Smoking Poultry

Smoking chicken or turkey imparts a unique, delicate flavor and pink color to cured with salt and nitrite meat and increases its storage life. Mild cures with relatively low salt content are used in preparation for the smoking to maintain the poultry flavor. A light smoke will add to the delicate flavor of the poultry, a heavy smoke will add flavor similar to smoked red-meat products. Most meats or fish if severely overcooked will taste like leather but poultry is particularly vulnerable because it is so lean. Fortunately, soaking birds in a brine – a solution of salt and water will help to achieve a moister, juicier product. If a product will be smoked at low temperatures nitrite (Cure # 1) must be used. Please note that Cure # 1 contains 93 % of salt and that has to be taken under consideration when mixing table salt with water.

Curing – wet method, **mild** cure. It is very easy to end up with poultry that's too salty to use. One of the reasons is that the brine is prepared as if a ham were cured and no consideration is given to the fact that a large part of any bird consists of his bones. The bones are not going to absorb any salt and the curing times need to be shorter. It is safer to brine on the low end of the time range on the first attempt and keep notes for future reference. You can always brine longer the next time if required.

The FSIS/USDA recommends :***"To prepare a brine solution for poultry, add ¾ cup salt to 1 gallon of water, or 3 tablespoons of salt per quart of water. For best flavor use, use sodium chloride – table salt"***. Taking this as common table salt (NON-iodized) this works out as ¾ of a cup equal to 219 g (0.48 lbs). This in turn works out to be a brine concentration of 5.48 % or a salometer/brineometer reading of **21** degrees. This would result in the amount of salt in the final product at the 0.50 percent level.

A noted expert on sausage making and meat curing **Parson Snows** recommends – 1 part table salt to 16 parts water.

1/17 = 0.0588 (5.88 %)

Using the ratio of 1 lb of salt per 16 lbs of water (1.92 US gallons) or 0.52 lbs of salt per US gallon of water equals a brine concentration of 5.88 % or a salometer/brineometer reading of **22.5** degrees. This would result in the amount of salt in the final product being at the 0.53 percent level.

Rytek Kutas in his book presents the following formula:

5 gal water

2 lbs salt

1 lb Cure # 1 (there is **0.93 lb salt** in it)

11/2 lbs powdered dextrose

and that equals a brine concentration of 6.5 % or a salometer reading of **25**degrees.(salt present in Cure # 1 included in calculations).

Dr. Estes Reynolds, a brining expert at the University of Georgia suggests using 9.6 ozs of salt for every US gallon of water for brines longer than several hours. This works out to be brine concentration of 6.68 % or a salometer reading of **25** degrees.

There are many sources that recommend using 1 lb of salt to 1 gallon of water. This works out a brine concentration of 10.72 % or a salometer reading of **40** degrees which is rather high if the bird will be brined for more than a few hours.

Conclusion

With salt everyone's tastes are different but it can be concluded that any salometer reading between 17 and 26 degrees will work out fine with the 21 – 22 being in the middle of the safe range. It should be noted that the higher salometer reading, the saltier the brine. Products that are going to be smoked below 160° F need Cure # 1 to be added to the brine. As Cure # 1 contains 93 % of salt and that fact has to be taken under consideration. About 3 oz of Cure # 1 are needed for each gallon of water and that comes to 85 grams. This works out to be 79 grams of pure salt. Going back to our FSIS/USDA

recommendation we need only 140 grams of salt as Cure # 1 already supplies 79 grams. That comes to 0.479 of a cup and for all practical purposes can be made equal to ½ cup. Using ½ cup pf salt and 3 oz of Cure # 1 we obtain brine concentration of 5.6 % which corresponds to a salometer reading of **21** degrees.

A typical brine solution at 22 degrees salometer reading :

1 gal of cold water
½ cup (146 g) of salt
3 oz (85 g) of Cure #1 – corresponds to 79 g of pure salt
3 oz (85 g) sugar (brown or white).

Many people claim the brown sugar imparts a better flavor. Also a maple – flavored sugar may be used to provide an unusual flavor.

