

## Barrow-Style Mozzarella

(adapted from <http://www.cheesemaking.com/store/pg/262-MozzarellaDryMilk.html>)

Makes about 1 pound

14 cups milk, prepared from non-fat dry powdered milk

2 cups heavy cream

1½ teaspoon citric acid

1 cup cold water (preferably distilled or purified)

¼ tablet rennet

¼ cup cold water (preferably distilled or purified)

¼ to ½ teaspoon kosher salt

6 to 8 quart metal pot and lid (preferably stainless steel)

Cooking thermometer

1. PREPARE the non-fat powdered milk according to the package directions. Note that if it is easier, you can just make a gallon of milk, and reserve 2 cups for drinking.
2. COMBINE prepared milk and cream in gallon jug and let sit in refrigerator, ideally overnight.
3. DISSOLVE citric acid in 1 cup water. Set aside.
4. DISSOLVE rennet in ¼ cup water. Set aside.
5. POUR milk and cream mixture in to pot.
6. ADD citric acid to pot. Stir well. No curds should form at this point.
7. HEAT mixture slowly on medium-high heat to 90oF. Stir minimally, to prevent scorching.
8. ADD the rennet mixture to the pot. Stir gently for 20 to 30 seconds.
9. REMOVE pot from heat. Cover, and allow curd to form for 15 to 20 minutes.
10. CHECK curd formation. Curds should have pulled away from the whey and be smooth and custardy. The whey should be clear.
11. CUT the curds in to 1-inch checkerboard squares using a knife.
12. REST the curds for 2 to 3 minutes.
13. HEAT the curds gently to 95 to 105oF. Note that the higher the temperature, the more whey released from the curd, and the drier your final product.
14. REST the curds for 2 to 3 minutes.
15. GENTLY spoon the curds in to a bowl, separating the curds from the whey.

At this point, you have two choices for heating and stretching your curds.

### CHOICE A: MICROWAVE METHOD

1. MICROWAVE curds on High for 60 seconds.
2. REMOVE and knead with a spoon or your hands. Drain off any whey.
3. MICROWAVE on High for 30 seconds. Your curds should begin to appear stretchy.
4. KNEAD with your hands or with spoon. Drain off any whey.
5. MICROWAVE on High for 30 seconds.
6. STRETCH your curds. Use clean metal spoons or wooden spoons to assist if the curds are too hot for you to safely handle. Let the curds stretch under their own weight, like you would do with taffy. If the cheese begins to stiffen up or stop stretching, microwave it again for 30 seconds. The more you stretch the cheese, the smoother it becomes.
7. ADD desired salt and stretch again.
8. FORM cheese in to a round ball once you are satisfied with its consistency.
9. DROP ball in to a bowl of cold/ice water. Let cheese sit in water for 30 to 60 minutes.
10. STORE cheese in an airtight container in the fridge.

## CHOICE B: TRADITIONAL METHOD

1. HEAT 4 cups of whey or water to 180oF.
2. USE rubber gloves, metal spoons, or wooden sticks or spoons to immerse your curds in to the hot liquid.
3. Work curds back and forth for 3 to 5 minutes, until they are ready to stretch under their own weight.
4. STRETCH your curds. Use clean metal spoons or wooden spoons to assist if the curds are too hot for you to safely handle. Let the curds stretch under their own weight, like you would do with taffy. If the cheese begins to stiffen up or stop stretching, microwave it again for 30 seconds. The more you stretch the cheese, the smoother it becomes.
5. ADD desired salt and stretch again.
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8. STORE cheese in an airtight container in the fridge.

### Bush Order Suppliers for Cheesemaking Products:

Sunshine Health Foods  
410 Trainor Gate Road  
Fairbanks, AK 99701  
(907) 456-5433

### Online Suppliers:

New England Cheesemaking Supply Company  
<http://www.cheesemaking.com>

**Citric acid:** same citric acid as in lime and lemons. Use to acidify your curds so they stretch. Some recipes call for the milk to curdle overnight. Do not substitute ascorbic acid (vitamin c) or acetic acid (vinegar) You can substitute lemon juice, but need to get the pH right. From a chemistry level, we are trying to knit together the caseins in the milk by souring (or ripening). Milk is normally 6.5, we need to get it down to 4.7 and then it starts to curdle.

