

Let's get cultured - Understanding our biome

The value of cultured and fermented foods and fibers in our diet.

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Best Fermented and cultured foods to include in our diet:

Vegetables: Learn how to ferment your own vegetables

Go to You Tube : Look up - The Art of Fermentation and Fermenting Vegetables with Sandor Katz [Sandor Katz](#) is author of the book Wild Fermentation and the Art of Fermentation

Make your own cultured vegetables

Sauerkraut - traditionally made with cabbage as the main ingredient - if purchased from a store only buy refrigerated sauerkraut it contains the live bacteria (probiotics) - off the shelf has no live bacteria

Kim Chi - Korean Sauerkraut - usually made with cabbage or nappa it also comes in varieties made from Daikon radish and small cucumbers - usually spicier and if purchased from a Korean market it has fish sauce in it

Fermented soy products:

Miso paste - again only purchase from the refrigerator - when using miso as a soup stock - add it only after the water temperature is well below boiling - so you don't kill the culture

Tempeh - is a fully cultured soy product originally from Indonesia - the proteins in Tempeh are far more digestible than from Tofu - there are many great ways to cook with Tempeh.

Tamari - is the traditional soy sauce and is made from the liquid that forms when miso is being made - it is the most preferable form of soy sauce to use as a condiment

Natto - is cultured from soy and popular in Japan - it has a very intense smell and flavor and strange texture - okra like stringy - the "lindberger cheese of soy"

Kombucha - made from adding a Scobie to Black Tea or Green Tea with sugar - the Scobie is a mixture of beneficial yeasts and bacteria that converts the tea and sugar into a very healthy probiotic beverage. Contains *Saccromyces Boulardi* a beneficial yeast

Dairy based:

Yogurt - always look at the label for active cultures

Kefir - "yogurt on steroids" as I call it - has a larger variety of probiotic bacteria and beneficial yeasts usually 12 or more strains and is a great support for the digestive system

Traditional aged cheeses with probiotics - cheeses that are made using the fermentation process and raw milk that have lactic acid producing bacteria. **Gouda** the longer it ages, the more probiotics are produced - it has been found to help aid the digestive system and Finnish studies have shown that it boosts immune system

function. **Aged Cheddar** raw milk cave aged is the best. Cheddars contain L.casei, L.Plantarum and L.Brevis. Emmental Swiss - it uses propionibacterium freudenreichii one of the “Keystone” probiotic species along with Streptococcus thermophilus and lactobacillus. Blue Cheeses made with cow’s, goat’s or sheep’s milk are laced with penicillium cultures cave aged is the best other blue cheeses are Roquefort, Gorgonzola (the oldest known blue cheese) and Stilton.

Sourdough Breads

German Sourdough Rye is fermented and contains both Inulin and FOS and is a great source of fiber.

Apple Cider Vinegar

Apple cider vinegar contain acetic acid which helps stimulate the growth of probiotic bacteria.

Fibers - fiber is what your beneficial probiotic bacteria eat ! Eat plenty of high fiber foods and you will always be feeding your probiotic bacteria. The more variety of plant foods in the diet the greater the **diversity** of bacteria we cultivate. The fiber in a bell pepper is different than the fiber in baby spinach and different from the fiber in baby onions. Cooked dried beans (lots of varieties)are outstanding. Learn how to pressure cook them - InstaPot cooks out the lectins. When microbes munch on fermentable carbohydrates including fiber and resistant starch in your gut, they produce short chain fatty acids, primarily acetate, propionate and butyrate.

The 2 of the best types of fibers that feed your biome are **Inulin** and **FOS**

Inulin is a Fructan Glycan Polysaccharide comprised of linked units of Fructose - that is the technical term - it is found in numerous foods and specifically feeds the bifidobacteria in the large intestine and enhances the production of Butyric Acid in the colon. Inulin has been found to lower LDL cholesterol by changing the composition of the gut flora, blocking the absorption of cholesterol and supporting the production of butyric acid. Inulin is found in Chicory root, Burdock root, Dandelion root, Jerusalem Artichokes, Garlic, Leeks, Onions, Wheat, Rye, Barley, Bananas. New Orlean’s style coffee is made from 50% Chicory root so it is an excellent probiotic drink. Natural Coffee substitutes such as Dandy Blend, Pero, Cafix act. have high amounts of Inulin in them.

FOS - Fructooligosaccharides are a group of non-digestible oligosaccharides composed of one molecule of sucrose and 3 molecules of fructose. Consuming 1 to 4 grams of FOS a day can increase the number of beneficial bacteria in both the small and large intestine by 10 fold ! FOS is converted to butyrate, a short-chain fatty acid that nurtures gut cells and improves colonic integrity.* It also increases uptake of minerals like calcium and iron. FOS is found in Jerusalem Artichokes, Chicory root, Leeks, Onions, Garlic, Tomatoes, Oats, Rye,Beer, Asparagus,Jicama

Resistant Starches - These are carbohydrates that resist digestion and end up in the large intestine where they become food for the probiotic bacteria thus enhancing their

growth and turn them into short-chain fatty acids the most important being butyrate which is the preferred fuel of the cells that line the colon. Raw potato starch (Bob's Red Mill) start with a small amount 1 tablespoon contains 8 grams of resistant starch. Work up to 4 tablespoons a day. Beans that are cooked and cooled like garbanzo beans used in hummus and other beans. Brown rice cooked and cooled also. Potatoes cooked and cooled. Swiss style Mueseli which contains raw oats is rich in resistant starches. Unripe bananas are high too. *(see the resistant starch handout)*

Other valuable fibers: Acacia Fiber is highly beneficial , Flax seeds and flax seed meal, Chia seeds. Blueberries - Swedish researchers have found that the skins of blueberries are a valuable pre-biotic. Pears, Kiwi, Radishes, Tomatoes, Lentils, Tender Greens and Kale. Guar Gum is a remarkable fiber that stabilizes blood sugar levels and is a great pre-biotic. PGX is a proprietary fiber developed by Natural Factors is used for weight loss and blood sugar management is also an excellent pre-biotic fiber. Pectins such as Apple Pectin and Citrus Pectins are also excellent.

