SUST
Journal of Agricultural and Veterinary Sciences
Journal homepage:
http:// journals.sustech.edu

Marketing Activities and Egg Cracks in the Marketing Chain and Disposal Methods in Khartoum State Groceries

Hashim Dufar Nogr[1], Osama E.Yassin[2], Manahil El Tigani[2] and Mohamed T Ibrahim[2]*

1- University of Upper Nile, 2- Sudan University of Science and Technology.
* Corresponding author mohdtageldin@hotmail.com

Received: Junuary 2020 **Accepted: May 2020**

Abstract

During the period February – April 2016 this survey study was conducted in Khartoum State on the marketing activities and egg cracks in the marketing chain and methods of disposal of cracked table egg. This is by considering similarities in the marketing chain and merits of each locality with reference to 1980 population census and the population density of each locality. From these data 40 groceries were randomly selected from Khartoum, 30 from Omdurman and 20 from Khartoum North. Questionnaires, interviews and personal observation were used for data collection on personal characteristics, commercial and marketing activities, pricing, transportation, egg cracks and methods of disposal of cracked egg. Data was analysed using descriptive statistic.

The main finding were that pricing Policy was based on supply and demand, egg purchase on external appearance, price competition not considered, consumers prefer buying by dozen while grocery owners prefer selling by tray. The source of egg was almost equal between companies and farm units, The storage period was 2 -14 days. Egg transport by company cars or open cars or rough roads. Display methods, mostly in open verandas and some good portion on the ground. Some of these commercial activities are conductive to egg damage and for breakage.

For cracked egg some total of 18.9% indicate high. For cracked egg disposal it was mostly by away from the farm (32.2%) and 13.3% by garbage car which poses environmental and health hazards. The study indicated no relationship or correlation between either the educational level or SSMO type of information and the method of cracked egg disposal. The study noted complete absence of any extension programs or any regulatory presence of any official body or institution for cracked egg disposal treatment.

Keywords: Cracks – Disposal – Chain – Economic Loss – Display Method

Introduction

Poor shell quality and cracked or broken eggs cause huge loss and cost to the producer including uncollected eggs of cracks, broken or shelless eggs that break before the intended use. Cracks and egg breakage occur starting from, the hen itself, during lying, at collection, moving in the belt, on packing and storing, during transport and at further handling. Gupta (2008) estimated that more than 10% of eggs produced in the hen house are uncollectable or break before use. The

first 2 -5 % lost in the farm and 2-3% during collection, on belt, cleaning, packing and transport. He found significant, correlation between egg shell strength and likelihood or breakage in the production chain. He concluded that packaging is a critical point in the logistic chain of the consumption system. Many varied and combination of factors affect shell defects, irregular shell shape texture and surface area, downgrades and cracked egg represent large economic loss in the poultry industry. Significant reduction in the number of egg lost due to inferior shell quality could be reduced by adequate nutrition, disease control, management practices and use of genetic lines of high quality egg traits. Mazzuco and Hester (2005) Solomn (2010) and Wole *et al* (2012) indicated that frequency of egg defects decreased substantially in commercial crosses of hens in the last decade by intensive selection in pure lines and well established crossing schemes, lighting controlled programmer and improved nutrition. Hincke *et al* (2000) indicated that shell breakage and downgraded egg or cracks remain elevated despite improvement in shell quality by manipulation of nutritional, environmental and genetic factor. Such eggs are exposed to bacterial and disease pathogens contamination specially in eggs or egg products are not thoroughly cooked. Hincke *et al* (2000) stated that inspite of basic research in calcium metabolism and problem of egg shell formation problem of weaker poor shell quality remains significant factor for the industry. Multiple factors affect shell quality as stress before the egg reaches the shell gland, photoperiod. inadequate nutrition, diseases, environment changes and equipment insult. Dunn (2011) indicated strong correlation for calcium crystal size and orientation with shell thickness. Both influence egg shell thickness structure and strength. Coutts and Wilson (2007) noted that besides genetic factors any condition that cause disturbance of the birds 10-14 hours before the egg is laid are likely to increase incidence of shell defects. Bell (2007) stated that cracks are divided into leaking and non leaking and include. Checks blind checks, hairline cracks the holes, body checks, pin hole and star cracks as determined by candling. Their value may vary from 25-50% of the value of sound shell eggs. Generally flocks vary as 2 – 10 % of problem incidence. Jones *et al*., (2010) stated that USDA (United States Department of Agriculture) noted that all shelled egg marketed in USA (United States of America) may have a maximum allow able percentage of checked egg (not leaking) ranging from 5 – 10%. Mertens *et al* (2006) analyzing egg breakage in the different chains stressed critical point at the farm and the cage system and showed relatively high percentage of breakage after Lay, grading and packing came next in the logistic chain after laying and collecting. Broken eggs cause economic damage in two ways 1- cannot be sold as first quality and 2- occurrence of hair cracks raise risk of bacterial contamination of broken and other eggs when leaking creating problems with external and internal quality and food safety.

