

Non-cheesy Things to do with Milk and Other Stuff

QUESO DIEGO
THE SAN DIEGO CHEESE CLUB

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What we're going to cover and taste

- Yogurt
- Kefir
- Kombucha
- Jun

What do these things have in common?

- Easy to make
- Healthy to eat
- Self-sustaining
- They're all a form of fermentation
- Probiotic

What is Probiotic?

- Probiotic foods contain live bacteria and yeasts that are good for the digestive tract.
- “Good” bacteria are needed for a healthy body
- Probiotics can replace bacteria lost by illness or antibiotics.
- Lactobacillus is the most common type
 - This creates the tartness in yogurt and kefir
- Bifidobacterium is also common. Good bacteria that can help with a number of digestive issues. (ask your doctor about this)
- These probiotic bacterium are present in the foods we’ll be discussing.

Yogurt

- From a Turkish word meaning to curdle or thicken.
- Thought to come from Mesopotamia around 5000BC
- Can be made with almost any mammal milk
- Made using a thermophilic bacteria starter
 - Milk must be heated and kept warm in order to nurture the bacteria
- You can use an existing batch of yogurt to make the next batch.

The live and active bacteria in Chobani Yogurt:

- Streptococcus Thermophilus
 - Helps bacteria survive the higher temps used in culturing yogurt
- Lactobacillus Bulgaricus
 - Feeds on lactose sugar and produces lactic acid
 - Help keep the pH in the small intestine low to prevent harmful bacteria to grow
- L. Acidophilus
 - Produces vitamin K as well as lactase, an enzyme that breaks down lactose
- Bifidus (Bifiobacterium)
 - Not to sure what this does. Seems to help with digestion...
- L. Casei
 - Aids in the growth of L. Acidophilus and general beneficial bacteria

Let's make some Yogurt

- What you'll need:
 - Double boiler pot
 - Thermometer
 - Spoon
 - Starter culture or store bought yogurt with "Live Culture"
 - "Yogotherm" or some insulated container

Heat some milk

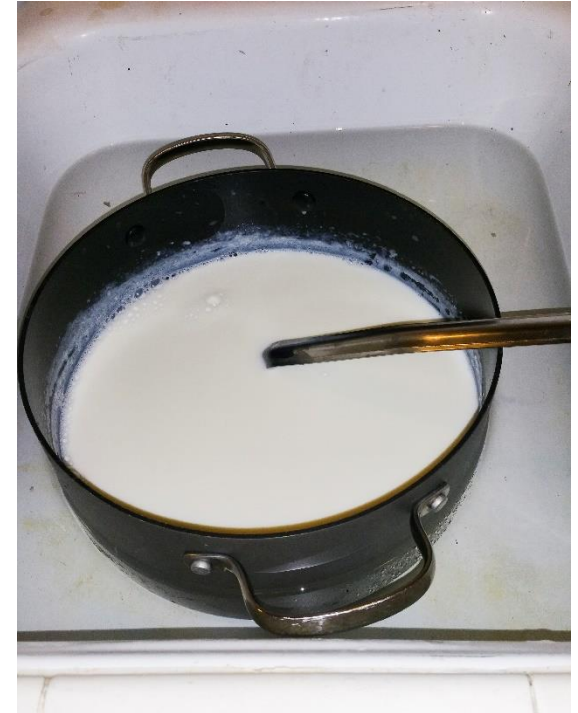
- Can use any milk as long as it hasn't been UltraHighTempPasturized.
- The yogurt cultures are thermophilic. This means they work best at a temperature of 104° to 112°.
- If you want a thicker yogurt then heat the milk to about 180° for 30 minutes and then cool the milk to 110° before pitching the starter.



Use a double boiler to heat the milk. Do not heat directly on stovetop.

Cool the milk and add the starter

- Put the pot in the sink with cool water to bring the temperature down quickly.
- Once it is cool you can transfer the milk to an insulated container.
- If using a powdered starter then follow the directions.
- If using a previous batch or a store bought yogurt then put about 2 Tablespoons of that per quart of milk.



