PRESERVING CHICKEN EGGS INTERNAL QUALITY USING COCONUT OIL

Masayan Moat[1]

ABSTRACT

Chicken eggs were submerged for less than one minute in coconut oil and their rate of deterioration measured during 49 days period. These eggs were compared with eggs stored under room temperature (24-32° C) and cool room temperature (16-19° C). The eggs submerged in coconut oil had a slower rate of deterioration which resulted in maintaining a good internal quality for a longer period.

Key words: Eggs storage, Coconut oil, internal quality

INTRODUCTION

There are several methods of preservation of eggs. Some of them can be used at farm level without any costly equipment, whereas the others are commercial methods involving the use of specific equipment. In the former category there are various techniques - eggs can be preserved using limewater, padi ash and salt, salt solution, and other compounds. Oiling the shell of the egg has been documented as a method of preserving egg quality. Mineral oil (Heath and Owen 1978), paraffin oil (Heath 1977), linseed oil (Sabrani and Payne 1978), and vegetable oil (Imai 1981) have been used and shown to preserve eggs well. The reported work in this paper showed that the rate of decline in albumen quality decreased in oil-treated eggs and that the initial rapid phase of deterioration was greatly reduced. This study evaluated the possibility of using coconut oil as a coating medium for egg storage.

MATERIALS AND METHODS

Naturally clean eggs, between 46 and 52 g weight and collected within 3 hr after lay, were used in the experiment. A total of 240 eggs were randomly allocated into 3 groups of 80 eggs each and were treated as follows;

(1) Eggs were stored at room temperature (24-32°C),

(2) Eggs were submerged for less than one minute in coconut oil and stored at room temperature as in (1) and

(3) eggs were stored in a cool room (17-21°C).

At 7 day intervals, during the 49 day trial period, a batch of 10 eggs was randomly picked from the 3 groups, weighed and albumen height measured. This measure of albumen height was used as the criterion of interior egg quality in this study.

The characteristics of grades of egg described by Bundy *et al.* (1975) were used in grading the eggs. There are four grades of eggs; "AA", "A", "B" and "C" quality. "AA" quality being the highest grade and "C" quality the lowest. A good quality egg in terms of albumen quality is an egg in which the albumen holds together well and stands up high around the yolk. This quality is commonly measured in terms of "Haugh units" and is an expression relating egg weight to the height of the thick white. A Haugh meter was used to measure the thick white at about

[1] Animal Husbandry Research Center, Department of Agriculture and Livestock, P O Box 73, LAE, Morobe Province

mid-point between the yolk and edge of the widest expanse of the thick white. Haugh units give a measure of albumen stability and the extent of deterioration of the egg contents during storage. Haugh unit scores less than 31 are classified as "C" quality, less than 60 as "B" quality, less than 72 as "A" quality and above 72 as "AA" quality.

RESULTS AND DISCUSSION

The results show clearly that coating egg shell with coconut oil subsequently stored at a room temperature is a better alternative to storage under cool condition (Fig. 1).

The Haugh Unit scores declined with time in all storage conditions with a more rapid and significant decline ($P < 0.05$) observed in eggs stored under room temperature during the first 7 days during which time the egg grade fell from "AA" to "C" quality. It took longer (28 d) for eggs stored under cool room condition to reach "C" quality. The eggs treated with coconut oil had slower declines in interior quality resulting in maintaining a "A" quality eggs after 14 d and "B" quality after 49 d. The effect of temperature on eggs quality is in accordance with the results of Card and Nesheim (1972) who reported a drop from "AA" to "C" quality with eggs held for 100 days at 3°C, 8 days at 23°C and 3 days at 37°C. The rate in quality decline after 7 d is also