This study was conducted to study egg cracks in the marketing chain in Khartoum state as limited or negligible information is available on this important expanding marketed food source, the table egg. Also to define and possibly monitor the critical points for eggshell breakage in different logistic chains.

Methodology

During the period February - April 2016**,** Study a survey was conducted in Khartoum

State, on table egg cracks in the marketing chain and on the methods of disposal of cracked eggs in the groceries. Considering similarity of marketing chain activities between Khartoum State localities being mostly of great similarities, the merits of each locality as Khartoum being the most urban, Omdurman the most densely populated and Khartoum North harboring most of the poultry farms a total of 90 groceries was selected randomly for the study considering the available facilities for the study.

Referring to the population census (1980) the only available (census data) of Khartoum State (5274821 persons) and the rate of the population of each locality to the total 40 groceries were randomly selected in Khartoum locality 30 from Omdurman and 20 from Khartoum North Locality. In each and within each Locality equal numbers of groceries were randomly selected in each of the 4 geographical directions and the center (8, 6 and 4).

Questionnaires interview, personal observations and were used for data collection. Data was collected on personal characteristics, commercial and marketing activities, pricing, table egg handling and egg cracks and methods of disposal. Data was statistically analyzed using simple frequencies percentages and analysis of variance.

Results and Discussion

The educational level of the grocery owners was 45.6% primary, 43.3% secondary 5.6% university and 5.6% illiterates which shows that most of the involved were of middle type of education. In the sample studied 75.5% had information on egg quality and 34.5 had no information which affected table egg marketing negatively. On the question of egg quality displayed 36.6% answered acceptable 36%. do not know, 16% low and only 13.4 stated high when a sample of 150 consumers was asked indicating that a good majority of the grocery owners and table egg consumers lacked information o n egg quality standards.

The main price assessment factor was at 33.3% for supply and demand followed by fixed prices at 27.8% level while price competition was at 15.6% indicating lack of the food alternative culture.

For purchase preference bases external appearance, shape and stamp were the main factors and for so most customers preferred purchase from supermarkets.

The preferred shell colour was the white as stated by grocery owners followed by brown eggs.

For the purchase method the customers preferred by dozen at 41.1% and by tray at 36.7% though grocery owners preferred selling by tray at 44.4% and by all methods at 51.1% Probably customers mainly for economic reasons preferred to buy in small amount while grocery owners preferred sale by tray for easiness and more sales.

For source of purchase farms were at 48.9% and companies 46.7% almost close to one another farms being many and companies being large producers.

Storing period ranged from 2-14 days depending on the site and the economic standard of the customers. The longer the storage period the more damaged broken eggs and quality loss.

Transport to the groceries was mostly by company cars, chilled and or refrigerated but a sizeable portion was transferred by open cars by grocery owners or hired. This is one

of the most critical factors that elevate egg breakage as was stated by Hincke *et al* (2000) and Mass and Bert (2014). Some 18.9% of the respondents stated that transport resulted into high breakage rate. In addition to transport most egg were displayed in open verandas which added more to breakage possibility.