Maintain the Temperature

- It's important that the container remain insulated to keep the temp up for 8-18 hours.
- I use the Yogotherm.
- It holds 2 quarts with extra room for starter



Finish

- Test your culture to see what the best setting time is.
- I use 12 to 18 hours. If you wait too long the curds and whey will separate (just stir if this happens)
- When it's done you can put it into a container, stir, and then refrigerate until you want to eat it.
- Before you eat the entire batch save some to use as a starter for your next batch.
- If you want Greek Style yogurt then...

Greek Style Yogurt

- This is a thicker style of yogurt made by straining off the whey.
- This also provides less sugar, fewer carbohydrates and more protein per portion than regular yogurt.
- Just strain like cheese curds.



Straining time will determine the final thickness. For the yogurt you'll try tonight the first batch was strained for 6 hours and pressed out 4 cups of whey. This turned out to be thick. The second batch was strained for less than 2 hours, for about 2 cups of whey, then blended with the first batch. This way you can make this exactly to your liking.

Milk Kefir – What is it?

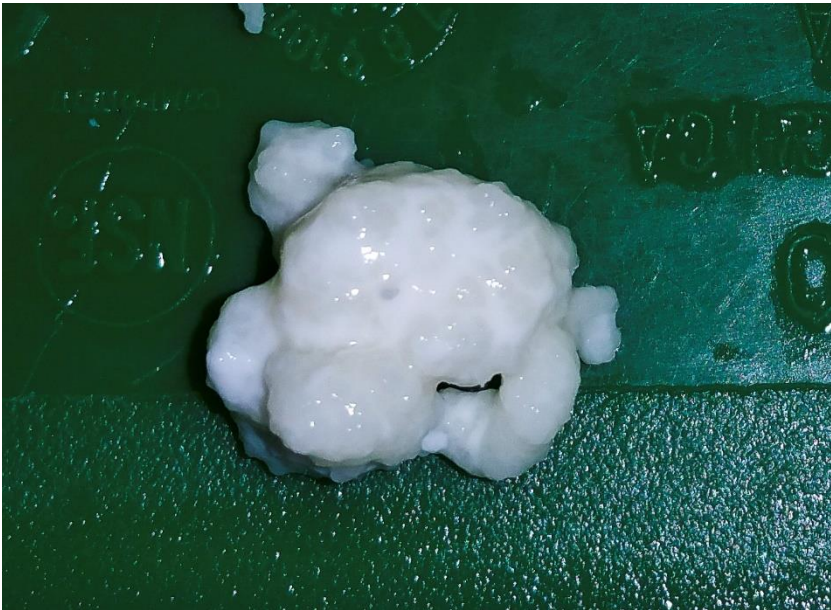
- Like yogurt, kefir is a thickened drink made from milk.
- It has probiotic properties.
- Kefir is made produced by “Kefir Grains” that use the milk and lactose sugar for food.
- You feed the grains and they give you kefir.
- There is a type of “Water Kefir” but that’s for another time.

How is it different from yogurt?

- Unlike yogurt, kefir cannot be propagated by using some of the old batch to start a new one.
- Yogurt cultures are thermophilic while kefir grains are mesophilic, they grow at room temperature.
- Yogurt culture contains bacteria but little or no yeast.
- Kefir grains are a complex community of bacteria and yeast.
- The grains need the sugar and milk proteins to live.
- The yeast can produce a slight amount of alcohol.

Kefir Grains

- They look like little cauliflower clumps.
- As you make batches of Kefir the grains multiply and grow.
- They are living organisms and must be fed to stay alive and healthy
- You cannot make kefir grains, you must obtain some.



