The Pharma Innovation Journal 2022; SP-11(5): 1484-1487

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(5): 1484-1487

www.thepharmajournal.com
Received: 19-03-2022
Accepted: 26-05-2022

SS Chauhan
Department of Livestock Production Management, C.V.Sc & A.H., ANDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

Basant Singh
Department of Poultry Science, DUVASU, Mathura, Uttar Pradesh, India

RK Sharma
Department of Livestock Production Management, C.V&AS, GBPUAT, Pantnagar, Uttarakhand- India

DV Singh
Department of Livestock Production Management, C.V&AS, GBPUAT, Pantnagar, Uttarakhand- India

J Palod
Department of Livestock Production Management, C.V&AS, GBPUAT, Pantnagar, Uttarakhand- India

Corresponding Author
SS Chauhan
Department of Livestock Production Management, C.V.Sc & A.H., ANDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

Effect of refined mustard oil on weight loss and internal quality characteristics of white leghorn hen eggs at room and refrigeration temperatures

SS Chauhan, Basant Singh, RK Sharma, DV Singh and J Palod

Abstract
The 164 Infertile Eggs of White Leghorn were procured from Central Avian Research Institute, Izatnagar, Bareilly, (U.P.). The birds were maintained on similar feed and environmental conditions. The 164 eggs were divided in four groups, each comprising of 41 eggs. These groups were categorized into two groups and were kept at room temperature and remaining two was kept in refrigerator. The weight and internal quality of egg as Albumen Index, Yolk Index, Haugh Unit were recorded. The experiment was designed in simple randomized block with Four treatments and two temperatures. The result showed that the weight loss of egg and yolk index, were differ significantly in comparison to control while Haugh Unit at room temperature and Albumen Index did not differ significantly at room and refrigeration temperature. Refined Mustard Oil treated eggs prolonged the shelf-life of eggs to 28 and 75 days under room and refrigeration temperature while in control it was 14 days and 60 days under room and refrigeration condition.

Keywords: Yolk index, albumen index, Haugh unit

Introduction

Poultry production has emerged as an important and fastest growing sector of our livestock economy. Poultry farming has become very encouraging enterprise in modern India for small farmers, landless labours, educated un-employed youths as well as for big entrepreneurs. The gap between availability and the requirement shows a huge scope for further growth and development of poultry industry in India Egg is a rich source of high quality animal protein and is often used as standard for measuring the quality of the other food proteins. It is an important source of unsaturated fatty acid, minerals especially iron and phosphorus and almost all the vitamins. It is well balanced amino acid profile and easy digestibility makes it a valuable protective food in human diet. Egg is the wholesome food of animal origin, which cannot be adulterated by any human means till is reaches to ultimate consumer in original form. It is the only source of high quality proteinous food and is very useful to fight malnutrition in India. Egg being very useful in human diet requires proper preservation to ensure its acceptability for a longer period. Eggs are highly perishable commodity and need fast movement from the point of production to the point of consumption, particularly during summer months. It starts deteriorating from the moment it is laid. Research indicated that one out of every four egg produced in India did not reach to the consumer in good conditions. Oil coating is one of the most important methods for preserving eggs. The oil seals the pores of the shell which prevents the evaporation of moisture, entry of microorganism, odours and escape of gases. This checks the weight loss of egg and maintains the good internal quality for longer period because some of the physiochemical changes in the egg contents are being retarded. Keeping aforesaid points in view, the present investigation on Refined Mustard oil was undertaken with following objectives: To evaluate the changes in the internal quality and weight loss in oil coated and uncoated eggs held at room and refrigeration temperatures.

Materials and Methods

A total of 164 freshly laid, infertile eggs of a single strain of White Leghorn of same age and reared in cages under identical condition of feeding and management were procured from Central Avian Research Institute, Izatnagar, Bareilly, (U.P.). The eggs of almost similar and weight were selected for study. The candling was done at the time of procurement and before the start of experiment for selecting the sound egg.

These 164 eggs were divided in four groups, each comprising of 41 eggs. These groups were categorized into two groups and were kept at room temperature and remaining two was kept in refrigerator. The following four treatments were done, and were designated as: T1- Untreated egg used at control at room temperature. T2 – Dipping in the Refined Mustard Oil containing permitted antioxidant at room temperature. T3-Untreated eggs used control at refrigeration temperature. T4-Dipping in the Refined Mustard Oil containing permitted antioxidant at refrigeration temperatures. Room temperature varied from 22^{0}C to 38^{0}C and relative humidity from 40 to 75 percent and refrigeration temperature was 8±1^{0}C and relative humidity 75 to 80 percent. The loss of egg was calculated by the difference between fresh and stored egg weight at specific intervals. Albumen and yolk indices were determined by the method of Heiman and Carver (1936) [12] & Funk (1948) [13]. The Haugh unit was measured according to Haugh (1937) [14]. The data were analysed statistically as per methods given by Panse and Sukhatme (1957) [15].