**Calcium chloride:** can omit if using raw milk. Store bought milk is generally lower in calcium than raw milk- protein is altered when pasteurized and homogenized. Adding helps restore to original state. Necessary for good curd formation and ability to stretch.

**Rennet:** collection of naturally occurring enzymes found in the stomach of any mammal, used to digest mother's milk. Helpful in mammals for digestion. One protein-digesting enzyme in particular rennin coagulates milk and separates curds (solids) from whey (liquid) portion. Modern advances have given us a vegetarian form, from moulds.

**Milk:** You cannot make cheese with ultra-pasteurized milk. The casein in the milk will not form a curd because it has been denatured due to the high heat involved in ultra-pasteurizing. You won't form a curd using ultra pasteurized milk but the concern I have is the fact that you are not ripening (acidifying) the milk before you add rennet. I have never made Haloumi before, but I am aware that it, along with certain Hispanic cheeses, doesn't melt when heated. These types of cheeses don't melt because of the higher heat involved in the process. Lowering the pH of the milk allows the rennet to work at an optimal level. If you're not able to get a source of fresh goat's milk, I have heard that powdered goat's milk, when reconstituted, can make cheese.

Homogenized milk: process developed in 1900 to prevent cream from separating.

Note that UHT cream is okay, since it is in smaller relative amounts.

Depending on what type of milk you're using, you may choose to experiment with the amount of calcium chloride you add to your cheese. We include it in the recipe because store bought milk has had its protein altered when pasteurized and homogenized and calcium helps restore the original balance. If you do decrease the calcium chloride, you may get a softer curd that melts better but may be a little harder to stretch. Commercially prepared cheese is also made differently and undergoes a short aging period which renders it more meltable after two to three weeks.

**Whey:** This stuff you can keep for a few weeks. Use in place of water or broth. Especially good in breads. Adds protein. Can add sugar and flavouring for a drink. Milk is made up of whey proteins and casein proteins. Casein is nutritive; whey are defensive proteins; bind to transport other nutrients and enzymes. Lactoglobulin form the basis for true ricotta. Heat denatured whey is more stable, less air space or bubbles, which is why is used for ice cream.

**Lactose:** lactose is a sugar that occurs naturally in milk. We need a lactose digesting enzyme, lactase, to properly digest it. Lactase-less (aka lactose intolerant) can consume about 250mL per day without issue. Cheese contains little or no lactose as most of it is drawn off in the whey.

**Water buffalo:** milk has "characteristic blend of modified fatty acids reminiscent of mushrooms and freshly cut grass, together with a barnyard nitrogen compound (indole)". Basic flavor of milk is affected by animals feed. Water buffalo thought to be introduced to Italy by Goths, or Normans, or Arabs, but are present beginning in the medieval period (1000CE). Much high fat and protein than cow milk. From Campania region of Italy. Although there are four small producing herds kept domestically here in the US. *Bubalus bubalis*; modern cows are *Bos Taurus*.

**Mozzarella:** Italian verb *mozzare* means to cut. *Bocconcini* are little egg shaped balls. Low Moisture mozzarella has a low galactose content, meaning less browning or ability to heat to higher temps.

**Distilled water** is made by boiling water and then condensing the steam, this leaves any impurities behind and so distilled water is the purest water that is available. However, distilled water pH and any other minerals that were present in the water are left behind by the distilling process.

Spring water is water that flows from springs and it usually is rich in minerals acquired underground by flowing over rocks. The minerals often impart a slightly sweet taste to the water, making it quite nice to drink, unlike distilled water which can be rather bitter.

Why won't my cheese stretch? It forms a nice curd that tastes good, but won't stretch, only breaks.

A: It sounds like your curd contains too much whey. This can happen when the milk you use has been pasteurized at a higher temperature than what is required. The high temperature denatures some of the proteins, causing them to hold on to more of the whey. It still makes cheese but it is difficult to stretch. If you can find a milk supplier that minimally processes their milk, you will get much better stretching results. Look for cream line milk. This is milk that has not been homogenized. If you have a Whole Foods Market in your area, they will more than likely have good quality milk that is not overly pasteurized. If not, ask your dairy manager at your store if they know what temperature their suppliers pasteurize their milk at. You want milk that is pasteurized less than 170F. If you can't get a different milk supply, try draining your curd in a mesh strainer for a few minutes to get rid of as much whey as you can before microwaving them.

