Kombucha and Pregnancy: Answers to Your Brewing Questions

Kombucha: fizzy, fermented, and full of probiotics. Some people drink kombucha for its fun effervescence and wide range of fruity flavors. Others, for its alleged health benefits ranging from improved digestion to lowered blood sugar. The increasing popularity of kombucha has not surprisingly led to an increased number of inquiries to MotherToBaby about the safety of drinking it during pregnancy. Carly, a recent visitor to our online chat service, explained that she had been drinking kombucha for years, but now that she was trying to get pregnant was it okay to keep drinking it? Great question! I'll share here what I talked about with Carly.

But first, what is kombucha? Kombucha is a sweetened green or black tea fermented with a symbiotic colony of bacteria and yeast, otherwise known as a SCOBY. Symbiotic means that the bacteria and yeast work together in balance. If you've never seen a scoby, let me give you a visual: a pale, rubbery, gelatinous disk vaguely resembling some sort of extraterrestrial organ. Not something most people would find appetizing from the get-go! But once the scoby is added to sweetened tea and left to ferment for a period of weeks, the result is a tangy, bubbly beverage that is slightly alcoholic, which brings me to the first consideration I discussed with Carly about drinking kombucha in pregnancy.

Kombucha and Pregnancy

Alcohol

Kombucha contains alcohol as a natural by-product of the fermentation process. In the United States, beverages containing 0.5% or more alcohol by volume (ABV) are required to have a label that includes a health warning for pregnant women. Varieties with lower alcohol content (less than 0.5 % ABV) are not required to have the label. Nevertheless, the non-labeled varieties still contain alcohol. For non-pregnant women, these small amounts of alcohol do not have a known risk; but in pregnancy, the advice of major medical organizations is to avoid alcohol altogether. Especially since the alcohol content of kombucha is not always clear-cut.

Most of the time, the manufacturing process can stabilize kombucha after it is bottled. However, kombucha has been pulled from shelves in the past after it was discovered that fermentation in the bottle did not stop, increasing the alcohol content above the amount that would require the pregnancy-warning label. And determining the alcohol content of homebrewed kombucha is difficult. Homebrews can reach as high as 3% or more depending on the type of yeast used in the scoby, how long and at what temperature the tea ferments, and other factors.

The best way to avoid unnecessary alcohol exposure in pregnancy is to not drink kombucha for those 9 months. And what about during breastfeeding? If you do enjoy an "alcohol-free" kombucha from time to time, the small amount of alcohol it might contain is unlikely to have a negative effect on your infant. Yet waiting a couple of hours after drinking the kombucha before nursing again will allow time for your body to metabolize the alcohol from your blood and breast milk.

Bacteria

Another concern about drinking kombucha in pregnancy is the possibility of bacterial contamination. Using proper sterile techniques can reduce harmful bacteria in the product, but the best way to eliminate any bacteria that might grow during the long fermentation process is to pasteurize the beverage with a quick heat treatment before bottling. Kombucha purists may argue that pasteurization destroys the probiotics responsible for the health benefits that kombucha may provide. However, unpasteurized products are not recommended in pregnancy due to an increased chance of foodborne bacteria such as listeria and salmonella, which can cause pregnancy complications. Unpasteurized products to avoid include certain milk and dairy products, and yes, fermented foods and beverages such as kombucha.

Homemade fermented foods carry an even greater risk of growing foodborne bacteria since the sterilization methods used at commercial facilities are not available in one's own kitchen. So when it comes to fermented products in pregnancy, store-bought selections that are pasteurized are the safest way to go. This means avoiding "raw" or unpasteurized kombucha, as well as homebrewed varieties.

Caffeine

A final consideration I discussed with Carly was caffeine. The general recommendation in pregnancy is to limit caffeine to about 200 milligrams (mg) per day. The caffeine content of kombucha can vary based on the type of tea used to brew it, and may fall somewhere in the 15-130 mg range. When calculating how much caffeine you're taking in, consider all potential sources including coffee, tea, soft drinks, and chocolate. The MotherToBaby fact sheet on caffeine lists the amounts found in some common products, and can be helpful for tallying up your daily intake (be sure to also check your product labels). For example, if you already drink a cup or two of regular coffee in the morning, a bottle of kombucha might put you over the recommended amount of caffeine for the day.

If breastfeeding, keep in mind that caffeine passes into the breast milk and can cause some babies to be irritable or have trouble sleeping. While you might not need to avoid caffeine altogether while breastfeeding, limiting the amount you take in can up the chances of a good night's sleep for both you and baby.