Butyric Acid gives the colon cells energy so they can do their job. Butyric Acid suppresses inflammation in the gut. Certain cheeses and butters are rich in Butyric Acid such as Parmesan, Emmentaler Swiss Cheese and Butter. **Ghee** is one of the richest sources - it is used in Indian and French Cooking (Clarified Butter). You can easily make your own by slowly heating unsalted butter and skimming off the top white solids until it becomes clarified - it is very stable and keeps for a long time - use it whenever you want to use butter. Butyric Acid helps prevent Colon Cancer and is very therapeutic for persons with colon health problems like Ulcerative Colitis. Resistant starches promote the production of Butyric Acid. Studies suggest butyrate may help improve insulin sensitivity and blood sugar regulation. Animal research suggests it may help in appetite control and weight by turning on genes that drive fat breakdown. Butyrate also gets into the brain and helps a gene in the brain make BDNF - Brain derived neurotropic growth factor.

Some of the advantages of using Ghee are:

1. It has a high smoke point 485 degrees
2. Ghee is rich in Vitamin A, D, E, K2 and CLA. When sourced from grass-fed cows, ghee has Vitamin K2 and is one of the highest sources of CLA
3. It is suitable for those with a dairy intolerance. Many who are lactose or casein intolerant have no issue with ghee.

(Thanks to Nancy Angelina - Educator for Source Naturals Vitamins for the information on Ghee)

The pH test for your Poo: As bacteria ferment dietary fiber and produce short chain fatty acids your colon becomes more acidic and less hospitable to pathogens. The more acidic the stool the better. Buy pH strips and stick a test strip in your poo on toilet paper. If your stool is consistently an 8 or 9 on the pH scale your'e likely not eating enough plant foods but if its in the range of 2 to 5 you are doing well.

One important note: Roundup ie. Glyphosate is an anti-biotic and will harm our microbiome. It is sprayed as a desiccant to dry up grains and bean to make it easier for the farmer to harvest. Residues of Glyphosate are found not only on wheat but oats and beans. The environmental working group recently tested non-organic Hummus and found it had very high levels of Glyphosate residues - never eat non-organic Hummus ! It is therefore very important to **only eat organically grown wheat, oats, soy and other beans**

Probiotic Species: There are 2 groups of probiotics that live predominantly in either the small intestine or the large intestine (colon)

Lactobacillus species best known as **Acidophilus** species live in the small intestine - **Bifido** or Bifidus species live in the large intestine. When we are born we have mostly bifidus species in our GI tracts - C-section babies are born without these beneficial bacteria which they would normally get from the birth canal at birth. As we get older 50+ years of age we need more bifidus bacteria.

Beneficial Yeasts are also important and can prevent diarrhea and support immunity such as *Saccromyces Boulardi*

The more diverse the variety of probiotic species the better ! Eating a diet with abundant fibers minimum 20 grams a day and over a weeks time eating at least 30 different colorful vegetables, spices, fruits, berries, beans (all kinds of varieties) and whole grains is the way to accomplish this. Learn about the high polyphenol foods and incorporate them into this mix.

Probiotic Superstars:

Akkermansia muciniphila right now is available in a supplement by Pendulum Life. *Akkermansia muciniphila* may be one of the most abundant and important species of probiotic bacteria found. It thrives in the mucous layer of the gut lining when it breaks down mucin SCFA's (Short chain fatty acids) are released which can be used by its bacteria neighbors for energy. In healthy individuals it accounts for up to 4% of your intestinal bacteria. It helps make acetate which feeds bacteria such as Firmicutes which in turn make butyrate which regulates colon health. Acetate also feeds another super important probiotic species called

FP - Faecallbacterium prausnitzii a member of the Firmicutes phylum makes up 5 - 15% of the total gut microbiome. It is anti-inflammatory it can also moderate the immune cells by acting on T cells and cytokines (IL-8, IL-10, IL-12) and producing anti-inflammatory molecules. It helps with the production of butyrate in the gut. Research has found benefit in Crohn's disease and Ulcerative colitis. By helping the production of Butyrate - it lowers the risk of colon cancer. Kiwi fruit are one of its favorite foods along with arabinoxylans found in grain fibers and sorghum.. *Akkermansia* is reduced in individuals with IBD - irritable bowel disease, obesity and type II diabetes. *Akkermansia* are pescatarians, they like plant foods especially polyphenols and fish oil. Flaxseeds, Green and Black Tea, Cranberries, Pomegranate and Grapes are some of the polyphenol rich foods *Akkermansia* loves.

Listen to the Rich Roll Podcast episode 5/16/22 Dr. Will Bulsiewicz MD on All things microbiome: Heal Your Gut, Sidestep Disease & Thrive