

Infinite Eggs

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Abstract

This experiment determined the best way to store eggs. Eggs were kept in four locations including the fridge, the freezer, a cool closet, and in the fridge for 24 hours then placed in a cool closet. The hypothesis was that the eggs kept in the fridge will last the longest. A half dozen of eggs were used for each location. The eggs were tested on freshness by putting them in a glass of water. If the egg laid at the bottom of the glass, the egg was fresh. When the egg floated to the top, it was determined a bad or not fresh egg. During the experiment, the eggs in the freezer cracked and were determined to be bad because the eggs would cause a mess if thawed. The second group of eggs to be deemed bad were the eggs in the closet. The third group of eggs to be determined bad were the eggs that were moved from the fridge to the closet. The hypothesis was correct because the eggs kept in the fridge remained fresh for the longest time. The goal of this experiment was to determine the best way to send eggs over a distance or store them for a long period of time. This goal was accomplished, and the eggs were found to last longest in a fridge temperature. Because eggs are cheap and have many nutrients, they would be a great food choice for third world counties when shipped in their optimal environment.

Literature Review

One of the best benefits of chickens are the eggs. They are a great source of protein and nutrients (Peck-Whiting, Jeanie). Eggs are used all around the world in different recipes (Damerow, Gail). There are more than 200 breeds of chickens to choose from so there are many chicken options (Thomas, Steven, and George P. Looby).

Hens start laying eggs when they are five to six months old (Peck-Whiting, Jeanie). Hens do not need a rooster in order to lay eggs; a rooster is only needed if the eggs are used to be hatched (John, Matt). When chickens are around one year old, they lay eggs almost every day. A hen can lay between two-hundred to two-hundred and eighty eggs per year. A chicken's productivity decreases as it ages. A chicken that has been laying for about three years loses its productivity and lays hardly any eggs (Peck-Whiting, Jeanie).

When a chicken reaches 18 months of age, it will molt for twelve to twenty-four weeks. Molting is when a chicken loses its feathers and re-grows new ones. During this time, chickens do not lay eggs (Peck-Whiting, Jeanie). Hens lay the best when the temperature is between forty-five degrees Fahrenheit and eighty degrees Fahrenheit. During the winter hens stop laying because there are less than fourteen hours of light in the day (Damerow, Gail).

Certain breeds of chickens are known to be good laying chickens. Some good laying chickens include Hamburgs, Leghorns, Audalusians, and Campines. There are also dual-purpose breeds that can be used for meat and eggs. Dual-purpose breeds include Jersey Giants, Orpingtons, Plymouth Rocks, and Rhode Island Reds (Hobson, Jeremy, and Celia Lewis).

Even though an egg may look simple, there are many components to an egg. The outermost layer of an egg is the shell. The shell has tiny pores, which allow oxygen to pass

through the shell. The larger end of the egg has more pores than the pointed end of the egg (John, Matt). Because of the pores in the shell, it is better for eggs to be brushed or wiped instead of being washed (Hobson, Jeremy, and Celia Lewis). Inside the shell there are two membranes that protect the albumin from bacteria. The membranes also slow the evaporation of moisture from the egg. The albumin is the egg white, and it contains 88 percent water and 11 percent protein. The chalaziferous layer separates the albumin from the yolk; the yolk is made up of fats, carbohydrates, proteins, vitamins, and minerals. There is an air cell in the larger end of the egg so when storing eggs, the larger end needs to face upward. An egg contains everything a chick embryo needs for survival while it's developing inside the shell (John, Matt).

Someone can see the inside of an egg by candling. Candling can be done using a flashlight in a dark room. If the air cell in the egg is less than 1/8th of an inch, then the egg is still fresh (John, Matt).

Sources tend to believe one way of storing an egg is better than another way to store an egg. *Keeping Chickens* believes that an egg will be fresh for five to six weeks if it is stored in a cool, dry, dark place. Raw eggs can be frozen and remain fresh for up to a year. If an egg is frozen in its shell, the shell will crack, but the egg can still be defrosted carefully (Hobson, Jeremy, and Celia Lewis). *Your Chickens* claims that people should store eggs on the bottom shelf of the fridge. They go on to say, "An egg kept at room temperature ages more in one day than an egg stored in the refrigerator ages in one week (Damerow, Gail)." The FDA requires that eggs be refrigerated. Eggs bought in stores go through an intensive washing process before the eggs can be sold. When the eggs are washed, it removes a "protective bloom" so the eggs have to be refrigerated. The European FSA does not require eggs to be refrigerated. Eggs found in European markets might be next to bread and not washed ("Safe Egg Handling Practices").

Lisa from *Fresh Eggs Daily* says to rinse eggs with warm water before putting them in the fridge (Lisa, "Handling and Storing Eggs).

There is a simple way to tell if an egg is still good called the 'Float Test.' The egg, being tested for freshness, is placed in a glass filled half way with water. If the egg lays at the bottom of the glass, the egg is still fresh. Once the egg does not touch the bottom of the glass, it is no longer a fresh egg (Lisa, "Handling and Storing Eggs).

The storage of chicken eggs is widely disagreed upon throughout the world. If eggs do not need to be refrigerated, it may be easy to bring eggs to third world countries. Because eggs are cheap and have many nutrients, they would be a great food choice for third world counties.