Results and Discussion

Effect of oil treatment on the loss in weight of egg

At room temperature the minimum loss of egg weight during storage was found in T2 (50.640g). The maximum loss in egg weight was observed in control group T1 (47.475g) after 14 days of storage which was significantly higher than that of oil treated eggs. At refrigeration temperature the lowest weight loss was noted in T4 (50.065g). The significantly highest loss in egg weight was recorded in untreated eggs T3 (47.383g) after 60 days of storage. Similar trend in the loss of egg weight during storage was obtained by Singh *et al.* (1997) [9]. Sachdeva and Verma (1979) and Heath and Owens (1978) [11]. The difference in weight loss may be attributed to the difference in evaporative losses, which were considerably checked by oil dipping under different oil treatments.

Table 1: Weight loss of eggs in g. at weekly interval under different treatments at room temperature

Treatments	Days of storage			Overall mean
	D1 (0 day)	D2 (7 days)	D3 (14 days)	
T1(Control)	51.440	49.233	47.475	49.383
T2	50.950	50.871	50.640	50.820

CD 5 % = 1.2239 CD 0.1% = 2.4254

Table 2: Weight loss of eggs in g. at fortnightly interval at refrigeration temperature

Treatments	Days of storage					Overall mean
	D1 (0 day)	D2 (15 days)	D3 (30 days)	D4 (45 days)	D5 (60 days	
T3(Control)	52.133	51.413	50.525	49.332	47.383	50.157
T4	51.416	51.366	51.121	50.068	50.065	50.807

CD 5%= 0.8671 CD0.1% = 1.5733

Effect of oil treatment on the changes in the interior quality of eggs

Yolk Index

At room temperature the minimum reduction was noticed in T2 (0.4485- 0.2564). Significantly highest reduction in the yolk index from (0.4485 to 0.1277) was observed in T1 (control) after 14 days of storage. At refrigeration temperature the reduction in yolk index was found slow in T4 (0.4485-0.3095). The yolk index was also found significantly lowest in T3 (0.4485-0.2749) after 60 days of storage. These finding are in conformity with the finding of Nair and Elizabeth (1983) [5] and Pandey and Mohapatra (1982) [6]. Decline in yolk index during storage can be attributed to the migration of water from albumen to yolk resulting in increase weight of yolk with consequent stretching and weakening of vitelline membrane and thus a decrease in yolk index due to flattening of yolk.

Table 5: Changes in Yolk Index of eggs in storage at room temperature

Treatments	Days of storage			Overall mean
	D1 (0 day)	D2 (7 days)	D3 (14 days)	
T1 (Control)	0.4485	0.2684	0.1277	0.2815
T2	0.4485	0.3629	0.2564	0.3559

CD 5%= 0.0619

Table 6: Changes in Yolk Index of eggs in storage at refrigeration temperature

Treatments	Days of storage					Overall mean
	D1 (0 day)	D2 (15 days)	D3 (30 days)	D4 (45 days)	D5 (60 days)	
T3(Control)	0.4485	0.3791	0.3256	0.2846	0.2749	0.3425
T4	0.4485	0.3920	0.3857	0.3129	0.3095	0.3697

CD 5% = 0.01932

Albumen Index

At room temperature the minimum reduction in albumen index was noticed in T2 (0.0918 - 0.0636). The highest reduction in albumen index was found in T1 (0.0918-0.0406) after 14 days of storage. At refrigeration temperature the reduction in albumen index was found slow in T4 (0.0918-0.0599). The albumen index index was also found lowest in T3 (0.0918- 0.0386) after 60 days of storage. These finding are in conformity with the finding of Cotterill and Winter (1955) [4] and Romanoff and Romanoff (1949) [3]. Better albumen index of oil dipped egg was believed to be due to effective sealing of shell pores which helped in retardation of carbon-di-oxide loss from egg. Rapid loss of carbon di oxide and increase in albumen P^H of untreated egg probably hastened the process of albumen thinning which affected albumen index adversely.

Table 7: Changes in albumen index of eggs in storage at room temperature

Treatments	Days of storage			Overall mean
	D1 (0 day)	D2 (7 days)	D3 (14 days)	
T1(Control)	0.0918	0.0757	0.0406	0.0694
T2	0.0918	0.0718	0.0636	0.0757

NS

Table 8: Changes in albumen index of eggs in storage at refrigeration temperature

Treatments	Days of storage					Overall mean
	D1 (0 day)	D2 (15 days)	D3 (30 days)	D4 (45 days)	D5 (60 days)	
T3(Control)	0.0918	0.0815	0.0728	0.0691	0.0386	0.07076
T4	0.0918	0.0825	0.0669	0.0648	0.0599	0.07318

NS

Haugh Unit

At room temperature the minimum reduction in Haugh unit was noticed in T2 (from 82.57-63.16). The highest reduction in Haugh unit was found in T1 (82.57 – 51.45) after 14 days of storage. These treatments did not differ significantly from each other at 5% level of significance.

