

RESEARCH ARTICLE

# Effect of refined soybean oil on weight and internal quality of eggs at room and refrigeration temperatures

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**ABSTRACT.....** A total of one hundred and sixty four fresh, neat clean, infertile eggs of White Leghorn here were procured from a single flock of same age from Central Avian Research Institute, Izatnagar, Bareilly (U.P.). Remaining 164 eggs were divided into 4 groups, each comprising of 41 eggs. These groups were categorized into two group and were kept at room temperature and remaining two were kept in refrigerator. Room temperature noticed from 22<sup>o</sup>C to 38<sup>o</sup>C and relative humidity from 40 to 75 per cent. The temperature of refrigerator was noted as 8±1<sup>o</sup>C and relative humidity 75 to 85 per cent. Shelf life, weight loss, albumen index, yolk index, haugh unit were noted. Significantly lowest percentage of weight loss of eggs was found in refined soybean oil treated eggs. The treatment T<sub>2</sub> and T<sub>4</sub> enhanced the shelf-life of eggs for a maximum period of 35 days at room and 90 days at refrigeration temperature which are untreated eggs (control) maintained the organoleptically acceptable life for a period of 14 days and 60 days at room and refrigeration temperature, respectively.

**KEY WORDS.....** Refined soybean oil, Internal quality of eggs, Refrigeration, Temperature

**HOW TO CITE THIS ARTICLE** - Chauhan, S.S. (2014). Effect of refined soybean oil on weight and internal quality of eggs at room and refrigeration temperatures. *Asian J. Animal Sci.*, 9(1) : 81-83.

**ARTICLE CHRONICLE** - Received : 10.02.2014; Revised : 08.05.2014; Accepted : 22.05.2014

## INTRODUCTION.....

Poultry production has emerged as an important and fastest growing sector of our livestock economy. Egg is a rich source of high quality animal protein and is often used as standard for measuring the quality of the other food protein. However, oil coating is one of the most important methods for preserving eggs which can be safely applied by semi-skilled persons who are UHAengaged in this profession. The oil seed the porce of the shell which prevents the evaporation of moisture, entry of microorganisms, odour and escape of gases. This checks the weight loss of the egg and maintenance the good internal quality for longer period because some of the physiochemical changes in the egg contents are being retarded.

## RESEARCH METHODS.....

A total of 164 white leghorn hen eggs were divided into

four groups each comprising 41 eggs. The following four treatments were done and were designated as:

T<sub>1</sub> : Untreated eggs used as control kept at room temperature

T<sub>2</sub> : Dipping in the refined soybean oil

T<sub>3</sub> : Untreated eggs used as control and kept at refrigeration temperature

T<sub>4</sub> : Dipping in refined soybean oil and kept at refrigeration temperature.

Albumin and yolk induce were determined by the method of Heimen and Carver (1936) and funk (1948), respectively. The Hangh unit were measured according to Hangh (1937). The data were analysed statistically as per methods given by Panse and Sukhatme (1957). Weekly weight loss determinations and quality evaluation were done for control and oiled eggs at room temperature. Whereas the same were studied at fortnightly intervals for the eggs which were stored in refrigerator.

**RESEARCH FINDINGS AND ANALYSIS.....**

The findings of the present study as well as relevant discussion have been presented under following heads :

**Effect of oil treatments on the shelf-life of eggs :**

The treatment T<sub>2</sub> and T<sub>4</sub> increased the shelf life 35 days at room temperature and 90 days at refrigeration temperature. The minimum storage life was found in control (un-oiled) eggs where it was 14 days and 60 days under room and refrigeration conditions, respectively.

**Effect of oil treatments on the physiological loss in weight of egg :**

At room temperature the maximum loss in egg weight

was observed in control group (7.7%) after 14 days of storage which were significantly higher than that of oil treated eggs.

At refrigeration temperature significantly highest loss in egg weight was recorded in untreated eggs (T<sub>7</sub>) to the extent of 9.11%. The weight loss was noted in T<sub>4</sub> (0.55%) after 60 days of storage.

**Yolk index :**

Significantly highest reduction in the yolk index from 0.4485 to 0.1277 was observed in T<sub>1</sub> (control) after 14 days of storage. The minimum reduction was noticed in T<sub>2</sub>.