For reasons for going in to the business 36.7 stated profitable and for 31.1% quarantined promising added source of income.

For encouragement of others to go into the trading in table egg marketing chain 65.5 % of the respondents answered positively.

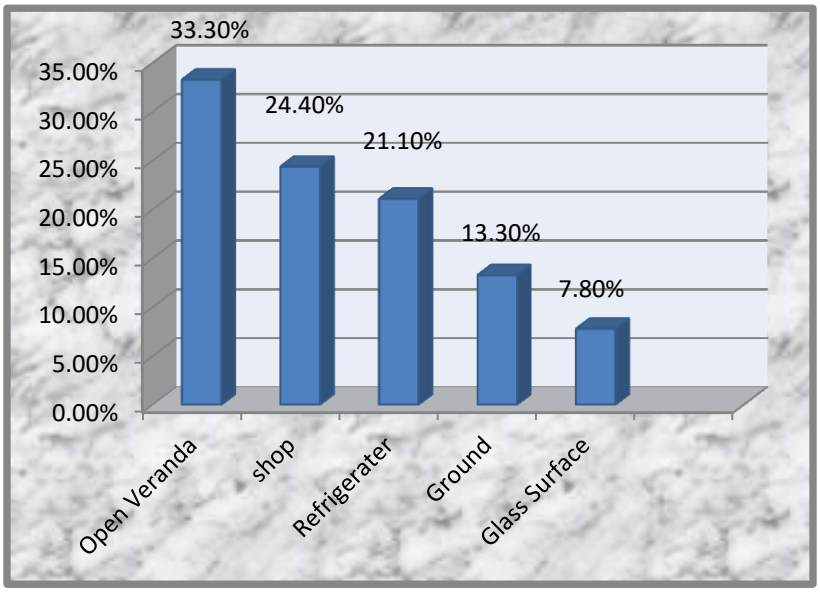

Fig (1) Sales display method in the groceries

Sales display method fig (1) above shows predisposing methods for egg damage and egg cracks.
Cracked eggs:

Table (1): Proportion of cracked eggs

Valid	Frequency	Percentage
1. Few	57	63.3
2. High	17	18.9
3.None	16	17.8
Total	90	100.0

Few ranked highest

When this number of high (18.9%) is converted into monitory value it becomes a sizeable loss as was mentioned by Gupta (2008), Mertens *et al* (2006) and Bell (2007)

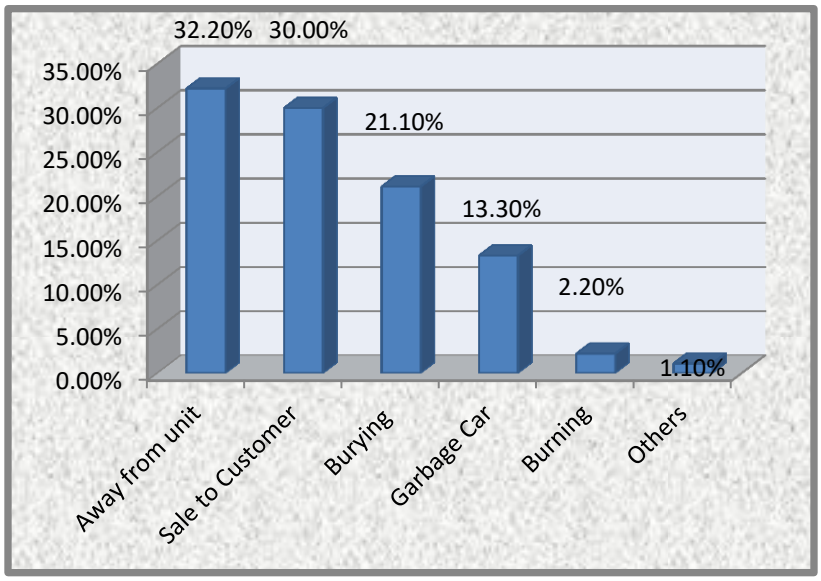

Figure (2): ways of disposal of cracked egg

Considering ways and methods of disposal of cracked eggs from the fig(1) –away from the unit tops at 32.2% and 13.3% garbage car which is considerable ration of 45.5% of an environmental and disease transmissible hazard for both poultry industry and humans.

