

THE ART OF EGG

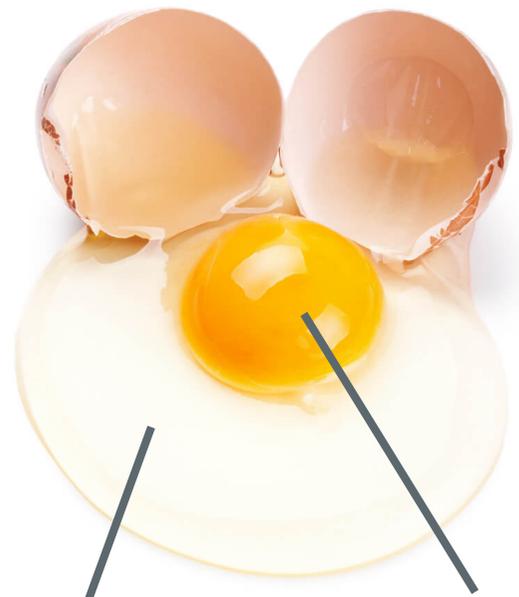
RAIMY SPORL

An egg, something so simple, yet underneath the speckled surface, a world of chemistry resides. Although an egg might appear like a white, brown, or colorful orb, it isn't just "some orb", it is an orb of life.



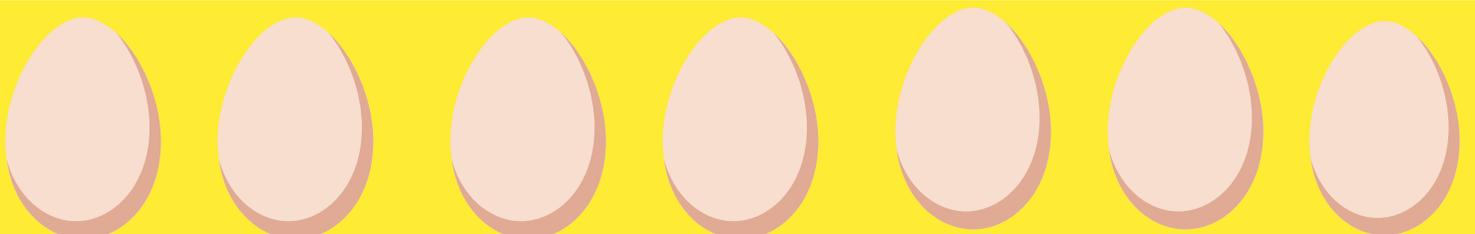
The egg shell itself is entirely made of calcium carbonate or CaCO_3 . It has an ionic bond which means the atomic structure is that of a crystalline one. However, the interesting thing behind this is that CaCO_3 can also be considered to have a covalent bond. The carbon atom in CaCO_3 is bonded to all the three oxygen atoms by a covalent bonds. The shell is a specialized material that is perfect for keeping the yolk inside while also keeping other things out. This is due to the thousands of pores that covering the surface.

The yolk and white of the egg itself is something completely different and more complex. It almost seems as if the shell is a capsule that holds a sea of proteins and nutrients. The egg white is also known as the albumen in more scientific terms and is composed in a series of layers (mostly made from water), containing more than 40 different types of proteins. The yolk is full of mostly proteins, minerals, and some fats.



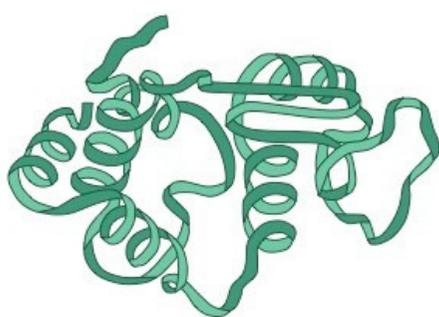
12% protein
86%t water

17 % protein
49% water
32% fat



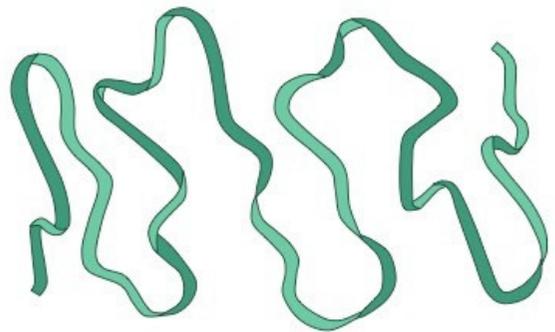
HOW DO EGGS ACTUALLY COOK?

