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## **Roman Cheeses: An evaluation and redaction**

Columella's first century AD work, *De Re Rustica*, (Book VII, Chapter VIII) provides a surprising amount of detail and insight into early cheese making practices and preferred flavors/textures, as well as some idea as to what modern cheeses can be used as reasonable facsimiles of period cheeses when redacting period recipes.

### **Flavor (Sharpness):**

These cheese making processes are very standard and still in use in modern times, though Columella's recommendations do say something about the Roman palette. The author sites two different processes meant to keep the cheese from becoming overly acidic.

But it ought to be made of pure milk, and of the freshest, without any mixture: for that which has stood long, and is mixed, contracts a-sharpness.

Not letting the bacteria "ripen" in the milk for too long limits acid production time.

But the milk-tub, when it is filled with milk, ought not to be without some gentle warmth. Nevertheless, it must not be brought so near as to touch the flames, as some people are of opinion, but be placed not far from the fire, and presently after it is curdled, the liquor must be transferred into wicker-baskets, cheese-vats, or moulds; for it is of great importance, that the whey be strained and separated from the condensed substance as soon as possible: for which reason, the country-people do not indeed suffer the moisture to drop slowly from it of its own accord; but, when the cheese becomes a little more solid, they put weights upon it, that thereby the whey may be squeezed out r then, as it is taken out of the moulds or frails, it is laid up in a dark and cold place, upon the very cleanest boards, that it may/ not be spoiled;

Furthermore, removing the whey as quickly as possible, limits bacterial acid production by removing all the bacterias' "food." Most of the lactose available to bacteria for acid production during the cheese making process is in the whey – so expelling the whey as quickly as possible makes for a less acidic cheese.

### **Consistency:**

Columella tells us what our choices for renneting the cheese are. Both vegetable and animal rennets were known and used as early as the first century AD. Because animal rennet seems to have been the most common, and because it is difficult to get access to the vegetable items that they were using for rennet, calf rennet will be used in this redaction. (Modern vegetable rennet is made from a fungus, and I have yet to see mention of any fungal sources of rennet in period texts.)

They, commonly curdle it with a lamb's or a kid's runner (rennet), although it may also be brought into a consistency, both with the flower of the wild thistle, and with the seeds of bastard saffron, or the blessed thistle and also with fig-tree-milk, which the tree emitteth, if you wound its green bark. But, indeed, that is the best cheese which has the least of the drug in it. But the weight of a denarius of rennet is the least that a pail of milk requires. Nor is there any doubt but cheese made of milk congealed with fig-tree-twigs tastes exceeding sweet.

In Columella's time, a denarius weighed about 4.5 grams (Wikipedia). Weight wise, that's the equivalent of about 1 teaspoon of water. My double-strength calf rennet requires about ¼ tsp to coagulate 1 gallon of milk for a hard cheese. Normal strength rennet would therefore require ½ tsp for 1 gallon of milk. Assuming Columella's imaginary dairy maids were milking into 2 gallon buckets, they were probably making hard cheeses. (As an aside: a cream cheese requires about 2 drops of rennet for a gallon of milk and ricotta cheese is made from whey solids and requires no rennet at all. Even discounting differences in methodology of rennet collection resulting in different concentrations of rennet, there is a fairly significant difference in the amount of rennet required to make a soft cheese and what is required to make a hard cheese.) There are other clues throughout the text to support this conclusion on the texture of the cheeses he describes, such as the comment that the cheese can be exported beyond the sea. A soft cheese wouldn't keep long enough to be considered an export item. Columella also mentions that some cheeses are soaked in a brine solution in order to salt them – this is another clue that tells us he is talking about a hard cheese. A soft cheese like ricotta or cream cheese would not hold up to the brining process.

