Consolidated: Cheese Making Process

Room temperature

The usual ideal temp during cheesemaking and draining is 70F - 72F (21C - 22C). Ideally, your cheesemaking space will be climate controlled.

Starter Culture

The usual temp at which culture is added and milk is held during ripening is between `86F – 90F` (`30C – 32C`).

Some acid-coagulated cheeses are ripened at lower temps, such as yoghurt.

We are working with DVS - Direct Vat Set cultures. They are added by sprinkling them on top of the warm milk, letting them set for a few minutes, then stirring them thoroughly into the milk.

Letting the powder sit on top of the milk allows it time to absorb some moisture and begin to rehydrate. If it is

stirred in immediately, sometimes the powder will form a clump in the milk that won't dissolve.

After ripening and just before coagulation, you may want to add additional ingredients like coloring `Annatto`, `calcium chloride`, `lipase`, or flavored liquid from herbs, seeds, smoke or hot peppers.

Rennet

Make sure to check if the rennet (especially microbial) is single strength or double strength. Use half the requested dose if it is double strength.

Liquid rennet must be diluted in cool, non chlorinated water before use. If chlorinated water is used, the chlorine will attack the rennet. Heat will also deactivate it.

Don't mix the rennet with the water until just before use - because light exposure, contaminants, etc.

Once mixed, it is critical that the milk stop moving in the vat and remain as still as possible until coagulation is complete.

`Rennet` solution should be dispersed over the milk by pouring it over a perforated ladle or using a "garden"

sprinkle can.

The stirring motion should be "up and down" instead of circular. You don't want to create a whirlpool effect.

Once you stop stirring, you can use a flat ladle to help the milk stop moving.

You should also log the time when you added the coagulant and how long you stirred it for in a logbook. This is essential for the next step.

Cutting

The firmness of the coagulated milk when you cut it "fixes" the type of curd you will end up with later on in the make. So if you know the goal, you will know at what firmness to cut and what size to cut the curd.

The goal is a **smoothly cut curd** of the **desired size**.

Determining when to cut

1. Observe the milk for the point at which the enzymatic phase ends and the coagulation phase begins. I.e. observe the flocculation point, using that time to determine the total coagulation time.

2. Watch for the ideal texture for cutting, or the `clean break`.

Checking for flocculation

Flocculation occurs when the enzymatic phase is 75% - 80% complete and clumping becomes noticeable.

To test for flocculation point, remove a small sample of milk in a clear container, swirl it, and see if flocks form on the sides of the container.

Once you see flocculation, the time is noted, then multiplied by a specific factor (see Table 2-2, p. 47). **The resulting number is the time from adding the coagulant to cutting.**

Checking for Clean Break

A clean break is a good test to use in addition to Flocculation testing, but is not a single moment in the vat. The optimal cutting time is a range, not a moment.

Method - Use a knife, cut a slit, insert the knife - flat side up- at an angle just behind the slit and under the uncut portion of the front of the cut. Then lift slowly and see if the cut seam expands forward. As the curd mass gives

way to the pressure below, it will part. As it parts, observe the sides of the tear and the liquid that escapes. Are the sides smooth or jagged? Is the whey white or yellow/green? If the sides are smooth and the liquid is more yellow/green than white, the curd is ready to cut.

If the cut time is off from its goal, adjust the amount of rennet for the next batch.

Cooking

Almost all hard cheeses will go through a phase where the curd is heated and stirred.

Temp increases are usually done in slow increments, with the initial increases being done the slowest to give the inside of the curd a chance to lose the whey at the same rate as the surface.

As the temp increases, the bacteria will respond by producing more or less acid, depending on the type of the starter bacteria.

Meaning, **you can adjust the rate of acid development by adjusting the temperature in the vat**.

If required, stir the curd as gently as is needed to prevent

the curds from "shattering", or breaking into tiny pieces.

Checking the curd for readiness

Scoop a small handful of curds from the vat, flatten your hands and make a patty of curds in your hand. Drain the curd with some light squeezing, then see if the curd sticks to one hand, holding it upside down. If it sticks, it is ready.