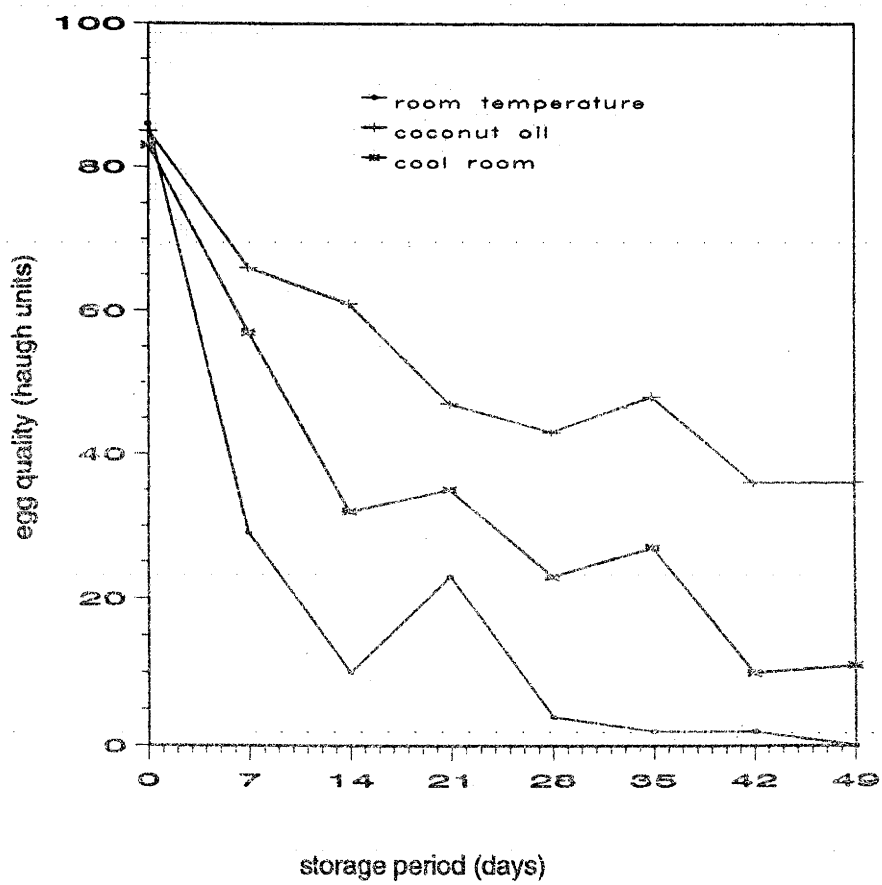

Figure 1. **Effect of storage conditions on egg quality.**

in line with the findings of Dawson and Hall (1954), who found a marked deterioration to have occurred within 3 days regardless of temperature.

There are several suggested reasons for the decline in albumen quality with storage. Sabrani and Payne (1978) listed losses in carbon dioxide resulting in slight alkalinity causing the long mucin fibre to break, chemical reductions breaking the disulfide bonds of ovomucin producing depolymerised ovomucin and thinning of egg albumen because of a dissociation of hysozyme-ovomucin complex.

The important feature of oiling would be the slower rate of evaporation (Sabrani and Payne 1978). Oiling has been shown to slow the rate of quality decline as it seals the pores and thus prevents gas and water losses and entry of micro-organisms and odours. However, loss in egg weight was not significant, at the end of 49 d, eggs stored at room temperature were averaging weight losses of 3.5 g per egg compared with 1.6 g for oiled eggs and eggs stored under cool room. Weight lost under room temperature was expected as the condition was favourable for water and carbon dioxide loss to occur.

The reports of past work on oiling eggs for storage and the results of this work suggest the usefulness of coconut oil as a coating medium for egg storage.

REFERENCES

BUNDY, C., DIGGINS, R. and CHRISTENSEN, V. (1975). *Livestock and Poultry production practice,* Hall Inc. USA. 593 pp.

CARD, L.C. and NESHEIM, N.C. (1972). *Poultry Production.* 11th Edition. Philadelphia, Lae & Febiger. 392 pp.

DAWSON, L.E. and HALL, C.W. (1954). Relationship between rate of cooling, holding and containers, and egg albumen, *Poultry Science,* 33: 624-628.

HEATH, J.C. (1977). Chemical and related osmotic changes in egg albumen during storage. *Poultry Science,* 56: 822-828.

HEATH, J.L. and Owen, S.L. (1978). Effect of oiling variables on storage of shell eggs at elevated temperature. *Poultry Science,* 37: 930-936.

IMAI, C. (1981). Effect of coating eggs in storage stability. *Poultry Science,* 60: 2053-2061.

SABRANI, M. and Payne C.G. (1978). Effect of oiling on internal quality of eggs stored at 28° and 12° C. *British Poultry Science.* 19: 567-571.