### **Pressing and Salting and Aging:**

when the cheese becomes a little more solid, they put weights upon it, that thereby the whey may be squeezed out r then, as it is taken out of the moulds or frails, it is laid up in a dark and cold place, upon the very cleanest boards, that it may/ not be spoiled; and it is sprinkled with bruised salt, that it may sweat out the acid liquor: and when it is hardened, it is pressed more vehemently, that it may be confiplated (?); and it is sprinkled again with toasted salt, and condensed again with weights. After this has been done for nine days, it is warmed thoroughly with sweet water, and placed in such a manner under a shade, upon hurdles made for that purpose, that one cheese may not touch another, and that it may be moderately dried. Then, that it may keep the tenderer, they put it close together in several stories, in a close place, not exposed to the winds. Thus it neither becomes spongy and full of holes, nor salt, nor dry; the first of which faults uses to happen, if it be pressed but a little; in the second, if it be seasoned with too much salt; and the third, if it be scorched in the sun. This kind of cheese may be exported also beyond sea. For that which is designed to be eaten in a few days, while it is new, is made up with less care: for, being taken out of the wicker baskets, it is put into salt and brine, and soon afterwards dried a little in the sun.

Salt doesn't seem to have been applied to the curds before pressing in any period document I have read (and only once in a 70-years-post-period recipe that also called for egg yolks and nutmeg). Brining was known and is still used in modern cheese

production. Salting the outsides of the finished pressed cheeses is mentioned in multiple period sources concerning the production of cheese, but not seen as much in modern cheese production.

Columella's description of the pressing process is much more extended than the one used in modern times. I've not seen any descriptions of modern pressing times that extend beyond 24-48 hours. (Usually not beyond 24.) Salting the curds before they are put in the press as occurs with many modern cheeses, drives the whey out of the curds much more quickly than pressing the cheese and then waiting for the salt to penetrate from the outside of the rind to the center of the cheese, and then pressing again when the cheese starts to sweat excess whey. Without the details of how many pounds per square inch the Romans were exerting on their cheese, it is difficult to determine just how hard their hard cheeses were – there being a fairly large range possible. From a soft creamy gouda to a grating quality Romano, directions for making these cheeses are remarkably similar if you leave out the details of pressing weights, waiting/aging times, starter cultures, and cooking temperatures. In this redaction, we will examine a modern gouda recipe and compare it to the processes described by Columella. It is theoretically possible that this type of cheese is close to what he was describing, however depending on the region and the native cultures (mesophilic vs. thermophilic bacterial cultures) he might also have been describing a Romano.

Columella's description of the environment used for aging cheeses and the types of circumstances they were striving to avoid in their finished cheeses again supports the (regrettable) notion that Columella himself was not fond of sharp/acidic cheeses – one of the characteristics of which is often a dry texture. He also comments that a spongy cheese full of holes (Yes... That would be Swiss cheese, which his predecessor, Pliny the Elder seemed somewhat fond of - if legend and some interpretations of Columella's footnotes are to be believed...) and overly salty cheeses were not desirable. Returning once again to the procedural similarities between gouda and Romano, I believe that when he refers to "hand pressed cheese" he may be referring to a gouda-like cheese, which is pressed at a lower weight than Romano and considered fully aged at anywhere between 2 weeks and 3 months of age. Whereas the "export cheese" as it were, may be a Romano, which isn't considered to be well aged until it's between 12 and 18 months old. No protective dressings are mentioned for the cheeses other than their own rinds. Waxing cheeses to age them didn't become popular until the Industrial Revolution, and though the elements required to bandage a cheese were certainly available in Columella's time, they are never mentioned in his work, nor any other period work with which I am familiar.

### **Optional Treatments:**

There are some who put bruised thyme, drained through a sieve, with the milk when they mix them with the milk, and so congeal it. There are some who put bruised thyme, drained through a sieve, with the milk when they curdle it. In like manner you may make it of whatever taste you please, by adding to it the seasoning you have made choice of. But that way of

making what we call hand-pressed cheese, is exceeding well known; for when it is a little congealed, and while it is yet warm in the milk-tub, they cut it; and, having sprinkled it with boiling water, they either shape it by hand, or squeeze the whey out of it in box-wood moulds. Also that which is hardened in brine, and so colored with the smoke of apple-tree wood, or of stubble or straw, is not of a disagreeable taste (i). But now let us return to the breeding of cattle.

Smoked and herbed cheeses were apparently known and popular in Roman times. It would seem that herbs weren't just added to cheeses as curdling agents, but also encouraged for seasoning purposes as well. The addition of boiling water to curds after cutting is not common to all cheeses and is referred to as "washing" the curds when it comes to a discussion of modern cheesing techniques. This is done with modern gouda cheese, but not Romano. Interestingly enough, smoked gouda is a popular cheese even to this day.