At refrigeration temperature the reduction in Haugh unit was found slow in T4 (82.57- 60.87). The Haugh unit was also found lowest in T3 (82.57- 50.25) after 60 days of storage. Significantly highest decline was observed in T3. These finding are in conformity with the finding of Panda and Rao, (1980) [1] and Sunder and Siddiqui (1986) [2]. Slower rate of decline in Haugh unit under refrigerator storage could be due to complimentary effect of egg coating oil and low storage temperature in minimizing liquefaction of thick white and egg weight loss. The difference in rate of quality deterioration was probably due to the retention of CO_2 and moisture by oil treated eggs.

Table 9: Changes in Haugh unit of eggs in storage at room temperature

Treatments	Days of storage			Overall mean
	D1 (0 day)	D2 (7 days)	D3 (14 days)	
T1(Control)	82.57	73.90	51.45	69.307
T2	82.57	70.26	63.16	71.997

NS

Table 10: Changes in Haugh unit of eggs in storage at refrigeration temperature

Treatments	Days of storage					Overall mean
	D1 (0 day)	D2 (15 days)	D3 (30 days)	D4 (45 days)	D5 (60 days)	
T3 (Control)	82.57	77.71	64.72	55.46	50.25	66.142
T4	82.57	69.30	64.58	63.25	60.87	68.114

CD 5% = 3.9611 CD 0.1% = 7.1872

Conclusion

The inference of the above observations clearly indicates that T2 (Dipping in Refined Mustard Oil at room temperature) and T4 (Dipping in Refined Mustard Oil at refrigeration temperature) proved good and superior to control in all the parameters at both the atmospheric conditions under observations. These two treatments T2 and T4 reduced the weight loss and maintained the interior quality of eggs for longest duration in storage. The findings are recommended for general adoption to the people.

Reference

1. Panda PC, DN Rao. Quality of the duck eggs marketed in Mysore City. Ind. Poults. Gaz. 1980;64:7-11.
2. Sunder GS, SM Siddiqui. Influence of oil treatments, storage length and temperature on the internal quality of chicken eggs. Indian Jr. Poult. Ci. 1986;21(2):139-141.
3. Romanoff AL, AJ Romanoff. The Avian Egg. John Wiley and Sons. Inc., New York, 1949.
4. Cotterill OJ, AR Winter. Egg white lysozyme 3 – The effect of PH on the lysozyme – Ovomucin interaction. Poult. Sci. 1955;34:679-686.
5. Nair RS, VK Elizabeth. Effect of age and season on quality of chicken eggs. Ind. J Poult. Sci. 1983;18(4):207-210.
6. Pandey NK, CM Mohapatra. Some physical and sensory quality attributes of quail eggs during storage. Avian Res. 1982;65(1):22-28.
7. Singh RP, B Panda. Comparative study of quail and chicken egg during storage. Ind. Jr. Ani. Sci. 1990;60:114-117.
8. Pandey NK, CM Mohapatra, RC Goyal, SS Verma. Influence of storage temperature on inter-relationship among physical quality traits and components of quail egg. Ind. J Poult. Sci. 1984;18(1):50-52.
9. Singh RP, SK Anand, SS Verma. Quality Characteristics of oil coated quail eggs under ambient storage. Ind. Jr. Poult. Sci. 1997;32(2):266-271.
10. Sachdev AK, SS Verma. Studies of the efficiency of two coating oils on the weight loss and internal quality of shell eggs stored at ambient and refrigerated temperatures. Ind. Poult. Review. 1979;10:11-16.
11. Heath JL, SL Owens. Effect of oiling variable on the storage of shell egg at elevated temperature. Poult. Sci. 1978;57:930-936.
12. Heiman V, Carver JS. The albumen index as a physical measurement for observing egg quality. Poult. Sci. 1936;15:141-148.
13. Funk EM. The relation of yolk index determined in natural position to the yolk index as determined after separating the yolk from the albumen. Poult. Sci. 1948;27:367-370.

14. Haugh RR. The Haugh unit for measuring egg quality. U.S. Egg Poult. Mag. 1937;43:525-555.
15. Panse VC, PV Sukhatme. Statistical method for agricultural workers. I.C.A.R. New Delhi, 1957.