Bacteria and Yeasts found in kefir grains:

- **Bacteria** *Species Lactobacillus* Lb. acidophilus Lb. brevis [Possibly now Lb. kefiri] Lb. casei subsp. casei Lb. casei subsp. rhamnosus Lb. paracasei subsp. paracasei Lb. fermentum Lb. cellobiosus Lb. delbrueckii subsp. bulgaricus Lb. delbrueckii subsp. lactis Lb. fructivorans Lb. helveticus subsp. lactis Lb. hilgardii Lb. helveticus Lb. kefiri Lb. kefiranofaciens subsp. kefirgranum Lb. kefiranofaciens subsp. kefiranofaciens Lb. parakefiri Lb. plantarum *Species Streptococcus* St. thermophilus St. paracitrovorus
- *Species Lactococcus* Lc. lactis subsp. lactis Lc. lactis subsp. lactis biovar. diacetylactis Lc. lactis subsp. cremoris *Species Enterococcus* Ent. Durans
- *Species Leuconostoc* Leuc. mesenteroides subsp. cremoris Leuc. mesenteroides subsp. mesenteroides Leuc. dextranicum
- **Yeasts** *Dekkera anomala/Brettanomyces anomalus Kluyveromyces marxianus/Candida kefyr Pichia fermentans/C. firmetaria Yarrowia lipolytica/C. lipolytica Debaryomyces hansenii/C. famata Deb. [Schwanniomyces] occidentalis Issatchenkia orientalis/C. krusei Galactomyces geotrichum/Geotrichum candidum C. friedrichii C. rancens C. tenuis C. humilis C. inconspicua C. maris Cryptococcus humicolus Kluyveromyces lactis var. lactis Kluyv. bulgaricus Kluyv. lodderae Saccharomyces cerevisiae Sacc. subsp. torulopsis holmii Sacc. pastorianus Sacc. humaticus Sacc. unisporus Sacc. exiguus Sacc. turicensis sp. nov Torulaspora delbrueckii Zygosaccharomyces rouxii*
- **Acetobacter** *Acetobacter aceti Acetobacter rasens*

Source: Cultures for Health
Milk Kefir Handbook

How to make Kefir.

- Take 1 quart milk, room temp.
- Add $\frac{1}{4}$ cup Kefir grains
- Cover and wait for 18-36 hours
 - The longer you wait the more tart the final kefir. You decide how you like it.
- Strain the grains
- Refrigerate the kefir
- Start a new batch
- Drink kefir
- Repeat