Using these observations about Roman preferences and cheese making technique, we can then alter a modern gouda recipe to eliminate any out of period ingredients and techniques. I believe you'll find there are very few alterations (but perhaps more explanations) necessary:

#### **Ingredients:**

1. We will need to add mesophilic starter culture (buttermilk) to our milk as it will likely have been pasteurized to kill of any germs naturally present. No cultures are called for in the Roman recipe as their milk was not pasteurized.
2. We must eliminate the addition of annatto as this ingredient is a coloring agent not necessary to the texture or flavor of the cheese. Additionally, it was not imported to Europe until extremely late in period, and there is no evidence that it was used to color cheese at any time during period.
3. We can add calcium chloride to make curd-handling easier, though it is not necessary. Pasteurized milk loses calcium, and when that happens the curds become more delicate. Most cheese makers agree that the addition of the calcium chloride has very little effect on the final cheese, but it will result in a firmer curd during the make.
4. Columella gives us leave to add "the seasoning you have made the choice of," so the optional herbs would be acceptable additions to the recipe, provided there is evidence that they were known and used in period.

#### **Milk Ripening:**

1. I believe that 90 degrees F constitutes the "gentle warmth" mentioned in the Columella description.
2. I don't believe that 15-45 minutes is an excessive ripening time. Some acidity is necessary in order for the rennet to work.

#### **Cut Curd Making:**

1. I believe that what is described here fits with what Columella describes briefly in his description of "hand pressed cheese."

#### **Curd Washing:**

1. Columella never mentions removing any whey from the curds before adding the boiling water, so here is the first change in the recipe. We shall skip to adding hot water to the curds. This recipe calls for removing whey equivalent to 1/3 of the volume of milk used and replacing it with 130 degree water until the overall temperature is 102 degrees. Columella calls for "sprinkling" boiling water on the curds. I infer that rather less than 1/3 the overall volume of milk is being used, but a hotter temperature of water is also being used. Thus, I add boiling water until the overall temperature of the vat is 102 degrees.

#### **Curd Pre-Pressing in Whey:**

1. Columella never mentions this step, so it will be skipped, though it is not implausible that the curds could have been pressed under whey by hand. No special technology or innovation is required for this to have occurred.

#### **Curd Pressing:**

1. Columella doesn't mention any use of a cheese cloth. Overall, I don't believe this makes any difference in the end product, but it does make flipping the cheese much easier between pressings. Thus I shall use the cloth with the caveat that it was not mentioned in Roman sources, but it WAS mentioned in other documents suitable for our period.
2. All of the weights required for pressing are relatively light (as compared to those used for a Romano) and entirely realistic for someone who is pressing curds by hand.
3. Columella kind of glosses over the exact pressing process for the hand pressed cheese, stating only that it involves "less care," which I take to mean that it wasn't a 9 day process.

#### **Salting:**

1. I don't believe that any of these instructions are outside the parameters described by Columella.

#### **Aging:**

1. The drying mats mentioned are often made of bamboo and would be similar to laying the cheese on a boards or "hurtles" as in Columella's description.
2. 60 degrees and 90% humidity replicate the conditions inside a traditional cheese cave, and I believe that Columella's "shady place out of the wind" is meant to duplicate those conditions as well.
3. Obviously, the rinded cheese will be the one required to make the most period end product. Columella mentions the importance of keeping the cheese on clean boards so that it is not spoiled, but does not mention mold being wiped off

cheese during the aging process. There are several possible reasons for this, one being that Romans ate moldy cheese as a matter of course, or had no qualms about cutting off the moldy rind and simply eating the interior of the cheese. (This is far more likely with some of the 1000 lb cheeses mentioned by Pliny the Elder some 50 years before... A little mold on the outside of a 1000 lb cheese is easy enough to shave off at the end of the aging period...)