Q: Does your Mozzarella recipe make the more "American" mozzarella cheese that's harder and used on pizzas, or the "fresh" mozzarella that's served with tomato and balsamic as a salad? I'm looking for a mozzarella that's much softer than what I see in stores.

A: It depends on the milk you use. The recipe calls for using whole milk; this will give you a cheese that is softer than traditional store bought mozzarella, but a little less soft than fresh mozzarella. If you use lower fat milk, it will produce a harder, more rubbery cheese. If you supplement your whole milk with a little heavy cream, you can make a cheese that is softer. I suggest you try the recipe as is and then make adjustments according to your preferences.

Q: I am making mozzarella and having trouble getting the curd to form a gluey mass, only a ricotta-like mass happens. I am very conscious about using non ultra pasteurized milk, but it still stays crumbly, any suggestions?

A1: If it looks like ricotta after you have let the milk set with the added rennet for 20 minutes, then you may be stirring it too much after adding the rennet. The rennet starts to form the curd as soon as you stir it in so, if you stir continuously, you are actually cutting the curd into small pieces which will be hard to come together in the microwave.

A2: If it looks like a solid mass after you've let it set with rennet added but looks like ricotta after microwaving, then you may not be getting the curd hot enough in the microwave. Try heating a little longer and then pressing as much whey out as you can before kneading with your spoon. Don't change the rennet or citric acid. If the above tips don't work, you can try making it without the calcium chloride. It is added specifically for store bought pasteurized milk which is generally lower in calcium than raw milk.

A3: Your milk may have been over-processed at the dairy. Switch to a different brand of milk if you can't get farm fresh milk.

Q: I doubled up on your one hour mozzarella cheese recipe and I cannot get it to work. What did I do wrong?

A: Our One Hour Mozzarella Cheese Recipe is designed specifically for one gallon of store bought whole milk. You can't double a cheese making recipe as you would any other recipe because some of the ingredients that you add are not just for flavor. They cause reactions in the milk and doubling them may not give you the results you're looking for. By doubling the rennet, you formed the curd even faster and stirring it would have resulted in curd that was cut up too much. (One half tablet of rennet is actually enough to set up to 5 gallons of milk). Another factor is the increased volume caused by doubling a recipe. You need to get the curd to about 140-145 degrees F in the microwave before it will stretch. Using twice the amount of curd will naturally change the amount of time you have it in the microwave.

<http://www.thekitchn.com/how-to-make-homemade-mozzarella-cooking-lessons-from-the-kitchn-174355>

New England Cheesemaking Supply

<http://www.cheesemaking.com/howtomakemozzarellacheese.html>

Homemade Mozzarella

<http://byo.com/component/resource/article/2027-making-mozzarella>

Mozzarella Cheese

<http://fiascofarm.com/dairy/mozzarella.htm>

The Food Issue: My Mozzarella

<http://www.chicagoreader.com/chicago/the-food-issue-my-mozzarella/Content?oid=1231745>

## Useful Websites About Cheesemaking and Ricotta

<http://joyofcheesemaking.com/>

For serious home cheesemakers. Includes lot of obscure recipes, instructions for making your own cheese caves for aged cheeses, and more.

<http://www.imakecheese.com/>

A blog that chronicles Andrew Wilder's adventures in cheesemaking. Not updated very frequently, but lots of good information if you're new to cheesemaking.

<http://theitaliandishblog.com/imported-20090913150324/2011/1/6/how-to-make-homemade-ricotta-cheese.html>

More experiments with ricotta cheese, and suggestions and recipes for what to do with it (besides make lasagna!)

<http://chefinyou.com/2012/01/how-to-make-ricotta-cheese/>

A vegan/vegetarian blog. The recipe is very similar to the one we're using, but if you have some questions or thoughts about experimenting, read the comments section.

<http://www.seriousseats.com/2010/02/how-to-make-fresh-ricotta-fast-easy-homemade-cheese-the-food-lab.html>

Make ricotta cheese in 5 minutes using your microwave! The comments section is also very interesting to read.

<http://www.smallmeasure.com/>

Blogger and cookbook author Ashley English's website. She and her family have a homestead in North Carolina and she blogs about everything from cheesemaking to beekeeping.

<http://www.livestrong.com/article/553662-how-to-know-when-ricotta-cheese-is-spoiled/>

Tips for how to tell if your ricotta has spoiled.