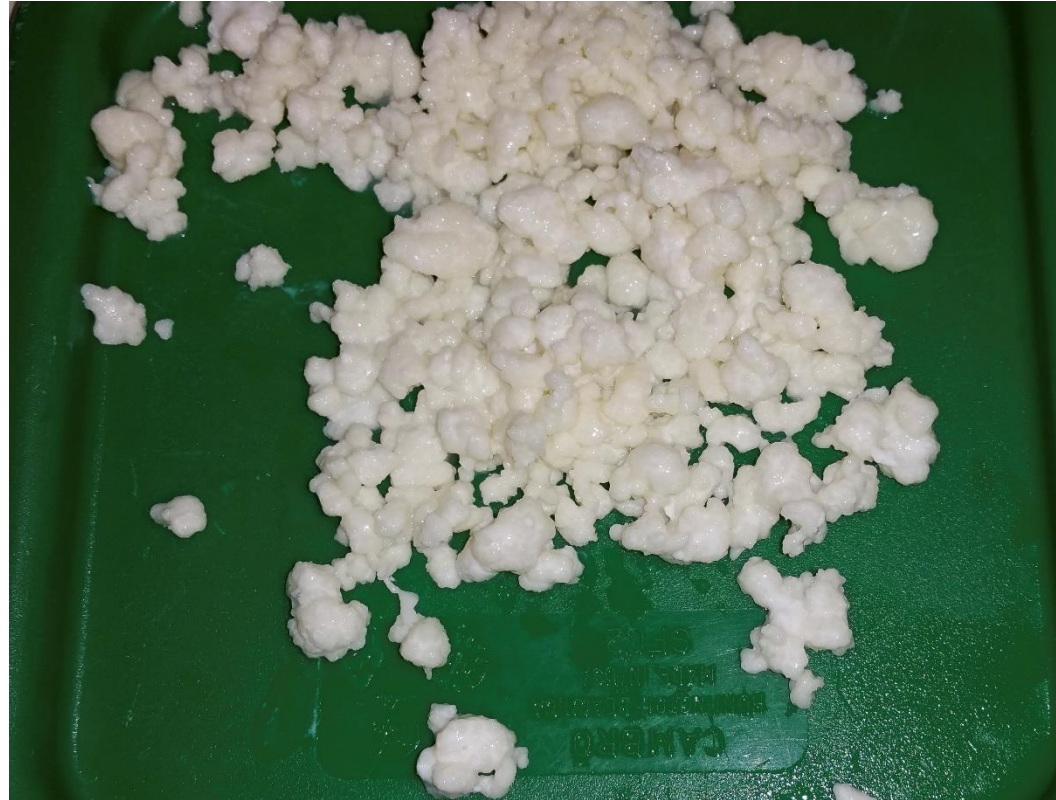


Your 1st Kefir

- You can buy a starter grains from eBay or obtain them from a friend.
- You'll need to bulk up the grains before you can make a large volume of kefir.
- Use about 1C milk per Tablespoon of grains.
- Let sit for 24 hours
- Strain the grains
- Repeat a couple times.
- After that you can make a quart and go from there.



- It won't take long to build up a good batch of grains



Cautions when using grains

- You can rinse the grains with distilled, RO, or cooled boiled water.
- Do not rinse with chlorinated water. This may damage or kill the grains. You can rinse with milk.
- Many sites will tell you to never use metal with the grains. This was true in 1910 but with stainless steel there's not problem. You don't need special "Kefir Strainers". You can use a slotted spoon or your hands. I use a stainless tea strainer.
- If you want to take a break from making kefir then put the grains in a small Tupperware and cover with milk and store in the fridge. Drain and repeat every few days.

What Kefirs do we have today

- 1 gallon each from grains bought on ebay.
 - ProBios Brothers
 - Someone else I can't remember
- These grains were kept separate until the end and used with store bought whole milk.
- Dr. Laura provide 3 quarts of goat milk. I used a blend of the grains for this kefir. This was awesome. Buy a goat!
- The grains I have to give away are a blend of both grains, about 2 Tablespoons total per batch.
- If you get these then use the process described a couple slides ago.

Final Notes on Kefir

- You can adjust the tartness by how long you leave the grains on the milk.
- You can make a slightly effervescent and low alcoholic kefir by removing the grains, covering the container, and leaving out at room temperature for a few days.

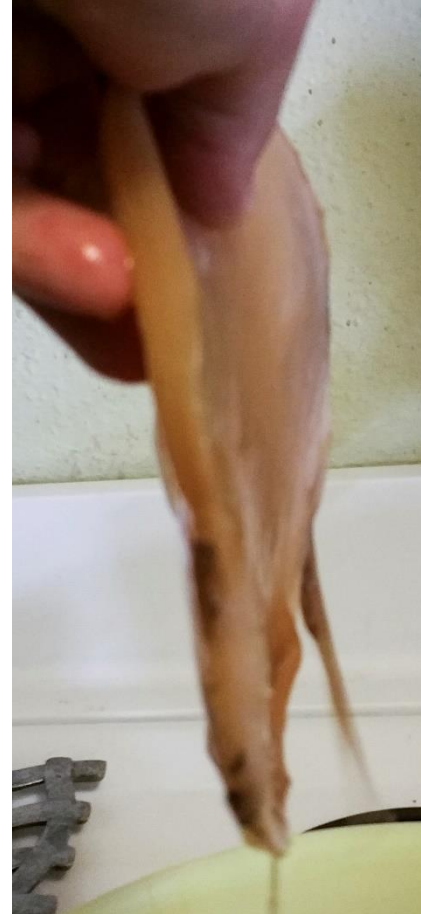
Kombucha

- Kombucha is a drink made from sweetened tea.
- You can make this with black or green tea as a base.
- Kombucha is another of the probiotic drinks that are easy to make and offer many variations to suit your taste.
- Once fermented you can bottle it for carbonation or drink it still
- You can mix with juices to add some flavor and cut down on the tartness.
- Like Kefir, Kombucha requires the help of a group of bacteria and yeasts called a SCOBY

SCOBY

- Symbiotic Culture (community) of Bacteria and Yeasts
- A Scoby is described as a mother, mushroom, starter, blob..
- It replicates as it matures with multiple batches and produces “babies”
- These babies are the basis for a new starter.
- You can’t make one from scratch. (sort of)
- Like Kefir grains you must buy one or get one from a friend.