VIII. DE CASEO FACIENDO. Casei quoque faciendi non erit omittenda cura utique longinquis regionibus, ubi mulctram devehere non expedit. Is porro si tenui liquore conficitur, quam celerrime vendendus est, dum adhuc viridis sucum retinet, si pingui et opimo, longiorem patitur custodiam. Sed lacte fieri debet sincero et quam recentissimo - nam requietum vel aqua mixtum celeriter acorem concipit - et id plerumque cogi agni aut haedi coagulo, quamvis possit et agrestis cardui flore conduci et seminibus cnechi nec minus ficulneo lacte, quod emittit arbor, si eius virentem saucies corticem. [2] Verum optimus caseus est, qui exiguum medicaminis habet. Minimum autem coagulum recipit sinum lactis argentei pondus denarii, nec dubium quin fici ramulis glaciatus caseus iucundissime sapiat. [3] Sed mulctra cum est repleta lacte, non sine tepore aliquo debet esse, nec tamen admovenda est flammis, ut quibusdam placet, sed haut procul igne constituenda, et confestim cum concrevit liquor, in fiscellas aut in calathos vel formas transferendus est. Nam maxime refert primo quoque tempore serum percolari et a concreta materia separari. [4] Quam ob causam rustici ne patiantur quidem sua sponte pigro umore defluere, sed cum paulo solidius caseus factus est, pondera superponunt, quibus exprimatur serum; deinde ut formis aut calathis exemptus est, opaco ac frigido loco, ne possit vitiari, quamvis mundissimis tabulis conponitur, aspargitur tritis salibus, ut exsudet acidum liquorem, atque ubi duratus est, vehementius premitur, ut conspissetur, et rursus torrido sale contingitur rursusque ponderibus condensatur. [5] Hoc cum per dies novem factum est, aqua dulci abluitur et sub umbra cratibus in hoc factis ita ordinatur, ne alter alterum caseus contingat et ut modice siccetur, deinde quo tenerior permaneat, clauso neque ventis obnoxio loco stipatur per conplura tabulata. Sic neque fistulosus neque salsus neque aridus provenit, quorum vitiorum primum solet accidere si parum pressus, secundum si nimio sale inbutus, tertium si sole exustus est. [6] Hoc genus casei potest etiam trans maria permitti; nam is, qui recens intra paucos dies absumi debet, leviori cura conficitur, quippe fiscellis exemptus in salem muriamque demittitur et mox in sole paulum siccatur. Non nulli ante quam pecus numellis induant, virides pineas nucas in mulctram demittunt et mox super eas emulgent nec separant, nisi cum transmiserunt in formas coactam materiam. Ipsos quidam virides conterunt nucleos et lacti permiscent atque ita congelant. [7] Sunt qui thymum contritum cribroque colatum cum lacte cogant. Similiter qualiscumque velis saporis efficere possis, adiecto quod elegeris condimento. Illa vero notissima est ratio faciendi casei, quem dicimus manu pressum, namque is paulum gelatus in mulctra, dum est tepefacta, rescinditur et fervente aqua perfusus vel manu figuratur vel buxeis formis exprimitur. Est etiam non ingrati saporis muria praeduratus atque ita malinis lignis vel culmi fumo coloratus. Sed iam redeamus ad originem.

(The original Latin was copied from:

<http://www.thelatinlibrary.com/columella.html> )