Table (2) Distribution frequencies and percentage of disposal method of cracked eggs and educational level

Disposal of Cracked Egg	Education Level				Total
	Illiterate	Primary	Secondary	University	
Away from unit	1 20.0%	15 36.6%	11 26.8%	2 40.0%	29 32.2%
Burying	2 40.0%	8 19.5%	8 19.5%	1 20.0%	19 21.1$
Burying	0 0%	1 2.4%	1 2.4%	0 0.0%	2 2.2%
Sale to Consumer	2 40%	7 17.1%	11 26.8%	2 40.0%	22 24.44%
Garbage Car	0 0%	8 19.5%	4 9.7%	0 0%	12 13.3%
Eating by Sale	0 0%	0 0%	6 14.6%	0 0%	6 6.7%
Total	5 100.0%	39 100.0	41 100.0%	5 100.0%	90 100.0%

bove data indicate no relationship or correlation between the educational level and ways and methods of disposal of cracked eggs.

Table (3) Distribution Frequencies and Percentage of Disposal of Cracked Egg and Role of Sudanese Standard and Metrology Organization (SSMO) information type.

Disposal of Cracked egg	Role of Stamadrd Meterology				Total
	Publised Paper	Tracing Course	Seminar and Workshop	None	
Away from unit	22 32.8%	5 35.7%	0 0%	1 26.7%	28 32.3%
Burying	18 26.9%	0 0.00%	0 0%	1 26.7%	19 21.1%
Burying	1 1.5%	0 0.00%	0 0%	1 26.7%	2 2.2%
Sale to Consumer	16 23.9%	6 42.8%	1 100%	1 26.7%	24 25.15%
Garbage Car	9 93%	3 21.4%	0 0%	2 33.3%	14 15.57
Other	1 1.5%	0 0%	1 0%	1 16.7%	3 3.3%
Total	67 100%	14 100%	2 100%	7 100%	90 100%

No relation between role of SSMO disposal of cracked egg .

The data do not show any direct effect of SSMO information on the methods and ways of disposal of cracked eggs similar to the result of the effect of education level which uncovers the limited or absence of any official role by any institution to improve on the method of disposal of cracked egg or to work on minim sing size of.

Conclusion

The study showed that many factors are involved, act and interact in the marketing chain flow including marketing activities, knowledge on quality and merchandising.

The main findings were the price determination was based on supply and demand and not quality. Purchase mainly on external appearance consumers buy by dozen, source of purchase almost equal between companies and farm units long storage period, harsh transport on rough roads, display in verandas and ground most of which predispose eggs to damages and or breakage.

Rate of eggs breakage was considerable and the main disposal method was away-from the farm and by garbage cars. The study indicated no relationship or correlation between the disposal method and either the educational level or SSMO type of information.

The study noted absence of extension programs or any guiding or controlling regulation on cracked egg disposal from any official body or institution.

Study Recommendations

- Need for more involvement of the official bodies concerned in regulating egg marketing chain flow.
- More attention and consideration for improvent and better utilization of cracked table eggs.

References

Bell, D.D, Patterson, P.H, Koelkebeck, K.W. , Anderson, K.E., Darre, M.J. , Carey, J.B. , Kunny, D.R. , Zeidler, G. (2001). Egg marketing in national supermarkets. Egg Quality part II. *Poul . Sci* , 80: 383-3j89.

Coutts, J.A., Wilson, G.C., Fernanel egg, S., Rasales, E., Weber, G., Hernandez, J.M. (2006). Optimum egg quality. A practical approach, Shefield: 5 M Publishing – P63.

Dunn, I.C. (2011). Genetic variation in egg shell crystal size and orientation is large and these traits are correlated with shell thickness and are associated with egg shell matrix protein in markers. *Animal Genetics*. 43 (4). 410-418.

Gupta, Li (2008). Maintaining egg shell quality Aristech.