SCOBY



What Makes up a SCOBY?

- **Acetobacter:** This is an aerobic (requiring oxygen) bacteria strain that produces acetic acid and gluconic acid. It is always found in kombucha. Acetobacter strains also build the scoby mushroom. *Acetobacter xylinoides* and *acetobacter ketogenum* are two strains that you might find in kombucha.
- **Saccharomyces:** This includes a number of yeast strains that produce alcohol, and are the most common types of yeast found in kombucha. They can be aerobic or anaerobic (requiring an oxygen-free environment). They include *Saccharomyces ludwigii*, *Saccharomyces apiculatus*, *Schizosaccharomyces pombe*, *Zygosaccharomyces*, and *Saccharomyces cerevisiae*.
- **Brettanomyces:** Another type of yeast strain, either aerobic or anaerobic, that is commonly found in kombucha and that produces alcohol or acetic acid.
- **Lactobacillus:** A type of aerobic bacteria that are sometimes, but not always, found in kombucha. They produce lactic acid and slime.
- **Pediococcus:** These anaerobic bacteria produce lactic acid and slime. They are sometimes, but not always, found in kombucha.
- **Gluconacetobacter Kombuchae** is an anaerobic strain of bacteria that is unique to kombucha. It feeds on nitrogen that is found in tea, and produces acetic acid and gluconic acid as well as building the scoby mushroom.
- **Zygosaccharomyces Kombuchaensis** is a yeast strain that is unique to kombucha. It produces alcohol and carbonation as well as contributing to the mushroom body.

What equipment do we need to make Kombucha

- Container: The mother will grow to whatever shape the container is, so pick something that's convenient. I like the Droppar from Ikea, \$10, straight sides, lid, hold 3+ quarts
- Strainer, stainless steel or food grade plastic
- pH meter or strips if you want to test the final pH
- Funnel
- Bottles to store the final product. Flip tops work great.



How to make a batch of Kombucha

- The Scoby feeds on a mixture of tea and sugar.
- The tea provides some of the nutrients and tannins that are needed.
- The sugar is food. Plain sugar works fine but you can use other types.
- Do not use honey. A kombucha Scoby cannot process the sugars in honey. You need another type of Scoby for this. More later.

Recipe for a 3 Quart Batch

- Bring 2 Qts of water to a boil. Let boil for 5 minutes then turn off.
- Add ½ Cup of sugar for each Qt of water (1 ½ C in this case)
- Stir until dissolved
- Add your tea. The amount will depend on how strong you like the tea flavor and tannin. I generally use 10 bags or more of Irish Black Tea or green tea. There is no absolute amount. Adjust to taste.
- Cool to room temperature.
- If making your first batch add ¼ C of apple cider to acidify.
- If making a subsequent batch then add 2 cups of the prior batch.
- Add your SCOBY, cover and wait



Fermenting

- It will take from 7 to 30 days for your kombucha to be ready.
- Don't bother tasting for the first week. After that you can insert a straw under the Scoby or use a spoon to get a sample.
- Taste every few days until you get the tartness you're looking for.
- Ideally you want a pH of 2.4-4 in order to have a safe drink that will not promote the growth of bad bacteria.