## CHAP. VIII.

### Of the Method of making Cheese,

THE care of making cheese must not be Emitted, especially in regions that lie at a great distance from town, where there is not the convenience of carrying the milk-pail to market. Moreover, if the cheese be made of thin liquor, it must be fold as quickly as possible, while it is yet green and retains the juice. If it be made of rich and fat milk, it will bear to be kept longer. But it ought to be made of pure milk, and of the freshest, without any mixture: for that which has stood long, and is mixed, contracts a-sharpness. They, commonly curdle it with a lamb's or a kid's runner (rennet), although it may also be brought into a consistency, both with-the flower of the wild thistle, and with the seeds of bastard saffron, or the blessed thistle and also with fig-tree-milk, which the tree emitteth, if you wound its green bark. But, indeed, that is the best cheese which has the least of the drug in it. But the weight of a denarius of rennet is the least that a pail of milk requires. Nor is there any doubt but cheese made of milk congealed with fig-tree-twigs tastes exceeding sweet. But the milk-tub, when it is filled with milk, ought not to be without some gentle warmth. Nevertheless, it must not be brought so near as to touch the flames, as some people are of opinion, but be placed not far from the fire, and presently after it is curdled, the liquor must be transferred into wicker-baskets, cheese-vats, or moulds; for it is of great importance, that the whey be strained and separated from the condensed substance as soon as possible: for which reason, the country-people do not indeed suffer the moisture to drop slowly from it of its own accord; but, when the cheese becomes a little more solid, they put weights upon it, that thereby the whey may be squeezed out r then, as it is taken out of the moulds or frails, it is laid up in a dark and cold place, upon the very cleanest boards, that it may/ not be spoiled; and it is sprinkled with bruised salt, that it may sweat out the acid liquor: and when it is hardened, it is pressed more vehemently, that it may be confpiflated (?); and it is sprinkled again with toasted salt, and condensed again with weights. After this has been done for nine days, it is warmed thoroughly with sweet water, and placed in such a manner under a shade, upon hurdles made for that purpose, that one cheese may not touch another, and that it may be moderately dried. Then, that it may keep the tenderer, they put it close together in several stories, in a close place, not exposed to the winds. Thus it neither becomes spongy and full of holes, nor salt, nor dry; the first of which faults uses to happen, if it be pressed but a little; in the second, if it be seasoned with too much salt; and the third, if it be scorched in the sun. This kind of cheese may be exported also beyond sea. For that which is designed to be eaten in a few days, while it is new, is made up with less care: for, being taken out of the wicker baskets, it is put into salt and brine, and soon afterwards dried a little in the sun.

Some, before they put the shackles upon the cattle, put green pine- apples into the milk-pail, and presently milk the cattle upon them; and they do not separate them till they have transmitted the coagulated substance into moulds\* Some bruise the green kernels themselves, and mix them with the milk, and so congeal it. There are some who put bruised thyme, drained through a sieve, with the milk when they mix them with the milk, and so congeal it. There are some who put bruised thyme, drained through a sieve, with the milk when they curdle it. In like manner you may make it of whatever taste you please, by adding to it the seasoning you have made choice of. But that way of making what we call hand-pressed cheese, is exceeding well known; for when it is a little congealed, and while it is yet warm in the milk-tub, they cut it; and, having sprinkled it with boiling water, they either shape it by hand, or squeeze the whey out of it in box-wood moulds. Also that which is hardened in brine, and so colored with the smoke of apple-tree wood, or of stubble or straw, is not of a disagreeable taste (i). But now let us return to the breeding of cattle.

- (i) Cheese dried in the smoke was much esteemed by the Romans, and preferred to air other forrs(?); and at Rome there was a particular place for smoking it, which Pliny says made it very agreeable to the taste, lib. xi. 42. Our author recommends the smoke of apple-tree-wood or stubble for that purpose.

## **Gouda Cheese Making Recipe**

Gouda along with Edam are the original washed curd cheeses, and originated from Netherlands. This method was then utilized by other countries resulting in other washed curd cheeses such as Havarti & Danbo from Denmark, Jarlsberg & Fontina from Sweden, and Colby from USA. However, Gouda, unlike some other washed curd cheeses, includes a pre-pressing of the curds in the whey step. Without this step, open textured cheese is the result.

Washed curd cheeses are called "sweet" cheeses by cheese makers as "sweet" is a term used to describe the body of the cheese with good flexibility, however, they are also slightly sweet in taste. Washed curd cheeses are different as heat is added to the curds and whey not by heating the vat, but directly by removing whey and adding hot water.

Gouda, and other washed curd cheeses are a good stepping stone after soft cheeses for new cheese makers as they:

1. Mature fairly quickly (2 weeks to 2 months), thus quicker rewards and faster learning curve.
2. Do not require heavy pressing forces, thus less equipment required.
3. Form close knit and chemically tight rinds, thus are well suited to simpler rinded methods such as waxed or natural rind, and therefore are easier to age.

### **Ingredients**

1. 2 US gallons fresh Cow's Milk.
2. Mesophilic Starter Culture of your choice, recommended are:
3. Rennet diluted in 1/2 cup cool water, amount depending on package directions and your experience with that brand.
4. Salt for saturated brine.
5. Optional: Flavoring, ~1 tablespoon ml Cumin Seeds or ~2 teaspoons Mustard Seeds.
6. Optional: Calcium Chloride if using pasteurized milk, amount as per manufacturers recommendation.
7. Optional: Coloring, 3-5 drops Annatto diluted in 1/4 cup water per 1 US gallon of milk.