Pitching

`Pitching` refers letting the curds settle in the vat, sometimes just before draining but often as a technique for allowing a bit more acid development in the vat without continuing to shrink the curds through stirring.

Draining in bags

They whey collecting below the bags should be relatively transparent and a yellow-green color, not white. It it's whitish, you know you are losing some butterfat and product

Draining and Pressing in Forms

If the curd temp is over `75F` (`24C`), the butterfat is less stable and mostly liquid, so you have to be careful

not to squeeze the fat right out of it. If you see white greasy whey, you know you are using too much pressure.

Room temp also influences drainage. Generally a `72F` (`22C`) room is ideal for draining most cheeses - it's just below the butterfat melting temp.

The cooler the room, the slower the draining and the `pH` development.

Salting

Salt `sodium chloride` , aka table salt, slows and halts acidification, assists with drainage, controls bacteria and mold growth, influences texture, and contributes to flavor.

The best texture for cheesemaking is flaked salt, such as you find in Kosher Salt. Make sure your Kosher Salt does not contain an `anti-caking` agent. Try to find the `Diamond Crystal` brand, via `Saltworks` .

Methods of Salting

There are two main methods of adding salt to cheese - `dry salting` and `brine salting` .

Dry salting is done by sprinkling or rubbing salt onto the

curd or formed cheese.

How to Brine Salt the Cheese

Ideally, cheeses are put into the brine at the same temperature as the brine - usually `46F to 59F` (`8C-15C`).

Just before placing wheels in the brine, it is a good idea to first agitate the solution to help ensure an equal distribution of minerals and contents.

Sprinkle dry salt on top of each cheese after it is floating in the brine. Otherwise, you should totally submerge the cheese in the brine using a rack that presses them down into the brine

Table 2-4: Average Ideal Salt Levels in Cheese - p.58

Table 2-5: Average Brining Times Based on Cheese Type - p.60

In general, for each `gallon (4L)` of **water**, add `1 tablespoon (15 ml)` of **calcium chloride** (of a 32% premixed solution) and `1 teaspoon (5 ml)` **white vinegar**.

If you aren't sure if your available water contains too

much calcium, see if you get any sliming on the surface of the cheeses. If the cheese starts to slime, you can usually save them by scraping off the slime and adding more calcium chloride to the brine before placing the cheese back in the solution. Remember to check the pH of the brine at the same time.

If you need to remove brine from your tank to keep it from overflowing, be sure to stir the brine well first, so you are leaving a balanced solution.

If your brine becomes too acidic, you can neutralize it a bit by adding some baking soda.

You can filter the brine through finely woven cheesecloth to remove particles and "sludge" that accumulate at the bottom of the tank.

For initial salting of cheeses, the usual level of salt to brine is about `23%` - fully saturated brine is closer to `26%` salt.

Salt should be monitored using a `salometer` (also spelled `salinometer`), aka a `brine hydrometer`.

There's an issue with how to read the `salometer`. If you want, read up on it on `p. 62`.

Review Brine Maintenance Tips!

Affinage

Temperature in the Aging Room

The goal temp in an aging room, according to G, is `50F - 55F` (`10C - 13C`)

Humidity in the Aging Room

There is a chart is Appendix C that gives you a table of bulb temps vs `RH`. Copy the table and keep it handy next to your `psychrometer`.

The goal temp in an aging room, according to G, is `50F - 55F` (`10C - 13C`), so she watches for a `2.5F` difference between the bulbs.

The `psychrometer` does not need recalibrating, but needs the wick to be cleaned once in a while and the reservoir of water to be refilled.

Keeping the aging space free from mold and pests

To prevent mildew and molds from growing on the walls of your aging space, wipe down using a chlorine solution or other sanitizer that is adequate (Table 6-1: Guide to

Sanitizers and proper dilutions).

If there is evidence of molds or debris, first use a damp cloth or a mild detergent to remove any visible buildup. Make sure not to use excess sanitizer as this could import unfavorable odors and flavors to your aging space, and of course your cheese.

Watch out for fly egg cases (they look like black, brown or white grains of long-grain rice) being laid in nooks and crevices.

