	36.25	26.66	32.63
Small	14.16	9.58	8.33	10.69
Pewee	4.11	1.66	2.08	2.63

Chi- square probability percentages are equal is .05
* These classes resembles the European classes S, A, B, C, D, and E, respectively

TABLE II. — Distribution of weight classes (%) of eggs obtained from various consumer channels.

Shell character %	Consumer Channels			Mean
	Super markets	Public markets	Broiler selling shops	
Clean	56.6	63.3	66.2	62.0
Dirty	40.8	26.6	23.7	30.4
Checked	2.5	10.0	10.0	7.5

Chi-square probability that percentages are equal is .001

TABLE **III.** — Distribution of eggs (%) purchased from various consumer channels in respect to their shell characteristics.

Haugh unit value	USDA grade %	Consumer C lannels			Mean
		Supermarkets	Public markets	Broiler selling shops	
>72	AA	73.7	85.5	96.2	86.5
60-72	A	20.4	10.0	3.7	11.8
31-60	B	5.4	.41	0	1.9
<31	C	0	0	0	0

Chi- square probability that percentages are equal is .0001

TABLE IV. — Haugh unit values and grade distribution (%) of eggs purchased from various consumer channels.

cleanliness and soundness grades are shown in tables II and III, respectively. Chi-square test indicated that those percentages were significantly ($P < 0.01$) unequally distributed among and within the different sources. Most of the eggs purchased were of the class 'large' when judged by USDA standards. These results were similar to those reported by ALSOBAYEL [3]. The percentages of 'medium' and lower, were much higher than those reported by NORTH [9], and similar to that of ALSOBAYEL [3].

Eggs purchased the broiler selling shops had higher percentages of 'jumbo' and 'extra large' weight classes than that of eggs purchased from supermarkets and the public markets.

Eggs purchased from supermarkets had the highest percentages of weight classes 'small' and 'pewee', and the highest percentage of stained and checked shells. The higher means of Haugh units compared to the other two sources, while the eggs obtained from public market ranked in the second place.

Haugh unit values were similar to those reported by another study [8], but higher than those reported by a third study [3]. Chi-square test showed that grade percentages were significantly ($P < 0.01$) unequally distributed among and within the various consumer channels (Table IV).

A high percentage of eggs tested were grade (AA) as judged by USDA standards, in respect to the interior quality. Yolk color of eggs obtained from different sources had similar score which is similar to the scores reported by ALSOBAYEL [3].

Eggs obtained from supermarkets had lowest weight compare to other sources but the highest price per kg egg mass.

With respect to shell thickness, there was a significant source effect ($P < 0.01$). Eggs purchased from supermarkets had the highest mean values in this regard.

From the results reported, it seems that most of eggs available to consumers in the place of the study are of good internal and external qualities. However, eggs in all sources were not subjected to any kind of grading system.

An explanation for these accepted and reasonable egg qualities is the time of execution of this study, which was during winter. The low weather temperatures during winter help eggs to have good characteristics for longer periods compared to summer conditions.

There is a need for more detailed studies during the whole seasons to determine the factors leading to deterioration of eggs before they reach consumers.

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