### **Directions**

#### **Milk Ripening**

1. Warm the milk to 85-90°F/29-32°C in vat of your choice, i.e. double boiler.
2. Add Starter Culture, optional Calcium Chloride, and optional Annatto colourant and mix thoroughly with a whisk to make uniform throughout the milk.
3. Cover and let the culture ripen at same temperature for 15-45 minutes.

#### **Cut Curd Making**

1. Trickle in diluted rennet stirring constantly for 1 minute to evenly distribute, then stop swirl with to enable better curd set.
2. Cover and let the milk stand at your target temperature for 40+ minutes until a clean break is achieved.
3. Cut the curds into 0.2-0.5 inch/0.5-1.25 cm cubes.
4. Allow the curds to sit and heal undisturbed for 5-10 minutes.
5. Stir gently, intermittently for 15-25 minutes to ensure the curds don't mat together.
6. Let the curds rest for 5 minutes to settle to bottom.

#### **Curd Washing**

1. Remove and discard volume of whey from top of vat equal to one third the volume of milk used. Add same volume of hot water to reach target 95-102°F / 37-39°C, normally 130°F / 55°C water will work.
2. Stir gently intermittently for 15-30 minutes, breaking any large lumps of curd.
3. Let the curds rest for 5 minutes to settle to bottom.

#### **Curd Pre-Pressing In Whey**

1. Drain/remove whey/water until the curds are just covered by whey.
2. Pre-Press washed curds for 15-30 minutes with weight equal to weight of curds (about 0.4 kg per liter / 1.5 pounds per 1 US gallon of milk). A perforated plate below your weight is best to allow whey to escape easier, I use improvise with an un-perforated next size smaller stockpot lid and used milk jug with water for weight.

3. Remove plate/lid and weights, drain off the water/whey.

### **Curd Pressing**

1. Warm your mold/hoop.
2. Place the knit pre-pressed curds into cheesecloth lined mold, pack curds down into mold by hand (try to minimize breakage of the curd pack).
3. Press the cheese lightly for 15 minutes at ~2 pounds per US gallon or 0.5 kg per liter of milk used.
4. Remove the cheese from the mold and cheesecloth, turn, replace in cheese cloth and mold and press again at ~5 pounds per 1 US gallon / 1 kg per 1 liter of milk for ~1 hour.
5. Remove the cheese from the mold and cheesecloth, turn, replace in cheese cloth and mold and press again at ~12 pounds per 1 US gallon / 1.5 kg per 1 liter of milk for final ~8-16 hours (i.e. overnight).
6. Remove the cheese from the press and cheesecloth.

### **Salting**

1. Place in Saturated Brine solution for 3-4 hours per pound or 0.5 kg of pressed curds, be certain to turn the cheese every few hours to ensure even rind development.
2. Note, after brining the cheese will have lost ~5% weight and the outer surface will have become firmer and almost tough.

### **Aging**

1. Place the cheese on a drying mat in 50-60°F/10-15°C and 85-90% humidity.
2. After a few days the cheese should be dry to touch and then it can be waxed. Or it can continue to be aged with a natural rind.
3. If natural rind, if unwanted molds appear on rind, clean with a low 2-3% brine and cloth or disposable paper towel. After cheese hardens, a brush can be used with brine.
4. Turn cheese and replace mat if moist initially every ~2 days then every week and eventually every month if age that long.
5. Consume after 2 weeks to several years, flavour changes with age.

### **Options**

1. Colourants: For slightly cream colour, add Annatto at initial cheese ripening stage before renneting.
2. Flavourants: Cumin or Mustard Seeds.
  1. Boil seeds covered in ~4 ounces/125 ml water for 15 minutes before start, (add water if required).
  2. Drain seeds, keep and cool flavoured water.
  3. Stir in cooled flavoured water before adding Starter Culture.
  4. Mix boiled seeds into drained curds before pre-pressing/packing into cheesecloth and mold for pressing.

