Oiling Retards Loss of Carbon Dioxide

One of the most important deteriorative changes that normally take place in shell eggs during storage is the development of thin or watery whites. It has been shown that this change is partly caused by the continual loss of carbon dioxide, which subsequently results in an increase in alkalinity of the egg white. A study was made to determine the rate of loss and the average amount of carbon dioxide given off by shell eggs under commercial egg-storage conditions, as compared with the loss of carbon dioxide from eggs that had been oiled before being stored. The eggs used in this work were uniform in size and were graded as U.S. Specials. The study was continued for 1,000 hours. It was found that strictly fresh eggs placed immediately in gas-collecting chambers made for the purpose lost on an average 10 milligrams of carbon dioxide per egg per 24 hours during the first 48 to 96 hours. After that time the amount decreased to about 5 milligrams per 24 hours. Oiled eggs showed an average loss of 5.5 milligrams of carbon dioxide per 24 hours for about 96 hours, after which the amount diminished to approximately 3 milligrams per egg per 24 hours. It is evident, therefore, that oil protection retards the rate of loss and consequently the amount of carbon dioxide lost. Thus it also retards hydrogen-ion change and the formation of thin or "watery whites."

A few unoiled eggs that had been held in the same commercial storage room continuously for 2 years were studied in a similar manner. It was found that these eggs, despite their age, still gave off measurable amounts of carbon dioxide in 24 hours, the average being between 1 and 2 milligrams per egg.

Studies on hydrogen-ion concentration in (1) unoiled, (2) plain oiled, and (3) vacuum carbon dioxide oiled eggs under storage showed that the vacuum carbon dioxide method exerts a stabilizing influence on the hydrogen-ion concentration. Fresh egg white showed an average pH of 7.6; whites of eggs which had been treated by the vacuum carbon dioxide method and then stored for 8 months showed an average pH of 7.8; plain oiled eggs stored at the same time showed an average pH of 8.3; whereas unoiled eggs, similarly stored, showed an average pH of 8.9.

Oiling Does Not Affect Flavor

The grading of shell eggs by candling alone is not a conclusive criterion upon which egg quality can be based. Storage eggs may be graded as high quality when viewed in front of the candle, but may
still possess objectionable flavors. Conversely, deteriorative changes during storage, resulting in low grading before the candle, are not necessarily accompanied by "off" flavor of the egg. Taste tests made on eggs that had been vacuum-treated before storage with colorless, tasteless, and odorless mineral oils of different base and of widely different specific gravities and "pour points" showed that the eggs had retained their original flavor during storage.

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EGG Quality, Controlled by Breeding and Feeding, Increases Poultry Income

A coordinated program of research on factors affecting the production of high-quality eggs is being carried on at the United States Animal Husbandry Experiment Farm, Beltsville, Md. Results obtained thus far, together with observations of the commercial handling of eggs, indicate several means by which farmers and poultrymen may obtain better returns from egg production. Consumers have always shown a preference for eggs free from objectionable odors, bad flavors, or discolored yolks. In recent years many consumers have become exacting with respect to other characteristics in eggs and have been willing to pay a premium for eggs of good size, uniform yolk color, and firm whites.

The quality of eggs, of course, is often materially affected by the conditions under which they are held on the farm and by those under which they are marketed. Improved methods of storing and marketing eggs will do much toward maintaining the quality which the eggs possess when they are laid, but the best methods of sanitation and marketing can do no more than maintain the quality of eggs determined by the feeding and the breeding of the birds which produced those eggs.

Eggs of good quality should be clean and fresh, weigh about 24 ounces to the dozen, be uniform in size and shape, have strong shells of uniform color, have firm whites, small air cells, and well-centered spherical yolks of uniform color, not too dark nor too pale. Such eggs command a price several cents a dozen higher than eggs lacking one or more of these qualities.

Shell Color Influenced by Breeding

Scientific studies have shown that shell color is determined by inherited factors and that uniform shell color may be attained only through selection and breeding. Shell quality, including strength and texture, probably may be improved in the same way. It may also be improved through proper feeding. Laying fowls should receive a diet in which the calcium-phosphorus ratio is between 1.8 to 1 and 3.5 to 1. The absolute calcium content may vary from 1.8 to 4 percent, depending on the egg production. The phosphorus content may vary from about 0.5 to 1.2 percent.

Confined layers should always receive from 0.5 to 2.0 percent of the diet in the form of tested cod-liver oil or its equivalent in some other source of vitamin D. Layers, particularly in sections north of the Gulf States, should receive an adequate vitamin D supplement to the diet during the winter months. There is some evidence that bluegrass range contains some factor other than vitamin D which improves shell quality.