In the end, Carly decided that foregoing her beloved brew for the duration of her future pregnancy would be in the best interest of her developing baby. In the meantime, she'll opt instead for water to stay well-hydrated, and for carbonated fruit spritzers and juices when she gets a craving for the uplifting fizz that kombucha provides. Cheers to that, Carly!

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By Lindsey Morse, MS, CGC, MotherToBaby New York

It's officially summer! Time for pool parties, cook-outs, and beach-side picnics. Bring on the hamburgers and hotdogs, potato and pasta salads, fish fry, and barbecue chicken.

You may be wondering if it is safe to eat that food that has been sitting in the sun? Also, didn't I hear somewhere that pregnant women shouldn't eat fish or undercooked meat during pregnancy? Is it safe to swim in lake water or at the beach? How can I protect my baby during my pregnancy while still enjoying summertime fun and food with my family and friends?

Easy! There are just a few simple tips to keep in mind.

Tip 1 – Thoroughly cook all meat and seafood
Food safety is important whether you are pregnant or not. But some food-borne illnesses can be more of a concern if you are pregnant. Safe handling, preparation, and storage of foods reduces the chance that you could be exposed to little organisms that could make you feel bad in a big way.

One of the most common questions about food during pregnancy is about eating meat, especially deli sandwich meat, or undercooked meat (like that medium-rare steak). There are all these warnings about what to eat and what not to eat. So, how do you know what is a concern and what can you do about it?

Well, there are several microorganisms (bacteria and parasites) that can be found in meat before it's cooked, if it's only partially cooked, or if it has been cooked and then frozen or refrigerated to be eaten later. These include things like Escherichia coli (E. coli), Salmonella, Listeria, and Vibrio. (See MotherToBaby.org for more info in our fact sheets.) Some types, or strains, of these microorganisms are not harmful and are actually good for us, helping with digestion for example. But others can make you sick causing stomach cramps, diarrhea, vomiting, joint and muscle pain, and fever. Symptoms may last only a few hours with some infections or up to a week with others. In women who are pregnant, exposure to some microorganisms might make you sick, but are unlikely to directly affect the baby's development. Other microorganisms may increase the chance for miscarriage or other pregnancy complications, like early delivery.

You may have heard that women who are pregnant should not clean out their cat's litter box due to a risk of toxoplasmosis, but did you know that this same parasite, Toxoplasma gondii, is also found in undercooked meats? When moms are infected during pregnancy, there is a chance for congenital toxoplasmosis in their babies. This can cause liver, spleen, heart, brain, and eye problems including blindness, deafness, seizures, and cognitive delays. This is usually only a risk with a new infection during pregnancy, not if you have had toxoplasmosis in the past.

Cooking meat and seafood until the center reaches a safe minimum temperature or reheating meat destroys the bacteria or parasite, thereby preventing illness. While great chefs will tell you all sorts of tips and tricks for determining how done your steak is, invest in a meat thermometer! They are easy to find in most grocery stores and really take the guess work out of not only your next backyard party but also your weeknight dinners. Below is a table with the

recommended temperatures for different meats. You can find our fact sheet on meat and seafood at https://mothertobaby.org/fact-sheets/eating-raw-undercooked-or-cold-meats-and-seafood/.

Meat/Seafood	Safe Minimum Internal Temperature
Fish and Shellfish	145 °F (63°C)
Pork	145 °F (63°C)
Beef (steaks, chops, and roasts)	145 °F (63°C)
Beef and Pork (ground)	160 °F (71°C)
Wild game	165 °F (74°C)
Poultry	165 °F (74°C)
Cold lunchmeat and deli meat	Cook until steaming

Tip 2 – Safe food preparation and handling are also important
Some of the same bacteria and parasites can also be found on fruits and vegetables, or in unpasteurized dairy products like milk, cheese, and eggs. Washing your fruits and vegetables thoroughly and eating only pasteurized dairy products are the best ways to prevent exposure. And don't forget to wash your hands, cutting boards, and utensils thoroughly after handling uncooked meat, as well as unwashed fruits and veggies to avoid contaminating other foods.

Oh, and that grilled chicken that has been sitting in the sun for three hours – forget it! Once cooked, meat and seafood should be eaten right away. Leftovers of all types (including those pasta and potato salads, and anything with mayo or salad dressings) should be refrigerated at or below 40o F (4oC) as soon as possible and then meats thoroughly reheated before they are eaten.

