



# BRINES MAKE MEAT JUICIER

## MEATHEAD, AMAZINGRIBS.COM

If you like your meat juicy, tender, and flavorful, salting it before you cook can improve it on all three fronts. Dry brining and wet brining both get salt into the meat, and that improves its ability to hold water and boosts flavor.

### Salt And Juiciness

When meat cooks, a significant amount of water evaporates from the surface and some gets squeezed out from cells and connective tissues that contract under heat. Lean cuts, like chicken breasts, turkey breasts, and pork loins, can dry out easily. How do you cook these meats to proper temperatures without turning them into shoe leather? Surprisingly, salt can help.

Meat proteins are complex, long, and coiled. When sodium and chloride ions penetrate the muscles, the electrical charges alter the proteins so they can hold moisture more tenaciously. As a result, less is lost during cooking. Researchers at Cook's Illustrated discovered that a chicken soaked in plain water and another soaked in wet brine each gained about 6 percent by weight. They cooked both birds as well as an unsoaked bird straight from the package. Weighed after cooking, the unsoaked chicken lost 18 percent of its original weight, while the chicken soaked in water lost 12 percent of its presoaked weight, and the brined chicken lost only 7 percent of its weight.

Lab tests conducted by the Amazingribs.com Science Advisor, Dr. Greg Blonder showed that the brine retained by the meat is concentrated near the surface. Thus, brining counteracts one of the biggest problems of grilling by helping hold moisture near the surface, which almost always dries out by the time the center is properly cooked.

### Salt And Tenderness

Cooking meat gently to the proper temperature can tenderize it



by relaxing the proteins, a process called denaturing. Salt can also denature proteins even before the meat hits the heat. But if you add too much salt, the muscle proteins can turn tough again during cooking.

### Salt And Flavor

Salt actually expands our taste buds, so it acts as a flavor amplifier. It also suppresses our perception of bitterness.

### How Brining Works

To study brine penetration, Professor Blonder took a 12-inch-long section of pork loin and soaked it in a wet brine. Periodically, he lopped off a cross-section and treated it with an indicator that detects salt. Here's how far the brine penetrated:

#### Salt Diffusion At 230°F

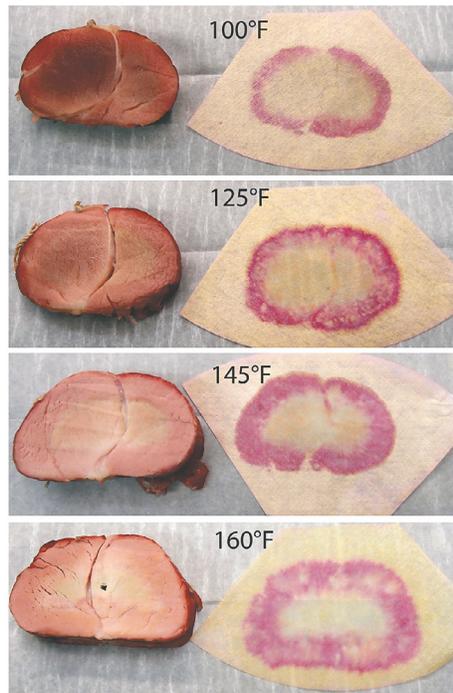


Illustration By Greg Blonder

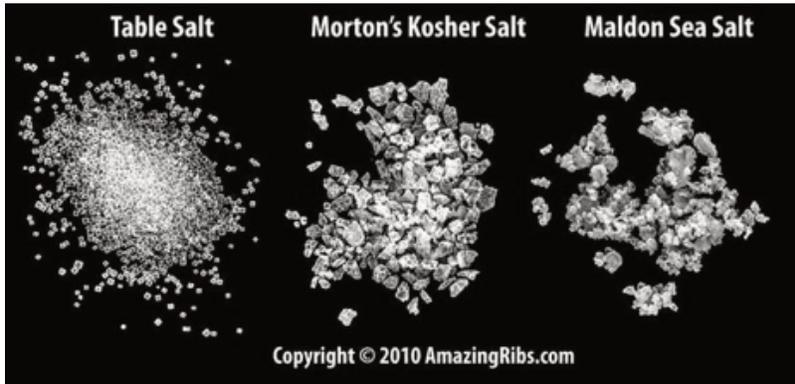
- 30 minutes: 1/10 inch
- 1 hour: 1/4 inch
- 8 hours: 1/2 inch
- 24 hours: 2/3 inch

That's right: After 24 hours, the salt still hadn't yet traveled 1 inch into the pork. Because it has less connective tissue, chicken is more porous, and salt will penetrate farther. Fish is more porous still. But you get the picture. When you brine, the salt remains pretty close to the surface.

To see how heat impacts salt penetration, he took a pork loin and rubbed it with curing salt. Then he washed it off and cooked it at 230°F. Periodically he cut off a slice and put it on a filter paper with a chemical that reacts with the salt. When the internal temperature of the meat rose, the salt migrated farther inward, far faster than it did when simply soaking in a wet brine (see image above). Blonder's experiments also showed that even though chicken and turkey skin are more than half fat, they will absorb salt. During cooking, the skin releases the salt into the meat. Meats with a thick fat cap block salt penetration almost completely.