Using a cheese trier/iron

A `cheese trier`, or `cheese iron` is a tool for removing a core sample from a whole cheese, and for tapping the outside of a cheese to listen for air pockets.

This tool allows you to check the progress of cheese without cutting into it.

You can help make notes on flavor and texture changes that will greatly help you determine when a cheese is ready.

As cheeses age, they might be bitter. Make notes on bitter phases as they occur and when they end, and this

will help you decide on ideal aging lengths for each type of cheese.

A core sample will also help determine when a blue cheese is ready to be wrapped or moved to a colder storage.

Using the iron use to tap a cheese can help determine when eye development is adequate or when a cheese is suffering from early or late blowing (see `Affinage` Troubleshooting). And it's fun to turn cheese into a percussion instrument.

How to core sample a cheese

1. If the cheese is semisoft, pre-chill it to refrigeration temps
2. Sanitize the trier and dry well. You may want to use a warm to hot sanitizing solution to help the trier more easily penetrate the cheese.
3. Insert the trier about `2/3` of its length (if the cheese is large enough) or halfway through the diameter of the cheese.
4. Rotate the trier in several complete rotations
5. Tilt the handle back slightly, and slide the sample out of the cheese.

6. Observer the sample for eyes, flaws, texture and aroma
7. With a sanitizing knife, cut a small portion from the tip of the sample
8. Slide the trier with the cheese sample on it back into the hole and push from the rind side to seat the sample back into the cheese.
9. Use a tiny bit of the cut sample to smear over the seams
10. Return the cheese to aging, and note on the make sheet the date and results of the sampling.
11. Analyze the sample for texture and flavor.

Dealing with Bad Mold on Cheese

At the first signs of mold, take a cloth moistened in a light brine (solution of 1 tablespoon salt and 1 tablespoon vinegar [optional] to 1 cup of water) and gently rub the surface of the cheese. Be sure not to leave the surface of the cheese wet.

Brushing rinds

One of the simplest ways to create a beautiful natural rind is to brush the rind periodically during aging. As with

a bandaged rind, brushing does not eliminate the molds but instead limits their growth and "damage" to the rind.

In the beginning, use a very soft brush to prevent damaging the still soft cheese. It is a good idea to have a minimum of two textures of brushes, one soft and one medium, to maintain brushed rinds.

When brushing, take your clean, sanitized, bone-dry brush and gently which it across the surface of the cheese. Doing this over a sink or moist surface can help trap much of the mold spores and stop them being airborne.

Continue to brush until the rind looks smooth. Never use a scrubbing or circular motion, but rather brush the mold off the cheese.

The goal is to prevent the molds from growing so rampantly that they form a thick rind and attract cheese mites.

Once done, the brush should be thoroughly washed, sanitized, and placed in a clean area to dry. You should have 2 pairs, just in case one is still drying. Never use these brushes on anything besides cheese.

The Six Steps to Cleaning

Step 1: Pre-rinse

Immediately after using, rinse all equipment with luke warm water, about `100F` (`38C`) to remove all visible milk and curd residues. This step is important to do before washing so the heat of the wash doesn't "cook" proteins onto the surfaces

Step 2: Wash

Fill the sink with very hot water and use detergent and a clean bristle brush and scrub pad to manually scour the surfaces of all equipment

Step 3: Rinse

Rinse with clean water. Some people like to use a sanitizing acid rinse at this stage.

Step 4: Air-dry

Allow all equipment to air dry between uses

Step 5: Sanitize

Just prior to use, sanitize all equipment by dipping in a food-surface-approved sanitizer. Most chemical sanitizers need 30 seconds of exposure to ensure proper

killing of any residual germs. Alternatively, you can use hot water at 170F (77C) and immerse equipment for 5 minutes.

Step 6: Acid Wash/Rinse

An `acid wash` is done on a periodic basis to remove mineral deposits that are not completely removed during the daily cleaning process.

An `acid rinse` (without cleaners) can be done daily instead of the stronger periodic `acid wash`. If you choose to do a daily rinse (G' prefers this), you can perform it either just following or in place of `Step 3: Rinse`.

When doing periodic acid washes, the frequency will greatly depend on the amount of calcium and minerals in your water, as well as the frequency of cheesemaking.