### **Tricks & Traps**

1. Milk Ripening: Popular Mesophilic Starter Cultures for Gouda are:
  1. Lactococcus lactis subspecies lactis + Lactococcus lactis subspecies cremoris + Lactococcus lactis subspecies biovar diacetylactis such as in manufacturer Danisco's DVS Choozit MM100 or MM101 or BT002.
  2. If want slightly denser Gouda with more diacetyl/buttery flavour then above three plus add Leuconostoc mesenteroides subspecies cremoris via manufacture Danisco's LM57 or pre-combined all four via manufacturer CHR Hansen's Flora Danica or manufacturer Abiasa's Aroma B.
  3. 200 ml of homemade Mesophilic Starter Culture.
2. Milk Ripening: Lower temperature results in slower and higher results in faster acid production.
3. Milk Ripening: Less time results in less acid production, longer in more and lower pH.
4. Cut Curd Making: Smaller cut curds result in faster whey release and drier Gouda, larger in slower whey release and moister Gouda
5. Cut Curd Washing: Lower washing temperature results in moister Gouda, higher in drier.
6. Salting: Longer brining time raises salt content of Gouda, lower results in less.
7. Aging: Do not allow rind to crack (normally from low humidity) as fissures will allow molds to penetrate the cheese.

8. If making Gouda for first time, use middle temperatures and times and next recipe vary up or down. Or if making two batches, make one at each of scale and using these "end posts" vary future batches.

[http://cheeseforum.org/Recipes/Gouda/Recipe\\_Gouda.htm](http://cheeseforum.org/Recipes/Gouda/Recipe_Gouda.htm)

## Romano Cheese Making Recipe

Romano is one of the world's oldest cheeses. It has been made near Rome, Italy since the time of Christ. Like Parmesan, this cheese must age at least 5 months. A longer time is used to produce a hard grating cheese. This cheese can be used in many recipes that call for Parmesan if a more delicate taste is desired. For a more flavorful cheese use goat and cow's milk in equal proportions.

### Ingredients

- 1 US Gallon Fresh Whole Milk.
- 5 oz. Thermophilic Starter Culture.
- Rennet of your choice amount as per packaging or your experience.

### Directions

1. Warm the milk to 90 F/32 C.
2. Add thermophilic starter and allow the mixture to ripen for 15 minutes.
3. Dilute rennet in 1/2 cup cool water.
4. Slowly pour the rennet into the milk stirring constantly with a whisk and stir for at least 5 minutes.
5. Allow the milk to set for 45-90 minutes until a firm curd is set and a clean break can be obtained when the curd is cut.
6. With a long knife, cut the curds into 1/4 inch cubes, set aside for 10 minutes to allow the curds to firm up.
7. Slowly raise the temperature of the milk to 115F / 46C. It should take as long as 45 minutes to reach this temperature. During this time, gently stir the curds every few minutes so they don't mat together.
8. Keep the curds at this temperature for another 30 - 45 minutes.
9. Drain the whey by pouring through a cheesecloth lined colander.
10. Carefully place the drained curds into your cheesecloth lined mold.
11. Press the cheese at about 10 lb/4.5 kg for 30 minutes.
12. Remove the cheese from the press and flip it.
13. Press the cheese at about 25 lb/11.4 kg for 3 hours.
14. Then press the cheese at about 40 lb/18 kg for 12 hours.
15. Remove the cheese from the press, careful it is still very soft.
16. Lightly pierce the surface of the cheese with a fork, so that the entire cheese is covered in small shallow holes spaced about 1/2 inch apart.
17. Float the cheese in a saturated cold brine for 12 hours. Be certain to flip the cheese over at least three times to ensure even rind development.
18. Pat dry the cheese, you will notice the outer surface has begun to harden.
19. Place the cheese in your refrigerator to age for at least five months (longer for stronger flavor). You will need to flip the cheese over every day for the first two weeks and then at least once weekly or it will dry unevenly.
20. Place an overturned bowl on top of the cheese after two days. Do not wrap it in plastic or it will not dry properly.
21. Inspect daily for mold. Should mold develop on the cheese surface, simply remove it using a paper towel dipped in white vinegar.
22. The surface may be rubbed with olive oil after three months if so desired. Do not wax this cheese.

[http://cheeseforum.org/Recipes/Recipe\\_Romano.htm](http://cheeseforum.org/Recipes/Recipe_Romano.htm)