There are two methods of curing poultry

Cover brine curing
Spray pump curing

<table>
<tr><td colspan="2">Cover brine curing method
Curing time depends on the size of the bird :</td><td>Spray pump method (optional)
To shorten curing time, poultry should be pumped with brine mixture in an amount equivalent to 10% of the bird’s weight. A 15 lb turkey should receive 1.5 lb of brine.</td></tr>
<tr><td>Cornish Game Hens</td><td>2 hours</td><td rowspan="8">Birds weighing 3 – 10 lb
Each breast – 3 injections 60 % of the brine
Thigh – 2 injections 30 %
Drumstick – 1 injection 10 %
Birds weighing 10 lb or more :
Breast - 3 injections 50 % of the brine
Thigh - 2 injections 25 %
Drumstick - 1 injection 10 %
Wings - 1 injection 10 %
Back (each side) - 1 injection 5 %</td></tr>
<tr><td>Chicken Pieces</td><td>2 - 4 hours</td></tr>
<tr><td>Whole Chickens (2 lbs)</td><td>1 day</td></tr>
<tr><td>Whole Chickens (4 lbs)</td><td>2 days</td></tr>
<tr><td>Turkey Breast</td><td>4 - 8 hours</td></tr>
<tr><td>Whole Turkeys (up to 10 lbs)</td><td>2 - 3 days</td></tr>
<tr><td>Whole Turkey (over 10 lbs)</td><td>3 - 4 days</td></tr>
<tr><td>A Very Large Turkey</td><td>5 days</td></tr>
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After the brine has been pumped in, the bird should be massaged lightly with fingers for better distribution of the brine inside. *Birds weighing less than 3 lb don’t need to be pumped and can be immersed in brine mixture.*

The poultry should be placed now in a stainless steel, clay or food grade plastic container and **covered fully** with the remaining brine (use weight plate if needed). It should be placed in the refrigerator or in case the container is too large, the ice should be added periodically to the brine if the temperature goes over 40 F. That should be taken under consideration if we want to maintain the proper proportion of the ingredients in the brine.

The curing times are as follows :

Birds 3 – 10 lb (injected) 24 – 36 hour

Turkeys over 10 lb (injected) 48 – 72 hours

Draining and drying

After curing, the poultry should be rinsed in cold tap water for 5 minutes to remove any crystalized salt from its surface, then it should be left for 30 min to drain. Poultry holds its shape after hanging in a smoker for many hours and it will look like a bat with spreaded wings and legs. To retain its original shape it should be placed in a stockinette bag.

Smoking

When the birds are dry or tacky to touch, they should be placed in preheated smoker and if they are still wet hold them at 130° F for one hour or more until dry. Keep the damper wide open to allow moisture to escape. Once the birds are feel dry, leave the damper in ¼ open position and smoke at 130° F for about five hours. Then continue smoking rising slowly temperature to 165° -170° F (74°-77° C) and hold until the inside temperature in the thickest part of the breast is 155° F (68° C). You could also insert a thermometer close to the ball and socket joint of the thigh as this is also the last place the meat becomes fully cooked. If the thermometer is not available , you can check the turkey by twisting the leg slightly. If it moves easily, the cooking is done. Small birds like Cornish Game Hens or Small Chicken will need shorter smoking and cooking times.

Notes

Sodium nitrite (cure # 1) in the brine will cause the poultry meat to become pink when it is smoked. If this color is objectionable you can remove the cure # 1 from the formula.

You can smoke turkey without cure # 1 but at higher temperatures to eliminate food poisoning (botulism) that cure #1 prevents. The turkey should be placed in a preheated to 180° F smoker for at least one hour. Then the temperature should be increased to 200° – 225° F and smoke applied. The turkey should be smoked/cooked to the internal temperature in the thickest part of his breast to 170° F. We are now **smoking/baking** turkey without worrying about food poisoning.

The turkey will have more shrinkage now as it will loose more moisture. It will have a different flavor to turkey that was smoked at lower temperatures. Also the smoking/cooking process will be shorter as the turkey will reach its required inside temperature sooner.

Nitrates/Nitrites in Brines

The FSIS/USDA allows the following maximum levels of Nitrates/Nitrites in Immersion Cures and/or Massaged/Pumped Products :

Nitrites: a maximum of 200 ppm – ie. 2 lbs of Nitrites per 100 US gallon of brine @ 10 % pump

Nitrates: a maximum of 700 ppm – ie. 7 lbs of Nitrates per 100 US gallon of brine @ 10 % pump

And be careful when making stuffing: *read the story* **Thanksgiving Dinner**

Without proper development conditions, C. botulinum bacteria lay low in a spore form, and can remain dormant for years. To grow, these bacteria require a slightly acidic, oxygen free environment that is warm (40-120 F) and moist, which is exactly what happens when we make our own meats, especially **the smoked ones.** You can make turkey stuffing a day earlier, just make sure it is in a refrigerator.