Normally, when you apply heat to something, it melts and therefore becomes a liquid; however, in the case of eggs it is something completely the opposite. When an egg is cooked, the proteins inside commences something called denaturing, or being denatured. When the proteins experience heat and stress, they lose their natural structure and "unfold" from the tight formation they had before. This unfolding exposes parts of polymers (which once were within the structure), some of which are "sticky" in a way that they are able to form bonds easily with other parts of polymers. These proteins then begin to clump together and this is what causes the egg to solidify. The bonds formed between the polymers of the proteins are very strong, so that is the reason why once an egg is cooked it will not return to its liquid state.

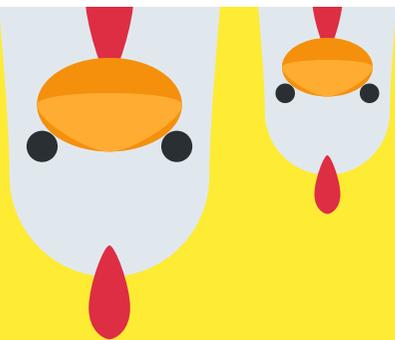


Folded Protein

DENATURATION



Unfolded Protein



MY DISH

One of the most classic egg dishes, and a perfect example of denaturing an egg is a boiled egg, that then makes a deviled egg. Deviled eggs take on many different forms.

From the salty vinegar style to a classic mayo and mustard egg. All of which sound amazing to any common party goer, yet, what is it about a deviled egg that makes it so delicious? To start, you need the basics; a hard boiled egg. This type of yolk is rather powder like when crushed up and has the perfect texture for a creamy yolk mixture. The beauty about this dish is the fact there are so many possibilities of flavor and texture; each of which are unique. However, when it comes to my personal preference, I enjoy a mean vinegary egg with lots of onion and pickle.

RAIMY'S TOP SECRET DEVEILED EGG RECIPE



<i>8-24 Eggs</i>	<i>8 eggs feeds</i>
<i>Mayonnaise</i>	<i>16 people (one each)</i>
<i>Dijon French Mustard</i>	<i>24 eggs feeds</i>
<i>Onion Powder</i>	<i>48 people (one each)</i>
<i>Paprika Powder</i>	<i>Total Time: 1 hour 20 min.</i>
<i>Roasted Paprika Powder</i>	<i>-Boiling time = 20 min.</i>
<i>White Pepper</i>	<i>-Cooling Time = 30 min.</i>
<i>Black Pepper</i>	<i>-Preparation Time = 30 min.</i>
<i>Mustard Seed Powder</i>	
<i>Pickle Juice</i>	
<i>Relish</i>	
<i>Finely Minced Black Olives</i>	

INSTRUCTIONS

- Boil a large pot full of water, adding a pinch of salt*
- Once water is at a raging boil, carefully place eggs into water and set a timer for 20 minutes*
- While eggs are boiling, fill a large bowl or dish with ice, when timer alerts, turn off heat and take the eggs out . Placing them into the bowl of ice*
- After eggs are cool to the touch, begin peeling the shells off each egg*
- The now peeled eggs should be placed on a cutting board and sliced down the middle longways*
- Pop the yellow and hardened yolk into a separate mixing bowl and crush the spheres into a chunky powder with a large fork*
- Start making the mixture by first adding a large dalup of mayonnaise, accompanied by a smaller dalup of Dijon mustard, about a hlaf a cup mayo and 1/4 cups mustard*
- Mix in thoroughly with the boiled yolk, this will be the base to the egg filling*
- Now it is time for the spice of life...spice! Add in a large dash of onion powder and paprika, along with a small dash of roasted paprika*
- Add two to three spoon fulls of dill relish, this will be the salt content*
- Add a small amount black pepper, white pepper, and mustard seed*

INSTRUCTIONS CONTINUED

- *Stir and blend well before adding three spoon fulls of black olive (this should be your last step to avoid crushing the olive pieces into a mush*
- *Now that the mixture is complete, load it into a large sandwich bag, big enough to hold it all*
- *Cut a small portion of one of the corners off, this will be your makeshift pipping bag(if you do not have one handy)*
- *Take the sliced half of the white egg "cup" and fill the hole with the mixture in a swirling motion from the homemade pipping bag*
- *Dust each deviled egg in a coat of normal paprika, plate, and enjoy*

EXPERIMENT OVERVIEW

In my experimenter, I wanted to find the exact and perfect temperature to boil the best deviled egg. By best, I am looking for a nice yolk consistency and color, making sure the white of the egg is not raw, and the egg whites' ability to hold shape (act as a cup for the filling). I took the five critical temperatures in the changing of the egg when it is being boiled: 57 degrees, 60 degrees, 65 degrees, 70 degrees, and 75 degrees.