Hincke, M.T. (2000). Egg shell proteins and shell strength molecular biology of egg shell matrix proteins and industry applications. In SIM: Nakal. Guenter (Eds). Egg Nutrition and Biotechnology. CABI publishing; walling ford, UK. P295.

Jones, D.R., Lawrence, K.C.,yoon, S.C., G.W, Heitschmidt (2020). Modified pressure imaging for egg crack detection and resulting egg quality. *Poul. Sci.* 84:761-765.

Mazzuco, H., Hester, P.Y. (2005). The effect of on induced molt and a second cycle of lay on skeletal integrity of white deghorns. ***Poul. Sci***. St (5) 771-781.

Mertens, F., Bamelis, B., Kemps, B., Kamers, B., Verhoeslst, E., De Ketelaere, M., Bain, M., Decuypere, E., Baerdemaeker, J.: Monitotoring of egg shell breakage and egg shell strength in different production chains of consumption egg. *Poul, Sci*, 85: 1670-1677.

Solomon , S.E. (2010). The over and the oviduct. In Manson (Eds . Egg and Eggshell quality. Nanson publishing, Ames, I.A. P149.

Wole, A.(2012). Genetic parameters of egg defects and egg quality in layer chickens. *Poul, Sci*, 9(16): 1292-1298. P1-3.

المناشط التسوقية وكسر البيض في سلسلة تسويق البقالات وطرق التخلص منه في ولاية الخرطوم

هاشم دفير انقور اروب، اسامة الشيخ يس، مناهل التجاني حسن ومحمد تاج الدين إبراهيم

جامعة السودان للعلوم والتكنولوجيا – الانتاج الحيواني

المستخلص

تمت دراسة مسحية في الفترة فبراير – ابريل 2016 في ولاية الخرطوم عن المناشط التسويقية وكسر البيض في سلسلة التسويق وعن طريق وسائل التخلص من البيض المكسور ثم وذلك باختيار التشابه في سلسلة التسويق والمميزات لكل محلية وبالرجوع للاحصاء الكلي في العام 1908 ونسبة السكان في كل محلية تم الاختيار العشوائي 40 بقالة من الخرطوم و 30 من ام درمان و 20 من الخرطوم بحري وتم توزيع البقالات بالتساوي بين الجهات الجغرافية الأربعة والوسط لكل محلية (8, 6, 4) ولجمع المعلومات تمت الاستعانة بالاستبيانات والمقابلات الشخصية والملاحظات وتم جمع معلومات عن الخصائص الشخصية والمناشط التجارية والتسويقية والتسعير والترحيل والكسر في البيض وطرق ووسائل التخلص من البيض المكسور وتم تحليل المعلومات بالنسب المئوية البسيطة وأهم النتائج المستخلصة كانت الشراء بالدستة بينما يفضل أصحاب البقالات البيع بالطبق ومصدر الشراء كان تقريباً متساوياً بين الشركات والوحدات المزرعية وتراوحت فترة التخزين بين 2–14 يوما ويتم الترحيل بسيارات الشركات والسيارات المفتوحة في طرق خشنة وغير معبدة جيداً وطريقة العرض في فرندات مفتوحه والبعض على الأرض مما يجعل بعض هذه الممارسات تعرض البيض للكسور والتدمير ونسبة الكسور أفاد 18.9% بأنها مرتفعة وبالنسبة للتخلص من البيض المكسور وأشار 32.2% إلى الرمي بعيداً عن المزرعة وأشار 13.3% أنه عن طريق عربة النفايات مما يشير إلى التلوث البيئي والتلوث الصحي وأوضحت الداسة أنه ليست هناك علاقة ارتباط بين المستوى التعليمي أو علاقة بين معلومات ومنشورات الهيئة السودانية للمواصفات وطريقة التخلص من البيض المكسور كما لاحظت الدراسة الغياب الكامل لأي برامج ارشادية أو أي لوائح تنظيمية أو وجود أي جهاز أو مؤسسة رسمية لمعالجة طرق التخلص من البيض المكسور.