The magnitude of reduction in yolk index was noticed lowest in T<sub>4</sub>. It was from 0.4485 to 0.3369 while in T<sub>3</sub> (control) it was from 0.4485 to 0.2749. The decrease in yolk index was

**Table 1: Effect of different treatments on the shelf-life of eggs at room and refrigeration temperature**

Treatments	Shelf-life of eggs in days at different temperature	
	Room temperature (38±8 °C; 40-75% R.H.)	Refrigeration temperature (8±1 °C; 75-80% R.H.)
T <sub>2</sub>	35	90
T <sub>1</sub> (control)	14	60

**Table 2: Percentage loss in weight of oil coated and un-coated eggs at weekly interval kept at room temperature**

Treatments	Days of storage		Overall mean
	D <sub>1</sub> (7 days)	D <sub>2</sub> (14 days)	
T <sub>2</sub>	0.16	0.391	0.204
T <sub>1</sub> (control)	4.290	7.708	5.999

C.D. (P=0.05) = 1.9965

**Table 3: Percentage loss in weight of eggs at fortnightly interval kept at refrigeration temperature**

Treatments	Days of observation				Overall mean
	D <sub>1</sub> (15 days)	D <sub>2</sub> (30 days)	D <sub>3</sub> (45 days)	D <sub>4</sub> (60 days)	
T <sub>4</sub>	0.391	0.97	0.404	0.558	0.438
T <sub>3</sub>	1.381	3.084	5.372	9.111	4.737

C.D. (P=0.05) = 1.8394

**Table 4 : Change in yolk index of eggs in storage at room temperature**

Treatments	Days of storage			Overall mean
	D <sub>1</sub> (0 days)	D <sub>2</sub> (7 days)	D <sub>3</sub> (14 days)	
T <sub>1</sub> (Control)	0.4485	0.2684	0.1277	0.2815
T <sub>2</sub>	0.4485	0.3972	0.3116	0.3858

**Table 5 : Change in yolk index of eggs in storage at refrigeration temperature**

Treatments	Days of storage					Overall mean
	D <sub>1</sub> (0 days)	D <sub>2</sub> (15 days)	D <sub>3</sub> (30 days)	D <sub>4</sub> (45 days)	D <sub>5</sub> (60 days)	
T <sub>3</sub> (Control)	0.4485	0.3791	0.3256	0.2846	0.2749	0.3425
T <sub>4</sub>	0.4485	0.3780	0.3577	0.3487	0.3369	0.3740

C.D. (P=0.05) = 0.01932

**Table 6 : Change in albumin index of eggs in storage at room temperature**

Treatments	Days of storage			Overall mean
	D <sub>1</sub> (0 days)	D <sub>2</sub> (7 days)	D <sub>3</sub> (14 days)	
T <sub>1</sub> (Control)	0.0918	0.0757	0.0406	0.0694
T <sub>2</sub>	0.0918	0.0787	0.0575	0.0741

**Table 7 : Change in albumin index of eggs in storage at refrigeration temperature**

Treatments	Days of storage					Overall mean
	D <sub>1</sub> (0 days)	D <sub>2</sub> (15 days)	D <sub>3</sub> (30 days)	D <sub>4</sub> (45 days)	D <sub>5</sub> (60 days)	
T <sub>3</sub> (Control)	0.0918	0.0815	0.0725	0.0601	0.0386	0.07076
T <sub>4</sub>	0.0918	0.0866	0.0832	0.0663	0.0550	0.07658

**Table 8 : Change in Haugh unit of eggs in storage at room temperature**

Treatments	Days of storage			Overall mean
	D <sub>1</sub> (0 days)	D <sub>2</sub> (7 days)	D <sub>3</sub> (14 days)	
T <sub>1</sub> (Control)	82.57	73.90	51.45	69.307
T <sub>2</sub>	82.57	82.12	76.34	80.343

**Table 9 : Change in Haugh unit of eggs in storage at refrigeration temperature**

Treatments	Days of storage					Overall mean
	D <sub>1</sub> (0 days)	D <sub>2</sub> (15 days)	D <sub>3</sub> (30 days)	D <sub>4</sub> (45 days)	D <sub>5</sub> (60 days)	
T <sub>3</sub> (Control)	82.57	77.71	64.72	55.46	50.25	66.142
T <sub>4</sub>	82.57	80.78	75.27	69.30	67.45	75.074

C.D. (P=0.05) = 3.9611

retarded by low temperature. These findings are in conformity with the findings of Romanoff and Romanoff (1949).

**Albumen index :**

The highest reduction was found in T<sub>1</sub> (Control) it ranged from 0.0918 to 0.0406 at room temperature after 14 days of storage. In T<sub>2</sub> it was 0.0918 to 0.0575.

It ranged in T<sub>4</sub> from 0.918 to 0.0575. The higher reduction range was observed in T<sub>3</sub> (control) after 60 days of storage it went down from 0.918 to 0.386. The statistical differences between the treatments were not found significant (P=0.05).

**Haugh unit :**

In T<sub>2</sub> the Haugh unit got reduced from 82.57 to 76.34 in 14 days of storage whereas during the same period it reduced from 82.57 to 51.45 in T<sub>1</sub> (control).

Under refrigeration condition it ranged from 82.57 to 67.45 in T<sub>4</sub> but it ranged from 82.57 to 50.25 in T<sub>3</sub> after 60 days of storage significantly highest decline was observed in T<sub>3</sub>.

**Conclusions :**

The inference of the above observations clearly indicate that (refined soybean oil) treated eggs proved equally good and superior to control in almost all the parameters at both the atmospheric conditions under observations.

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