Purpose

The purpose of this experiment is to test which environment is best to keep eggs in for a long period of time.

Hypothesis

The eggs that are kept in the fridge will remain fresh for the longest time.

Materials

1. Two dozen eggs
2. Two egg cartons each cut in half
3. Paper towels
4. Glass large enough to allow an egg to float to the top of water
5. Water
6. Egg drying rack
7. Sharpie

Procedure

1. Two dozen fresh eggs were collected and cleaned using cool water.
2. The eggs were collected into four groups of six, and they were tested for freshness using the floating egg test.
3. Two egg cartons were cut in half so six eggs could fit in one half an egg carton.
4. Each egg carton was labeled with a sharpie.
5. One egg carton was labeled “freezer”; another carton said “fridge.” The third egg carton half was labeled “closet”, and the last egg carton was labeled “fridge to closet.”
6. The eggs were placed in their egg cartons with the narrow end down because the air pocket is typically on the wider end.
7. Each slot in the egg carton was labeled by numbers.
8. The set of six eggs labeled “fridge” and the set of eggs labeled “fridge to closet” were placed in the fridge.
9. The set of six eggs that said “freezer” was placed in the freezer.
10. The set of six eggs that said “closet” was placed in a cool closet.
11. Every 24 hours, the eggs were tested using the floating egg test.

A. The Floating Egg Test

1. A glass was filled half way with water.
2. An egg was placed in the water.
3. If the egg lays on the bottom of the glass, it is fresh.
4. If the egg begins to rise up of the bottom, the egg is still good.
5. If the egg is standing up in the glass, but the tip is still touching the bottom of the glass, the egg is still good to eat.

6. Once the egg touches the surface of the water, it is no longer fresh.
 7. After each egg was put in the glass with water, they were dried with a paper towel then set on an egg drying rack.
 8. The eggs were set on the egg drying rack in the same order they were in their egg carton so they would not get mixed up.
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12. The floating egg test results were recorded in a table.
 13. After the first floating egg test the egg carton that said “fridge to closet” was removed from the fridge and placed in the cool closet.
 14. When at least three eggs in one set were no longer fresh according to the floating egg test, that set of eggs was deemed bad or not fresh any longer.
 15. The last set of eggs that are still fresh according to the floating egg test were the eggs that remained fresh for the longest time.

Data

The purpose of this experiment was to test which environment is best to keep eggs in for a long period of time. The best environment was found by using the floating egg test on four groups of eggs kept in different environments. One group of six eggs was put in the freezer at -8°F . Another group of eggs was kept in the refrigerator at 20°F . The third group was placed in a closet at about 67°F , and the fourth group was placed in the refrigerator for 24 hours then moved to the closet.

The freezer eggs were determined to be bad on the second day because they cracked. The eggs were still sinking to the bottom of the glass showing that they were still fresh, but the shells were split because they expanded from the cold temperatures.

Table 1: Freezer Eggs

Egg Number	Day of Spoilage
#1	Day 2
#2	Day 2
#3	Day 2
#4	Day 2
#5	Day 2
#6	Day 2

The eggs kept in the refrigerator remained fresh throughout the whole experiment.

Table 2: Refrigerator Eggs

Egg Number	Day of Spoilage
#1	Remained Fresh
#2	Remained Fresh
#3	Remained Fresh
#4	Remained Fresh
#5	Remained Fresh
#6	Remained Fresh

The eggs kept in the closet were the 2nd group of eggs to go bad. Egg #6 went bad on the 35th day, and egg #2 went bad on the 37th day. Egg #4 went bad on the 38th day, and egg #5 went bad on the 41st day.

Tablet 3: Closet Eggs

Egg Number	Day of Spoilage
#1	Remained Fresh
#2	Day 37 (January 6 th)
#3	Remained Fresh
#4	Day 38 (January 7 th)
#5	Day 41 (January 10 th)
#6	Day 35 (January 4 th)

The eggs that were moved from the refrigerator to the closet were the third group to go bad. Egg #5 went bad on the 14th day. From the beginning, egg #5 looked different than the other

eggs; its shell was very rough and had many small bumps on it. Egg #4 went bad on the 44th day, and egg #1 went bad on the 45th day.

Table 4: Refrigerator to Closet Eggs

Egg Number	Day of Spoilage
#1	Day 45 (January 14 th)
#2	Remained Fresh
#3	Remained Fresh
#4	Day 44 (January 13 th)
#5	Day 14 (December 14 th)
#6	Remained Fresh

A cause of error could be if the eggs were laid on different days. The eggs were bought from a store so the date of when the eggs were laid was unknown. To improve the experiment, eggs laid on the same day from a known source could be used. To improve accuracy, more eggs could be tested.

Conclusion

The purpose of this experiment was to test which environment is best to keep eggs in for a long period of time. The floating egg test was used to determine when the eggs were no longer fresh. The first group of eggs that went bad were kept in the freezer. The second group of eggs to go bad was kept in the closet, and the third group to go bad was the eggs that were moved from the refrigerator to the closet after 24 hours. The eggs kept in the refrigerator remained fresh through the whole experiment which consisted of 45 days. The hypothesis was correct because the eggs kept in the fridge remained fresh for the longest time.

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