

Why? Why? Why?

The goal of this activity is to help you:

- A. Develop a prediction for what you think will happen in your experiment
- B. Develop a robust chemistry-based explanation for your prediction

What is your testable question?

How does marination affect the color, taste and moisture of pork

What is your proposed hypothesis?

I think the time of marination will make the pork more salty, more dark color and make the pork more moist

If you haven't already done enough research to have a clear hypothesis that you are confident in, continue researching and come back to this activity when you are ready.

Why? Why? Why?

If you have ever spent much time with a young child you know that they can ask Why? Why? Why? over and over again as they seek to understand the world. I want you to act like that young child today and keep asking why in relation to your testable question and hypothesis until you have an answer that is robust, deeply rooted in chemistry and if possible makes reference to matter (atoms or molecules) and energy or forces in the particulate realm.

Below is an example of how I think this might look.

Question: How does the amount of baking soda affect the fluffiness of a cookie?

Hypothesis: As the amount of baking soda is increased, the cookie will be fluffier.

Why #1 Why do you think this hypothesis will be true? *The cookie will be fluffier because it will expand when baked.*

Yes, but Why? #2 *When baking soda is used in cooking it releases a gas.*

Yes, but Why? #3 *When baking soda is heated above a certain temperature it undergoes thermal decomposition and turns into carbon dioxide gas, water vapor and sodium carbonate.*

Yes, but Why? #4 *The chemical bonds holding the atoms in baking soda together aren't that strong and when they are heated past a certain temperature the bonds break and allow new bonds to form. Carbon dioxide and water are more stable molecules so they can form and not break down at these temperatures.*

Yes, but Why? #5 *Bonds can break at higher temperatures because when the temperature increases atoms and molecules are moving faster. The strength of attraction between atoms in a molecule depends on how electrons are shared so different molecules can have different attractions.*

I see, can you summarize that? *Increased amounts of baking soda will cause cookies to be fluffier because when baking soda gets hot enough atoms are moving fast enough to break bonds and new more stable bonds form. These new stable molecules happen to be gasses, carbon dioxide and water vapor, which occupy more volume and thus cause the cookie to rise and create an overall eating experience of being fluffier.*

Why? Why? Why? Your Turn:

Repeat the process of asking why until you have a robust explanation that incorporates chemistry and if possible makes references to molecules or atoms and energy or forces. After you've reached this level of explanation (you may or may not need to use all 5 "Whys?"), summarize all your "Whys?" into a few sentences.

Why #1

I think marinating the meat would make it more moist because its absorbing more liquid into the meat

Why #2

enzyme in a marinade causes the meat's tissue to weaken on the surface

Why #3

fat in a marinade, because it helps transfer fat-soluble flavors onto the meat and also helps retain moisture

Why #4

Acid help weakens the surface proteins in the meat and naturally boosts flavors

Why #5

the color gets darker because there is sugar in the sauce and it is burnt, it is the result of caramelisation.

Summary

There are many factors in the marination that led the pork to be more moist and obtain that moisture. When there is liquid in the meat, the fat helps transfer the fat soluble, therefore keeping the meat moist. The acid or enzyme in a marinade causes the meat's tissue to weaken on the surface causing the meat to be more tender. the color gets darker because there is sugar in the sauce and it is burnt, it is the result of caramelisation.