## Dry Brining Vs Wet Brining

For wet brining, we submerge food in a saltwater solution of 5 to 10 percent salinity. To wet brine, you need to calculate the amount of water and the amount of salt, and then you have a big container of water you need to fit in the fridge. Dry brining is simpler and equally effective. The late chef Judy Rodgers of San Francisco's famous Zuni Café popularized the dry-brining technique, and since discovering it, I almost never wet brine anymore.



To dry brine, you simply salt the meat a few hours before cooking. How much salt? Salt tolerance is so personal that it's nearly impossible to give an exact amount. As a rule of thumb, sprinkle on about 1/2 teaspoon kosher salt (or 1/4 teaspoon table salt) per pound of trimmed meat. You do not need to rinse off excess salt. It will all be sucked into the meat. I dry brine almost all my meats, including steaks and chops, both beef and lamb, as well as many vegetables. They all benefit from the flavor boost and the water-retaining properties of salt. And dry brining helps poultry skin crisp, while wet brining softens it.

### For Steaks And Chops

About an hour before cooking, sprinkle the salt on the meat, massage it in, and return it to the fridge. After an hour, you're ready to cook.

### For Roasts

Rub the salt over the entire surface area. For the best results, refrigerate the meat overnight or for a day. If the meat is tapered, like a leg of lamb, use less salt on the thin end.

### For Chicken And Turkey

Professor Blender's tests have proven that salt does penetrate chicken and turkey skin, so go ahead and sprinkle the salt right on the skin. It may help crisp the skin. Breasts need more salt than thighs because they are thicker. Refrigerate for at least 2 to 4 hours.

### Wet Brining

Wet brining works best on fish, chicken breasts, turkey breasts, and pork loin chops: food that cooks so quickly that the absorbed moisture doesn't have time to drip out during heating. Chicken thighs, turkey thighs, and cuts of pork like ribs and shoulder are moist enough from fat that they don't need wet brines. I never wet brine red meats unless I am making a cured meat like corned beef. Wet brines can make poultry skin soggy and harder to crisp. If you decide to wet brine, the brine should contain 5 to 10 percent salt by weight. Recipes often call for 1 cup table salt to 1 gallon water for a 7.7 percent brine by weight. If you have kosher salt, use about double the volume.

### Measuring Different Salts

A salt's grain size can make a huge difference in its volume measurement and its total sodium content, or saltiness. For example, table salt, which is fine in texture and has a cubic grain, has less air between the grains than kosher salt, which has a larger, flake-

shaped grain. So if a recipe calls for 1 teaspoon Morton's Kosher Salt and you use 1 teaspoon table salt, the results will be almost twice as salty. If the recipe calls for salt by weight, such as 8 ounces, it doesn't matter which salt you use. The saltiness will be the same when measured by weight. Here are some approximate conversions:

#### Morton's Table Salt

1 teaspoon  
about 1/2 teaspoon  
1 cup

#### Morton's Kosher Salt

about 2 teaspoons  
1 teaspoon  
about 8 ounces (1/2 pound) by weight

There are some differences among brands. Diamond Crystal Kosher Salt has a coarser grain than Morton's, so you need to use more than the Morton's. That's another reason why it is best to measure salt (as well as sugar and flour) by weight rather than volume, since a pound of table salt, a pound of kosher salt, and a pound of sea salt all contain the same amount of NaCl. If I knew that every kitchen had a good digital scale, I would list salt measurements in my recipes by weight.

MYTH: Osmosis is how salt gets into meat during brining.

BUSTED! Many cookbooks tell us that salt is pulled out of the brine and into the meat by osmosis. Osmosis is the process of ions and molecules passing through semipermeable membranes. Salt is a tiny two-atom molecule, and it gets into the meat primarily by diffusing through wide-open pores, sliced muscle fibers, capillaries, intracellular water, and other channels. That's how it gets into the meat. Once there, osmosis does help the salt get through cell membranes and into muscle fiber proteins.

### Briners, Beware: Double-Salt Jeopardy!

Rubs are a great way to flavor meat, and brines are a great way to add flavor and moisture. But commercial rubs often contain a lot of salt, so a salty rub on top of brined meat can make the meat unbearably saline. My advice is to make your own rub mix and leave the salt out of the blend. Most of my rub recipes do not include salt, which allows you to apply the salt and seasonings separately. Also, never brine meat that is labeled "enhanced," "flavor-enhanced," "self-basting," "basted," or "kosher" because it has already been salted during processing. Last, remember that the drippings from brined meat will taste slightly salty. If you make a gravy from drippings, be sure to taste first before adding salt. You can always add salt, but you can't take it away.

Meathead is the barbecue whisperer who founded Amazingribs.com, by far the world's most popular outdoor cooking website. He is the author of "Meathead, The Science of Great Barbecue and Grilling," a New York Times Best Seller that was also named one of the "100 Best Cookbooks of All Time" by Southern Living magazine. This article was excerpted and modified from his book. More on his book here: <https://amazingribs.com/book>. For 3000+ free pages of great barbecue and grilling info, visit AmazingRibs.com and take a free 30 day trial membership in the Pitmaster Club.