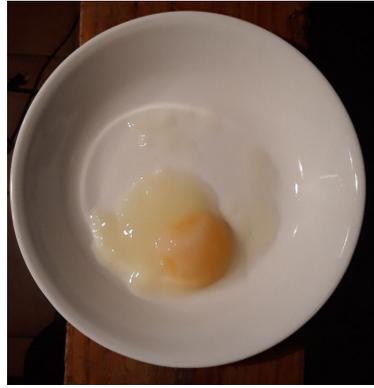
PROCESS:

To start this experiment, I gathered my materials. I used a water bath instead of just boiling my eggs on the stove because I needed to get an exact and precise temperature read on each batch of eggs. I filled the bath with 4 liters of water, the recommended amount when using this machine, and started the heating process. It took about an hour for the water bath to heat up to my desired temperature, so this project was a waiting game for the perfect egg. I decided to test five different critical transnational temperatures to watch the process of cooking and protein denaturing, but to also find the temperature that is just right for a deviled egg dish. Each temperature category included six eggs each. Before placing my first batch of eggs in, I labeled the top of each egg shell with the temperature that egg was going to be cooked in order to keep track of all thirty of my eggs. Once the water bath had reached my first desired temperature, 57 degrees Fahrenheit, I gently dropped each egg in and set a timer for 45 minutes. 45 minutes is the time span I would cook each batch of eggs for. When the timer alerted, I would remove the eggs with tongs and place them into an ice bath for cooling. I would then proceed to turn up my water bath to the next temperature, which in that case was 60 degrees.

RESULTS:

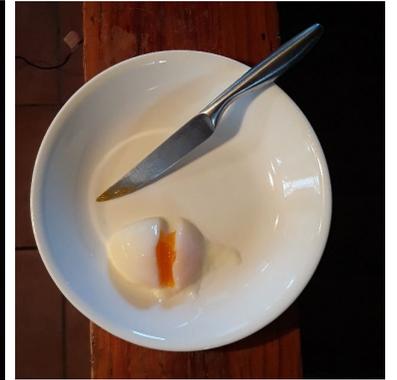
Test 1, 57°: After cooking, the egg was still quite raw. The yolk was a dark yellow and still running, while the white of the egg had a clear and white coloration. This egg was not able to hold shape and therefore could not become a deviled egg

TEST 1:



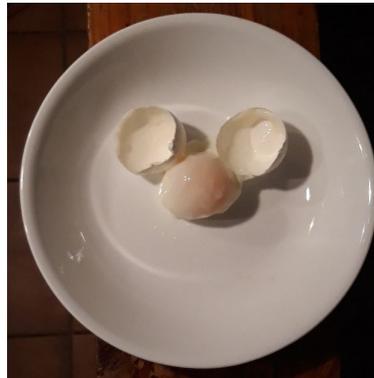
Test 2, 60°: This egg was slightly more cooked, but the whites of the egg were still runny, slightly clear, and appeared to look like watered down jello. The yolk was still dark yellow and had a sticky consistency. It was not able to hold shape when cut.

TEST 2:



Test 3, 65°: This temperature is considered the best for a perfect pouched egg. The egg whites were, again, like watery jello. The yolk was a dark yellow in the center and around the edges the color was a light yellow. This egg could not hold shape, so no dice.

TEST 3:



Test 4, 70°: The yolk was finally a light yellow color, but had a very play-dough like texture, not ideal for deviled eggs. The whites were mostly solid, but slumped off the egg when it was cut in half

TEST 4:



Test 5, 75°: Finally, after testing many temperatures, I had arrived at the ideal one for making a hard-boiled egg. The yolk was a pale yellow and had a powdery texture. The whites, when cut, held a cup-like shape, perfect for a deviled egg

TEST 5:

