

## Are “Fermentation Chambers” And “Curing Chambers” Really Necessary?

*From an earlier post by Chuckwagon*

Yes, they are. Have you ever cut into a salami and found a gray ring around red meat? This condition occurs when the humidity has been too low during curing, causing quick dehydration (and thus hardening) of the casings - not allowing the correct amount of moisture to naturally dissipate from the sausage as it cures.

Trapped moisture can also cause the sausage to spoil. Ol' Rytex Kutas used to compare case hardening to stuffing a pipe full of sausage. He said, “*When the ends of the pipe are welded shut, there is just no way for the moisture to escape from the sausage*”. It is important to understand there are two atmospheric conditions that we must be able to control if we are to produce dry-cured sausage. They are simply (a.) **temperature** and (b.) **humidity**. For fermenting sausage, the ideal temperature range is between 40° F. and 55° F. (4° C. and 13° C.), while maintaining a relative humidity of about 70%, depending upon the sausage being made. Inside a typical refrigerator, the humidity is only about 30% to 40% - much lower than that needed to cure sausages. Many people have tried to maintain 70% humidity by placing a pound of salt into a shallow pan of water. Although, the humidity indeed increases, this method is not recommended as it is not easily regulated or controlled.

Again, dry-cured sausages at the outset need more than 70% relative humidity to start the fermentation process and keep them from drying too quickly. For the first few days (depending upon each recipe), they are placed into a controlled, heated, and moist fermentation chamber to promote fermentation through the development of any number of strains of *lactobacilli* or *pediococci* (lactic acid producing) bacteria. Directly responsible for fermentation, the bacteria consume sugar and produce lactic acid, giving the sausage a sour, tangy, taste. The more sugar added, the more “tangy-tasting” the sausage becomes.

Hey! Did you notice I used the word *taste* – not *flavor*? Actual flavor-producing bacteria are another strain altogether. Later in the process, the humidity and temperature are usually lowered a bit as they are placed into a “curing chamber” for further slow, controlled dehydration. In dry climates particularly, sausages must be cured inside a chamber capable of sustaining a high degree of moisture at varying temperatures. Typically, different “holding periods” are required for dry-cured sausages in an environment of 70 - 75% relative humidity at assorted lower temperatures specified by individual recipes, although the greatest fermentation takes place between 100°F. (38°C.) and 110°F. (43°C.).

**Without fermentation and curing chambers, your sausage will probably spoil.** Professional chambers or rooms may cost thousands of dollars – not an investment all hobbyists are willing to make. However, using a little imagination and applying a bit of skill, many people transform old refrigerators or freezers into top-quality curing chambers. Some sort of humidifier/dehumidifier with an exterior control must be employed to effectively produce top-quality, fermented sausages, and hobbyists have come up with every sort of contraption imaginable; many are first-rate! As I was in the piano building business for nearly half a century, for decades, I effectively used a DampChaser™ piano humidifier/dehumidifier system, that I incorporated into a modern

refrigerator with all sorts of added shelving and hangers provided for stocking meat sausages. If you prepare dry-cured, smoked, fermented sausages, bacon, or ham, you must:

1. Purchase a reliable thermometer for constantly monitoring the dry-curing temperature.
2. Purchase a hygrometer for monitoring relative humidity.
3. Build or use some type of “fermentation chamber” (described below)
4. Build or use some type of “curing chamber” (or drying room) having controlled specific relative humidity for a specified time period.
5. Install a means of controlling the temperature and controlling the relative humidity in your fermentation chamber as well as your curing chamber.
6. Provide for a “storage chamber” or storage room for long-term storage if necessary.

So, what is the bottom line? A small humidifier (use only distilled water please) and an **in-line voltage humidistat** (which senses relative humidity, operating on the same principle in which we control temperature) must be purchased. An effective method for heating and cooling the chamber becomes necessary and a “single-stage, line-voltage thermostat” does the trick, alternately controlling a small ceramic heater and a cooling fan. Mine came complete with a temperature sensor, a temperature control with a relay switch, and instructions. The line voltage thermostat solved the problem of having the refrigerator’s controls limiting the operational temperature from only 32°F. (0°C.) to 40°F. (4°C.). In total, I spent a bit more than I perhaps should have, but I purchased first class controls and equipment with ability to control a wider range of temperatures and humidity. Later, I changed the “single stage thermostat” for a “two-stage line voltage thermostat”, enabling me to control two independent devices – such as the ceramic heater and a computer fan (used for cooling) or even a small cooler. The two-stage unit is more expensive, but may be just the item you are looking for. For smaller operations, the proper thermostat could be as near as your local pet supply store where reptile terrariums are found. If you wish to incorporate ultimate convenience, a “*two-stage line voltage thermostat*” may be just the device you require. Nutone makes a model, and Green Air ([www.greenair.com](http://www.greenair.com)) yet another.

If you are not inclined to develop your own temperature and humidity controls, search sausage-making supply catalogs that provide them pre-built and ready to simply plug in. The Sausagemaker in Buffalo, New York, offers top quality controls and humidifiers, as do other suppliers. Quality controls for monitoring temperature and humidity may seem pricey, but their reliability is critical and you really wouldn’t want to purchase a second-rate product that will break down in time. Some models even have all the controls contained in a single handy unit. The publication “The Art Of Making Fermented Sausages” by Stanley Marianski, includes much information as well as some great ideas for building and equipping your own fermentation and storage chambers. Mr. Marianski has even included a few sources for ordering supplies over the internet. For the true “do-it-yourselfer”, there are also some great plans available from Phil Young, a moderator called “Wheels”, at [sausagemaking.org](http://sausagemaking.org). “Wheels” has published them on the site’s bulletin board free of charge.

At the beginning of the fermentation process, some sort of fan must be used to carry away moist, stale air as the sausage dries. The moisture content is at its highest as the process begins, although it usually only requires a smaller computer fan to move air away at about 2 miles per

hour. Halfway through the process, depending upon how much moisture is being dissipated, the air speed may be safely decreased to only about one mile per hour. Without this minimal draft being provided, the moisture collecting on the surface of the sausage could become slimy, promoting the growth of unwanted microorganisms. If moisture continues to collect on the surface, the relative humidity must be lowered slightly. The ideal device is a sturdy computer fan, capable of continuous operation. A vast array of them is available at your nearest computer supply store.

Best wishes, Chuckwagon