

Hickory Milk, Milkshake, Skim Milk/Tea, Cream, and Ricotta

Here is a modern, fast, mechanizable, and commercializable way of making hickory milk products that will blow the socks off consumers and bring shagbark type nuts to the market.

Making Milkings (the ground kernel/shell mix used to make hickory milk products):

1. Sort nuts on the lineage float table. Separate into A grade (low low floaters and 99% good nuts with the 1% being partially weeviled but healthy full nuts), B grade (slightly higher floating but still 90% good), and high floaters/discards (mostly bad nuts). Note that you will need to linearly size nuts to make the nuts face-face dimension consistent if you are using a species with high variability in that dimension. Shagbarks are quite consistent in this dimension but will still benefit from linear sizing commercially.
 - Lineage Float Table: <https://youtu.be/ySj22tPbzSU?si=DQH6QAoGijn3Ph4f>. Request parts list via direct message.
 - Sizing should separate nuts linearly with long slits, not circles for correct dimensioning for the float table. This would best be done using circular rotating drum sizing machines like the Thompson In-Shell Pecan Sizer. It works but not well without a roller sizer on small scales. The face to face dimensions of wild shags is between 0.57" and 0.74". The Badgersett population varies from 0.60" and 0.85". If I were to choose two sizing edges. I would use 0.68" (11) and 0.81" (13) as my two slot sizes for my context. If I would add a 3rd it would be 0.75" (12). Note that the pecan world uses size numbers as 16ths of an inch so a 12 would be 12/16ths inch.
 - <https://www.midwesthazelnuts.org/processing-equipment.html>
 - <https://www.thomsonindustriesinc.com/in-shell-sizer.html>
2. Use A grade for mechanized milking, hand crack B grade or use Levi's to-be-developed nut roller mill cracked onto a conveyor to sort out bad nuts. Never crush unsorted milking nuts into a bin; mycotoxins can be very dangerous in milking and quality should be of the highest priority. Beware of the rare pink nut and blue nut; these nuts come through in the B grade float sometimes and may cause severe sickness if milked.
 - A quality food grade conveyor belt with a variable speed drive is sold here: <https://www.mcmaster.com/5734K267/>
3. Lightly crack all nuts in your mechanized cracker, ideally in the to-be-developed nut roller mill that Levi Geyer is working on. Sieve out anything less than 4 mesh and look over the nuts for quality control purposes. If you see blackened parts of nuts from partial weeviling, discard. Anything less than 4 mesh is considered hickory milkings during this and any future step; 4 mesh is a good size for milkings because there will not be any retainers at 4 mesh and the particle size makes for quality milk.
4. Now that the sorting is near perfection, crack to try to get the particle size less than 4 mesh. For me, this looks like using a mechanized crowding plate cracker followed by a modified steel burr mill. Generally burr mills require an input feed less than 2 mesh so I use my cracker to get particle size down to that. Above 2 mesh doesn't feed into the screw well and will make your mill spin without grinding anything; about the same principles appear to be true with the KK20 oil press; there is a slight design change that

some mills use to prevent this issue that I am happy to talk about with anyone interested; that said, my burr mill and the KK20 cannot be easily modified to carry this design change. Always remember to take out particles less than 4 mesh as they can cause bridging in hoppers and there is no need to grind them again. Temperature of the nuts may affect how the kernel shatters relative to the shell when milled.

5. Now that all my nuts have gone through the mill or very tight cracker plate spacing, I sieve out anything above 4 mesh, mill once more in the steel bur mill to try to extract a bit more fine kernel. After sieving this re-milled material, discard the coarse material for chicken feed. If the mills are set right, there will be a very low proportion of kernel in this discard. This increases the kernel proportion of the milkings and increases milk quality in my opinion. The shell imparts a more tea-like, darker flavor on the milk which I do not prefer; if you have ever milked pure kernel or milked just shell pieces, you know what I mean. Now you have milkings; freeze this for future milking.
6. Once the milkings are milked, they hold high quality for at least 3 days in the fridge. Adding salt likely increases fridge life; more experiments and data is needed but expect the quality to hold for 7 days in the fridge with minor additions of salt (which I add anyways for flavor enhancement). For reference, 7 days is the fridge life of raw milk. Some experiments are underway. All the milked products freeze well; I have not observed any product quality differences after freezing.
7. One quart of milkings weighs about 430g (about a lb). With my nuts and my processing methods, I get 6 cups of skimmings, and 8 cups of shell for when milking approximately 13 cups of dry milkings; note that the shell density is lower because they tend to be larger, more uniform size than kernel pieces.

menu.