Tip 3 – It is good to eat fish during pregnancy, but some are better than others
Another frequent question is about eating fish during pregnancy. Many fish contain a substance called methylmercury. Some fish have higher levels of this type of mercury than other types of fish – this usually depends upon the size of the fish, how long it lives, and where it lives prior to making it to your table.

But fish and seafood are actually a good source of protein and other vitamins that are good not only for adults but also for developing babies. The key is to eat the right types of fish and seafood in the right amounts. See our fact sheet athttps://mothertobaby.org/fact-sheets/methylmercury-pregnancy/pdf/ for more information. The Food and Drug Administration (FDA) also has a quick guide which can be helpful to determine which are the best options for you: https://www.fda.gov/downloads/Food/ResourcesForYou/Consumers/UCM536321.pdf%20

Tip 4 – Do some research before going swimming
Some of the bacteria mentioned earlier in this blog can be found in water, like your local lake or warm coastal waters. In addition to bacteria, lakes and rivers can contain things like protozoa and worms which cause diarrhea, abdominal cramps, and fever. Besides eating contaminated food, these organisms can get into your body if you swim in infected

water especially when you have an open wound, even a small scrape, if you swallow any water, or if water goes up your nose. Risks are often highest during and after a storm as this increases rain water runoff and pollution from the surrounding area.

There also can be certain types of algae in the water that may be harmful in high amounts. I recently received a call from a pregnant mom on vacation in Florida concerned about a red tide warning in her area. Red tides are caused by a high concentration of algae (an algal bloom) and happen mainly in Florida but can occur along the Gulf Coast or as far north as Delaware. Many algal blooms are not harmful, but others can cause low oxygen levels in the water harming marine animals and causing a build-up of toxins (called brevotoxins) in the water.

Pay attention to the warnings in your area because it is not a good idea to swim in areas where you know that there is an algal bloom or high bacteria counts, particularly if you have an open wound. Check out the Environmental Protection Agency's website https://www.epa.gov/beaches to find info about freshwater and saltwater beaches in your area. Also, look around the area that you plan to swim for obvious signs of pollution like a neighboring farm, trash in the water, or even dead fish floating in the water.

It is also important not to eat locally, recreationally caught shellfish during a red tide – shellfish in grocery stores and restaurants are regulated and are not caught during an algae bloom so they aren't contaminated but recreationally harvested shellfish could be. The brevetoxins which are found in red-tides are not destroyed by cooking.

Bottomline, planning is key! While often the risks associated with food-borne illnesses are bigger for you than for your baby, a few simple precautions can help you have a healthy pregnancy and still enjoy your favorite foods and summertime activities. Just remember to pick up a meat thermometer, give those veggies a good wash before you make that salad, avoid foods that have been sitting out in the sun, and know your lakes and beaches!

Lindsey Morse, MS, CGC, is a senior genetic counselor for Ferre Genetics, a program of the Ferre Institute based in Binghamton NY. Lindsey is also a teratogen information specialist with Pregnancy Risk Network, also known as MotherToBaby New York, and has served as co-director of the program since 2015. Lindsey counsels patients in all areas of genetics from prenatal to adult genetics. She also lectures on a variety of genetic issues to community organizations including high school, university, and medical students, physicians, and community health programs.

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By Ginger Nichols, Licensed Certified Genetic Counselor at MotherToBaby Connecticut

I was pregnant in 2004 when the Food and Drug Administration (FDA) and the U.S. Environmental Protection Agency (EPA) released guidelines on limiting fish consumption in pregnancy because of methylmercury. That pregnancy was definitely the most amazing time of my life; however, it was also stressful. It was the 5th time I had been pregnant, but due to miscarriages and the death of a son who was born very prematurely, I had yet to bring a baby home from the hospital. I became hyper-vigilant about anything that might be a possible exposure of concern for a pregnancy. I freely admit that my frame of mind for that pregnancy could not be called logical. Therefore, with the new and somewhat scary information about fish and methylmercury, fish was quickly added to my list of "don't eat that." I also admit that I don't eat the recommended amount of fish anyway, so it was not that big of a leap to stop eating all fish.

It turns out that I wasn't the only 'fish out of water.' According to a FDA study of the dietary habits of over 1,000 pregnant women in the U.S., around 21% of the women said that within the past month they had eaten zero fish. For the women who said that they did eat fish, most were eating less than the recommended dietary guidelines. However, fish is healthy for you! You don't want to stop eating fish altogether, so instead of avoiding fish, let's learn the facts.