Finishing

- There are many ways to finish the fermented Kombucha.
- When done, remove the Scoby and set in a bowl. Pour about 1 ½ cups of the finished kombucha on top of this.
- You can then ladle the kombucha into flip top bottles. If not adding anything to the kombucha then leave a little headspace.
- Seal the bottle and store at room temp for a 3-7 days. The fermentation will continue and develop some carbonation.
- If you want this to be still then just put in the fridge.
- Do not open the carbonated bottle at room temp! It may make a mess.
- Cool the carbonated kombucha in the fridge and enjoy.

More on Finishing

- Kombucha is a great vehicle for trying different flavors. The ones you'll try tonight include one or more additions of:
 - Ginger
 - Cranberry juice
 - Orange juice
 - Raspberry juice
 - Pineapple juice
 - Pomegranate juice
- You only need about 10-20% of the juice for flavor. You don't want to lower the acidity too much. Experiment a bit.

Propagating your SCOBY

- As your Scoby grows it will thicken. Eventually it will start to peel away like 2 pancakes.
- At this point go ahead and separate the layers. It's ok if one tears a bit, it will fill in.
- You now have two Scobys. Give one away, make two batches, or store it. More later on storing.

“Making” a Starter Scoby

- As mentioned earlier you cannot “make” a Scoby, but you can encourage one to grow. The green tea Scoby was created this way.
- Get a bottle of commercial Kombucha at the store. Make sure it contains live probiotics. I like the Synergy brand.
- Make a small 2 cup sweet tea starter.
- Drink ½ the kombucha and pour the rest into the starter.
- Cover and treat like a regular batch.
- After a few days you’ll see a film on top of the liquid. This is the Scoby starting. After a few weeks you’ll have a new Scoby that you can use on a larger batch.
- Just watch that no mold forms or for any off odors. That could indicate an infection and you should toss it and start over.

Storing Your SCOBY

- If storing for a very short time, like a week, then put the Scoby in a plastic container with 1 a cup or so of the fermented kombucha. You can store this in the fridge for about a week before making more.
- For longer storage, 6 weeks or less, just make a new batch and let it sit. This may turn very sour but it will survive.
- For longer storage use the above technique but replace some of the liquid with a sweetened tea every few weeks.
- If you're not going to use it for a few months bring it to a meeting and let someone adopt it.

Some final Kombucha notes

- There is a lot of flexibility in making kombucha. There's no absolute as long as you use tea and sugar.
- You can adjust the tea strength as you like.
- Add fruits or fruit juice.
- Blend away!
- You do want to make sure the final product is acidic enough to discourage the growth of unwanted bacteria.
- Have fun.

Jun

- Jun is very much like Kombucha
- It's not very common and I just heard about it a month ago.
- The main difference is that the sugar comes from honey and not simple sugars.
- This requires a different SCOBY. A kombucha Scoby cannot process the more complex sugars in honey.
- Thank you to Frank Goldbeck of Golden Coast Meadery for giving me a Jun starter.

The Difference in Scobys

- The kombucha Scoby grows in homogeneous layers like pancakes.
- The Jun Scoby is more vertical, like a condo building.
- When separating a Jun Scoby you cut it like toast.



Yum. I want some of that.

Making Jun

- You make it the same way as Kombucha but with the following differences:
 - Instead of sugar use $\frac{1}{4}$ cup of honey per quart of tea.
 - Uh...that's the only difference I can think of.

What I have to give away

- 3 quarts of yogurt
- 5 Kefir grain starters
- 3 Black tea Scobys
- 2 Green tea Scobys
- 1 Jun Scoby starter
- 22 bottles of Kobucha to try
- 2 bottles of Jun
- 2 gallons of cow kefir
- 1 gallon of goat kefir

What to do

- If you get one of the starters please use it within a couple days.
- Make enough to start propagating some new starters.
- Bring to future meetings to give to someone else

Thanks to

- Dr. Laura for the goat milk
- Frank Goldbeck for the Jun starter
- Sandor Katz for promoting this stuff.
- References:
 - Cultures for Health website
 - www.culturesforhealth.com
 - The interwebs
 - WebMD.com
 - Probiotic.org
 - “Wild Fermentation” and “The Art of Fermentation”, by Sandor Katz



Questions?