Store in the freezer to preserve quality and prevent rancidity of the kernel oils. The milk products keep great quality for 5 days minimum in the fridge; small additions of salt may add more fridge stability.

Hickory Skim Milk

1. Bring water up to a boil where the water is higher than it is wide or at least equal height:width of water. This ratio is helpful for decanting. Use a lightweight pot that is good for pouring out liquid. Do not fill the pot more than 70% full for ease of decanting
2. Add 1 part milkings (mix of ground shell and kernel provided) and 2 parts water.
3. Lightly simmer for 15 mins until the shells sink. Foam will form at the beginning so be careful and do not let it boil over; the foam goes away after a few mins of simmering. I like to keep the foam in the milk but some people take it out.
4. Stir the pot, let settle for 10 seconds, then decant off all the liquid, floating solids, and suspended solids through a large 16 mesh strainer (most mesh kitchen strainers).
 - a. I recommend you add the skim milk (the liquid portion that goes through the 16 mesh strainer) back into the shells, stir the shells up, and decant another time to get extra kernel that was mixed or settled into the shells. I add the skim milk back in two times typically.

- b. On the last pour, use an empty 16 mesh strainer to catch shells and get the last bit of liquid from the shells.
5. You now have the suspended solids separated from the skim milk. Quickly sort out any obvious shell pieces from the kernel solids; I usually find 5 pieces per gallon bag of milkings and it is not a deal if you have a little bit of shell mixed because that comes out in sieving in future steps.

Hickory Milkshake

1. Blend the solids and liquids together in a vitamix on high for 90 seconds (or more if you prefer a smoother product).
 - a. Never vitamix prior to decanting; shells are abrasives and make microplastics.
2. Pour through a 30 to 50 mesh sieve. Almost nothing should get caught in the sieve other than small dark shell pieces. If lots of white kernel solids get caught, you should have blended longer; reblend if so.
3. Sweeten lightly with maple syrup to taste and add a bit of salt.
4. This is Hickory milkshake. This is very heavy and is a replacement for Raw Jersey cow milk. I would add to baked goods or ice cream recipes.

Hickory Milk (2%)

1. Dilute Hickory Milkshake 50/50 with water.
2. This is a replacement for 2% milk and is most similar to nut milks I have had from the store. This is good in cereal and nixtamal corn making puddings etc.

Hickory Cream

1. Put the skimmings into a vitamix or food processor. Add about 2 parts hickory skim milk for each part of skimmings.
2. Blend for a minute in a vitamix for 2+ mins.
3. Sieve to 30-50 mesh; this takes out shells. You may need to press into the sieve with a spoon but it will be smoothest if you blend long enough that all particulate other than small shells easily pass through the sieve.

Hickory Mascarpone

1. Put the skimmings into a food processor. Don't add any skim milk.
2. Food process for 8+ mins.
3. Sieve to 30 mesh; this takes out the few shell pieces and makes the product incredibly smooth. You will need to press into the sieve with a spoon. 30 mesh lightens the color by taking out shell particulate and skin particulates.
 - o If I were automating, I would try the Robot Coupe C80 with the 0.5mm basket (approx 30 mesh). https://www.robot-coupe.com/usa/en_US/p/product/20682

4. Sweeten light with maple and lightly salt. Use as mascarpone in crepes, as frosting, or filling etc. Incredible.

Dried Hickory Niblets

1. Place skimmings on a baking sheet. Sort out any small dark shell fragments from the skimmings thoroughly.
2. Place in the oven (170F is the min for my oven and it is fine) or a dehydrator (135F) for 6ish+ hours.
3. These niblets are buttery and smooth tasting but have not retained any of the hickory flavor. Still, they are better than English walnuts by a long shot. This is not an energy efficient process and will likely not be commercializable. Beware of shell fragments; there is always one that makes it through the quick scan; this is another reason why this is not commercializable.

I expect that I will be selling milkings next year. This year I'm only distributing it as gifts and for trials. I am expecting to be selling for \$15/quart of milkings which will put the cost/gallon of hickory milkshake at \$30/gallon and 2% Milk at \$15/gallon which is about 30% more expensive than bottled hazelnut milk which is a fairly similar level of fattiness to my 2%. I think that prices are reasonable for a pesticide-free and herbicide-free, new product with incredible flavor and rich ecological value in our current market. I do also expect to be selling hickory kernel after next harvest season.

Hickory oil is real. Hickory milk products are real. Hickory kernel is up next. The hickory trifecta is nearing!