

EGG PRODUCTION AND EGG QUALITY CONSERVATION

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Abstract

The ideal of the egg producer and the consumer is a fresh egg, with a clean, smooth, brown or white shell, a pure, deep-yellow yolk and a translucent, firm white. It is important that the producers make sure that hens lay more eggs like this. It is essential for both the industry and the consumer that the incidence of egg defects be minimised at all levels of production and marketing. Producers, in particular, must be able to quickly pinpoint and correct problems.

Key words: egg, quality, production, conservation.

INTRODUCTION

For eggs, the consumer might equate good egg quality with eggs that have a dark yellow yolk when the egg is broken out, or that same consumer might equate a good quality egg as one which has a nice egg shaped shell without any calcium deposits on it and is not cracked. Grades are used to classify eggs into different levels or ranges of quality such as AA, A, or B. Most consumers buy eggs that have the grade classification of AA or A but for the most part they do not know what the distinction is between the two. It is important, however, for people involved in every aspect of the egg industry to know: what egg quality really is; what factors go into the determination of good or bad egg quality; and how can egg quality be conserved.

MATERIAL AND METHODS

We will speak here about the egg quality, egg shell quality, interior egg quality and conserving the egg shell and interior egg quality.

In order to classify eggs into the various grades used, an evaluation needs to be done. Egg quality is a general term that relates to various standards that are imposed on the eggs. These standards can be broken down into those used for determining the quality of the egg shell itself - exterior egg quality, and those standards which relate to the quality of the interior of the egg - interior egg quality. Some of these standards are based on subjective measures of egg quality and some are based on a more quantitative measure of egg quality. In general, exterior and interior egg

quality standards are based on shell cleanliness, shell soundness, shell texture, shell shape, relative viscosity of the albumen, freedom from foreign matter in the albumen, shape and firmness of the yolk, and freedom from yolk defects.

The quality of the egg shell is affected by many factors. A major problem which affects the thickness of the egg shell is related to the internal blood acid-base status of the bird. During exposure to warm environmental temperatures, the hen reacts by increasing its rate of breathing in order to help cool itself. This physiological occurrence causes the lowering of CO₂ in the blood and produces a condition termed "respiratory alkalosis." The pH of the blood becomes alkalotic and the availability of Ca⁺⁺ needed for the formation of the egg shell is reduced. This causes an increase in the production of soft-shelled eggs.

The esthetic quality of egg shells relate to the quality factors which the consumer can see, such as soundness of the shell, cleanliness of the shell, shape of the shell, and color of the shell. Several factors do affect esthetic egg shell quality. Factors such as wash water temperature which affects the incidence of "thermal" cracks, moisture condensation on the shell, refrigeration temperature, and mechanical handling of the egg all affect the esthetic quality of the egg shell. Microbiological contamination of the inside of the egg is greatly affected by the ability of the egg shell to stop the invasion of micro-organisms and bacteria from entering the egg through the shell's pores.

About conserving egg shell quality - many factors can contribute to the conservation of good egg shell quality. If the egg producer manages his flock in the proper manner by providing the proper nutrition and environmental conditions, then high egg shell quality should be achieved. A specific procedure that a producer should do to assure the production of eggs with good egg shell quality is to avoid scaring the birds so that the egg spends the normal amount of time in the shell gland. There are several procedures that need to be followed in order to conserve the asthetic quality of egg shells. The frequent gathering of eggs will help prevent the accumulation of dirt and stains on the shell. In addition, when eggs are washed the temperature of the wash water should be about 20°F warmer than the eggs. As far as procedures followed to conserve microbiological contamination of egg shells, appropriate washing and egg processing techniques should be followed. The use of the proper sanitizing agent is very important to maintaining egg shell cleanliness and free from bacteria contamination.

Interior egg quality relates to the functional, esthetic, and microbiological contamination factors of the albumen (white) and yolk. Good interior egg quality is essential to consumers who use eggs in many

common baking and cooking items. As soon as the egg is laid, its quality begins to decline. As time of storage increases, the overall egg quality as measured by conventional grading standards declines.

In addition to their nutritional value, eggs (albumen and yolk) have numerous important functional and esthetic properties. These were described in Mountney and Parkhurst (1995) and are: eggs act as a binding agent to hold other ingredients together, albumen acts as a smoothing agent to give icings a desirable texture, eggs act as a thickening agent, eggs act as a leavening agent in baked goods, eggs are used as a coating for cakes, rolls, cookies, egg yolks add color and richness to foods, eggs are used as a clarifying agent which are used to remove extraneous materials from beverages, coffee, etc. In addition to the previously mentioned functional and esthetic qualities of eggs, both the albumen and yolk tend to take up flavors and odors of surrounding food items or environment.

Microbiological contamination quality and factors of albumen and yolk are very important. Egg white contains a low concentration of the enzyme lysozyme. This enzyme has been shown to have the capability of breaking down the cell walls of some bacteria. Egg white also has a high pH which acts as a retardant for bacteria growth.

A number of items need to be mentioned about methods to maintain higher interior egg quality and prevent the breakdown of egg albumen and yolk. The main method utilized to maintain high interior egg quality is to store eggs at a relatively cool temperature (45°F or lower). Also, it is important to maintain a relatively high relative humidity (70-80%) in the egg storage area. Since eggs lose moisture due to increased storage time and temperature, the high humidity environment will slow this process down. The use of low storage temperatures will help maintain the good functional properties of both albumen and yolk, reduce the loss of carbon dioxide through the shell from albumen, and help maintain albumen pH. The flow of water from the albumen to the yolk which occurs at high temperatures will be retarded if eggs are stored at a low temperature. The process of oiling eggs will also help maintain interior egg quality. The practice of oiling eggs prior to washing the eggs is not a good idea, however, if this is done, the oil gives the eggs a coating of protectant like an umbrella and bacterial contaminants will have an easier time of penetrating the shell. Also, when washing eggs, the temperature of the wash water should be at least 20° warmer than the egg to avoid bacteria from entering the egg.

CONCLUSIONS

In summary, it is important for egg producers and marketers to realize the factors which contribute to egg shell and egg interior quality. Knowing what causes a reduction in egg shell and interior quality is important, but equally important is knowing how to correct the cause to conserve good egg quality.

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