

# Traditional Mozzarella Howto



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This recipe uses substitute ingredients instead of water buffalo milk to approximate the flavor and texture of mozzarella di bufala. It makes approximately 1 lb cheese and uses old-world, Italian techniques where possible.

This is a tricky cheese to get right because it requires you to wait for the acidity to build up so the cheese can stretch. If you wait too long, it can fall apart. If not enough, it will be tough and rubbery. Attention to detail is key with this cheese.

Here are some notes we've gathered about traditional mozz making if you go beyond the basics of using buttermilk as the acidifier and want to more closely try to replicate the mozzarella of Italy:

- Mozz uses both rod-shaped and sphere-shaped bacteria. They act in symbiosis, feeding off each other to encourage growth and acid production.
- The rod-shaped culture is usually *Lactobacillus bulgaricus*, *Lactis*, or *helveticus*, or a mix.
- The sphere-shaped bacteria is usually *S thermophilus*, but sometimes contains the classic *Lactis* and *cremoris*.
- The ratio in mozz, and actually, other Italian starters, of coccus (sphere) shapes to rod shapes is from about 3:1 to about 5:1. Meaning sometimes it's lower, say 2.5:1, and sometimes higher, 5.5:1. This is very important.
- The final moisture content is important because it's what gives the softness, and so is the fat content.
- To get a high final moisture content, traditional makers cut in large curd pieces, let the curd heal, then re-cut into smaller pieces, and stir gently without heating for 5-10 minutes, then begin the heating schedule.
- To get a high enough moisture content, use a flocculation of 3-4x.
- It is not only acid development but also the protein breakdown that influences stretch. Meaning you need to wait for the curds to be ready and use the right culture
- If you want a cheese for cooking, like on a pizza, and you don't want it to brown, use *L helveticus* as part of the bacilli mix. The browning is caused by a maillard reaction with the leftover sugar. *L helveticus* consumes that sugar, giving a more uniform melt and less browning.

## Ingredients, Equipment, and Supplies

Quantity	Description
1 gallon	2% milk, not ultra pasteurized (Whole Foods or Alpenrose brands in Western WA)
1 cup	Heavy cream, not ultra pasteurized

1/4 cup	Cultured yogurt. Or use DVI culture with lactobacillus
1/2 cup	Cultured buttermilk. Or use 1/8 tsp DVI culture with lactococcus/streptococcus. 1/8 tsp per 1-2 gal, 1/2 per 2-5 gal.
1/4 tsp	Single strength liquid rennet, or 1/8 tsp double strength
1/4 cup	Distilled water
1 cup salt	Kosher or rock salt, non-iodized
3 quarts water	2 quarts heated to 170F, 1 quart for brine.
1/4 tsp lipase	Optional, adds a little flavor. Use a mild lipase. Add with buttermilk.

Stainless pot big enough to contain milk: ~6 qt stockpot works well for 1 gal
Thermometer, 0-212 F. pH meter if you have it
Long knife that reaches to the bottom of the pot and optionally, whisk
Colander
Paint strainer bag (1 gal size) or cheesemaking cheesecloth (not from the grocery store)
Empty yogurt cup or other small container that floats
Clean kitchen sink
Container big enough to contain 2 cups liquid
Ladle and gloves