By now, you may be asking: *"What is methylmercury and why is it in fish?"* As a Genetic Counselor and MotherToBaby specialist, I often talk to women about eating fish during pregnancy, so let me explain…. Methylmercury is an organic form of mercury. Mercury occurs naturally in the environment and it is also released into the air as a by-product of some industrial processes. When mercury gets into the soil and the water (including lakes, rivers, and the ocean), bacteria and fungi found in soil and water change mercury into methylmercury. Since methylmercury is in our water, it is found in different levels in pretty much all fish and shellfish. In general, larger fish with long life spans that eat other fish are typically going to have higher levels of methylmercury than smaller, younger fish. If you are interested, there are lists of average mercury levels in fish available online, such as this FDA web site: https://www.fda.gov/food/foodborneillnesscontaminants/metals/ucm115644.htm

Methylmercury is found in all tissues of the fish, so cleaning or cooking the fish will not reduce the levels of mercury. People who eat a lot of fish with high levels of methylmercury can also accumulate methylmercury in their bodies. Our bodies easily absorb methylmercury from our gastrointestinal (GI) tract and it takes a long time for our bodies to get rid of it.

"So why should I be concerned about eating too much seafood with high levels of methylmercury?" We

know that even if you are not pregnant, methylmercury is toxic to our nervous system and organs. The effects of methylmercury poisoning have been known since the 1950s. People who became sick from methylmercury poisoning had many symptoms that included numbness in the hands and the feet, muscle weakness, tremors (shaking), and personality changes (irritable, shy, nervous). Now before you panic, be aware that these people had been exposed to fish with levels of methylmercury far higher than even the most contaminated fish in your grocery store!

We know that methylmercury can cross the placenta in pregnancy. With very high exposures, babies have been born with small head size and brain damage that can lead to seizures, developmental delay, blindness, and muscle weakness. Since methylmercury can affect the baby's developing brain, high exposure is a concern at any stage of pregnancy. For more info, visit the MotherToBaby fact sheet on methylmercury in pregnancy and breastfeeding at https://mothertobaby.org/fact-sheets/methylmercury-pregnancy/.

By now you may feel like you just need to stay away from eating fish in pregnancy, when in fact studies are showing that women who eat fish during pregnancy have better pregnancy outcomes than women who do not eat fish. Recent studies have also looked at how nutrients in fish, including Omega-3 fatty acids, might have positive effects for baby's development and actually may help to protect against any possible harm that might occur from prenatal methylmercury exposure. And what's more, women in the U.S. generally do not depend upon fish as their only protein intake, so are unlikely to eat enough fish to cause harmful effects in a pregnancy. So, to reap the full health benefits of fish consumption for you and baby, the key is to eat a variety of fish that are low in methylmercury. This is where the FDA's updated 2017 guidelines can provide some assistance.

"What are the current FDA guidelines?" The FDA's recently revised advice is designed to encourage women who are pregnant and/or breastfeeding to consume up to 12 ounces of fish that are low in methylmercury each week, and provides guidance on which fish are the best options by breaking the fish into categories of Best Choices, Good Choices, and Choices to Avoid. The easy-to-read guide can be found here: https://www.fda.gov/downloads/Food/ResourcesForYou/Consumers/UCM536321.pdf. You'll notice that on the FDA's guide, different types (species) of tuna and tilefish are listed under different categories – so take note of which type you are buying so you know which list it is on.

Following current recommendations, if you are planning to become pregnant, currently pregnant, or currently breastfeeding:

- A typical serving of fish is 4 to 6 ounces, measured before cooking.
- Each week, you may eat up to 2-3 servings of a variety of fish from the Best Choices list; there are over 35 different types of fish on this list!
- If choosing a fish from the Good Choices list, limit yourself to just the one serving of that fish for the week.
- Avoid the following fish, as they are highest in methylmercury: shark, swordfish, mackerel, marlin, orange roughy, bigeye tuna, and tilefish from the Gulf of Mexico.
- If you are eating fish caught by family or friends, check for local fish advisories. The EPA has a search option to check for fish/shellfish advisories based on where you live: https://fishadvisoryonline.epa.gov/General.aspx. You can also check in with your state Department of Public Health. If there isn't an advisory, limit yourself to just one serving of that fish and do not eat any other fish that week.

So now that we've got you on the hook and reeled you in, what's the takeaway? With around 60 fish listed as Best and Good Choices on the FDA's 2017 fish guidelines, 'there are plenty of fish in the sea' for pregnant and breastfeeding moms!

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About MotherToBaby

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