## Process

Step	Time from Step 1	pH Target
1. Gather all your ingredients and equipment in one place.	0:00	N/A
2. Sanitize all the tools by filling the pot with a few inches of water, and putting everything that fits in it, closing the lid and letting it steam for 30 seconds. You can also dip everything in a solution of 1 gal water with 1 tablespoon of chlorine in it. If using chlorine, rinse with water after.	0:05	N/A
3. Pour the milk and cream in the pot and heat on the stove to 88 F. Turn off stove.	0:35	6.5-6.6
4. In a sanitized container, pour in the 1/2 cup buttermilk, 1/4 cup yogurt, and a cup of milk. Mix together until blended, and add back to the pot. This is to temper the buttermilk to help with a more even distribution. Add lipase now if using it. Stir up and down with a ladle for 10-15 strokes. Let it sit for 20-30 minutes.	1:00	6.5-6.6
5. Take 1/4 cup distilled water and add rennet to it, mix, and add to the milk. Stir up and down 10-15 strokes. Note the time when you added the rennet and place the empty, sanitized container (such as yogurt cup) to float on top.	1:05	6.5-6.6
6. Check for surface gelling of the milk by nudging the empty container. When it no longer moves, the surface has gelled. This should take about 8-12 minutes. Note the time it has taken from when you add rennet to when the surface gels. Multiply this time by 3 to get the total time to wait from when you added rennet to the time to cut the curd. For example: added rennet at 12:00, 10 minutes to surface gel = wait until 12:30 (10x3=30).	1:15	6.4-6.5
7. After waiting according to the 3x multiplier, cut the curd with a knife horizontally, vertically, and at a 45° angle into large, 2" pieces. Wait for 10-15 minutes to let the curd heal.	1:45	6.4-6.5
8. Cut the curd again with a knife or with a whisk into 1/2" pieces, about the size of a large pea or hazelnut. Let rest again for 10 minutes. The whey should begin to separate. Stir gently without heating.	2:00	6.3-6.4
9. Fill your sink with 110° F-115° F water and put the pot with curds and whey inside. Stir the curds briefly for 5 minutes, and then every 10 minutes for 30 minutes, and let the curds settle on the bottom for 15 minutes (50 minutes total). The warm water will raise the curds to around 100° F. When stirring the curd, if there are any very large pieces, break them up so the curds are uniform.	2:50	6.0-6.1
10. Drain the whey from the curds by pouring everything into the straining bag or cheesecloth over the colander. Save whey if you want to make ricotta.	3:00	6.0
11. Let curds sit at room temperature for 3-8 hours. You can also put them in the refrigerator, and this takes longer. If you want it to go faster, put them back in the pot and put the pot in the sink with hot water to cheddar the curd mass.	6:00	Down to 5.3
12. Test for stretch by cutting off a piece of the curd and dipping it in very hot water (at least 115° F). If it stretches, the curds are ready, if it breaks apart, leave for another 30 minutes and test again. If the	6:00	5.2-5.3

curd falls apart into mush, it has overacidified. Check every 30-60 minutes for stretch.		
13. Once curds are ready, cut or break into thin strips, about 1/2" inch wide and 1" long.	6:00	5.1-5.2
14. Prepare a solution of 1 cup of kosher salt and 1 quart water. Heat together the salt and water until dissolved and then chill and put ice cubes in it. You can prepare this ahead of time. Must be cold when you start forming the mozz.	6:10	N/A
15. Heat 2 quarts of water or whey to 170° F in a separate pot or microwave.	6:10	N/A
16. Pour the hot water into the container with the cut curd. Do not pour directly on the curd, pour on the side.	6:10	5.1
17. Pull and stretch the mozz into a strand, and then mold it back and shape into a ball or form smaller balls from the strand. Use your gloves, this gets hot. Do not knead.	6:15	5.0- 5.1
18. Once formed, put in cold brine and let it brine for 30-60 minutes and remove. Enjoy within 3-5 days. You may also eat this lightly salted or unsalted.	6:30	5.0-5.1

## Notes

- You can make the mozz as an overnight recipe. If making as an overnight recipe, the important part is that you drain when the pH is at or below 6.2 (ideal range 6.0-6.2), about 1.5-2 hours from adding buttermilk. Drain the whey and place the curd mass in the fridge and go to bed. It should be ready to stretch in the morning.
- You can store the formed mozz in a brine pickle, but you must prepare a different one than above. If storing in brine, make up a solution consisting of 1 quart water, 1/4 TBSP CaCl<sub>2</sub> solution (30-32% CaCl<sub>2</sub> solution), 1/4 tsp vinegar, 2-3 tsp salt. Store only in this brine. If using whey instead of water, cut CaCl<sub>2</sub> solution and vinegar to 1/8 TBSP CaCl<sub>2</sub> solution and 1/8 tsp vinegar.

## Troubleshooting

- Curds shatter after cutting them and trying to stir the first time.** Your milk has been overprocessed by the manufacturer. Use different milk. Try to save the existing make by continuing and making a fresh white cheese out of it. You may be able to still make a mozzarella.
- Curd does not stretch in test.** Wait some more; not enough acid has been developed. If you get a piece of curd and it mashes and falls apart, that's too much acid. If it stretches a little a breaks, not enough.
- Mozz is rubbery.** Five factors need to come together for moist mozz: correct curd size/multiplier, fat content, low cook temp, adequate acid, and gentle handling. One or more of these is off if it is rubbery.
- Mozz is too soft and mushy.** You waited too long to stretch, or you cut the curd into too big pieces.

- **Cheese lacks flavor.** Try another brand of buttermilk or use DVI culture. Try adding lipase. Marinade.
- **Curd does not set.** Check rennet age and make sure to use distilled water for diluting. Add 1/4 tsp CaCl<sub>2</sub> solution/gal in the future for the milk or use different milk. Make sure milk is not ultra pasteurized.

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