

ACIDOPHILUS MILK

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Introduction:

Acidophilus milk is cultured milk; sometimes called sweet acidophilus milk that has a therapeutic value. This cultured product is usually low in fat and has a longer shelf life than ordinary milk. The bacterium *Lactobacillus acidophilus* is added to it, giving it a tangy flavor and thickened texture and may be readily implanted in the intestinal tract if adequate amounts of the cultured milk are consumed over a period of time. Many experiments have been conducted to study its effect on persons suffering from constipation. In all of the cases studied, from 80 to 100 percent of the patients were relieved by consuming adequate amounts of acidophilus milk. Many people believe it can benefit digestion and prevent allergies due to the activity of the acidophilus bacteria in the intestines. The administration of acidophilus milk is just as valuable for the treatment of diarrhoea. Excellent results have been obtained in treating new born lambs and calves by feeding acidophilus milk.

The Starter Culture:

The selection of starter culture is most important step in the preparation of acidophilus milk. It is now possible to obtain a pure broth culture of *Lactobacillus acidophilus* at, or through, all drug stores, although they often contain other strains, including *Streptococcus thermophilus* and *Lactobacillus bulgaricus* that are commonly used to make yogurt. If fermented too long, the milk will turn into yogurt. The product of a reliable manufacturer should be specified. *Lactobacillus acidophilus* is a member of the *Lactobacillus* genus of bacteria. These bacteria can be found in the mouth, intestine, and vagina. *Lactobacillus acidophilus* is thought to benefit health, since it produces Vitamin K and lactase. However, *Lactobacillus acidophilus* cannot make many other vitamins and amino acids. Because of this, *Lactobacillus acidophilus* is mostly found in the upper gastro intestinal (GI) tract where there are higher amounts of these nutrients. *Lactobacillus acidophilus* is commonly used in the food, such as yogurt, other dairy products, and also in fermented soy products, such as miso and tempeh.

Lactobacillus acidophilus is one of the most commonly used probiotics, microorganisms that are used to promote health. Probiotics are different from prebiotics, which are complex sugars that may support the growth of "good" bacteria in the intestinal tract. The word "synbiotic" means that a product has both a probiotic and a prebiotic. There is a good evidence for the use of *Lactobacillus acidophilus* in treating vaginal infections. However, there is an unclear evidence

for other medicinal uses of *Lactobacillus acidophilus*, such as in irritable bowel syndrome and also in brain disorders, asthma, high cholesterol, lactose digestion, or diarrhea.

- a. **Preparation of mother culture-** Fill two 1000 ml Erlenmeyer flasks half full with skimmed milk and plug tightly with cotton and then sterilize in a pressure cooker or in a steam autoclave for about 30 minutes at 15 pounds pressure. The sterilized milk should show a slight brown colour and should have a caramelized odour. As a check on the efficiency of sterilization, keep the sterilized milk at room temperature for several days after it has been removed from the sterilizer. During this period there will be growth of bacteria that were not killed by the heating, with the result that an undesirable fermentation will take place in the milk. For inoculation of the milk use a wire needle that has been sterilized/ incinerated in flame. The mouth of the flask containing the sterilized milk and the mouth of the flask containing the culture should be sterilized immediately after removing the cotton plugs by passing them through an open flame. Care must be taken to avoid contaminating the cotton plugs. The inoculated milk is then incubated at 37°C for about 36 hours. At the end of this period a solid coagulum should have formed, which is free from any gas holes.
- b. **Preparation of the bulk culture-** Use a high quality skimmed milk containing a minimum number of bacteria. Place the milk in 20 L stainless steel cans. The cans should be filled to within 6 inches of the top. A straight-sided, shotgun type of can is convenient. The lid should be of the overhanging type, a sheet of parchment paper may be placed over the top of the can before the lid is placed in position. A pressure cooker of a size large enough to accommodate three or four 20 L cans is convenient to use for sterilizing the milk. Before sterilization, the milk should be preheated to a temperature of approximately 38°C. Sterilization consists of heating for a period of 13 to 15 minutes after the air has been expelled from the cooker, at 15 pounds per square inch gauge pressure. This gives a temperature of 121°C. The sterilized milk should have a slightly brown colour and caramelized flavour. The sterilized milk should be placed in a tank of water and cooled to a temperature of 38°C. It then can be inoculated with mother culture, using approximately 60 ml culture for 1500 L of milk. A steam-sterilized metal rod may be used for stirring the milk briefly after inoculation, or this stirring may be omitted. The water in the tank should be maintained at 37°C ± 1 °C by means of an electric heater which is thermostatically controlled. Normally the milk will show a good coagulation without wheying off after 36 hours of incubation. Cool the acidophilus milk by means of cold running water to a temperature of 10° to 15°C. It is now ready for marketing. Agitate the coagulum vigorously, using a sterilized stirring rod, until it is of a creamy consistency. Place the milk in bottles, jars, or lacquered tin cans. The milk may be stored at room temperature for a period not exceeding 14 days. If stored longer there will be a marked decrease in the number of bacteria present

Preparation of Acidophilus milk:

- a. **The Milk Supply**-To start with, the milk must be free from those bacteria which naturally occur in fresh milk. This can be attained by boiling ordinary market milk for a long time, but it has been found that unsweetened evaporated milk is particularly suitable for this purpose. It can be obtained from the grocer at a fair price and can be kept on hand ready for use, and it is certainly sterile. Evaporated milk has been sterilized under rather high steam pressure (about 11 pounds): this is sufficient just to begin to caramelize the milk. Kopeloff has shown that when milk is autoclaved to a "light caramel colour" the acidophilus organism grows more rapidly in it than in the milk heated to a lesser degree.
- b. **The Control of Temperature**-The acidophilus organism grows best at about 32° to 40°C. It exhibits less growth at lower temperatures, though it has been found that the organism produces acid at a considerable rate even at room temperature. (Four observations showed an average increase of 0.65 per cent lactic acid in 24 hours at 65°C.) Milk that has been inoculated can be warmed to 70 to 80°C and transferred to a thermos bottle where it will maintain a temperature high enough to permit very satisfactory growth in 15 to 24 hours. The rate at which the temperature falls off depends upon the quality of the bottle and also, of course, on the temperature of the surrounding air. But it has been found that beginning with a temperature of 80°C, a quart thermos bottle of average quality will permit the temperature to drop no more than 25° to 30°C in 24 hours. Such temperatures are found to be quite satisfactory for the rapid production of acidophilus milk.
- c. **Preparation**-Carefully clean a quart thermos bottle by allowing it to stand overnight full of water containing some washing powder or a little household ammonia; then scald it. Place the cork, a can opener and thermometer in a pan and pour boiling water over them. Wipe the top of a one-pound can of evaporated milk free from dust and pour boiling water over it. Open the can and pour contents into the pan that has been scalded. Fill the can with boiling water and pour into the evaporated milk. Immerse the pan in cool water and stir the mixture with the thermometer until the temperature comes down to about 40°C. Add 30-60 ml of commercially available *Lactobacillus acidophilus* culture, mix, and transfer it to the thermos bottle. (The temperature should now be between 70° to 85°C) Cork the bottle and let it stand for 24 hours, or until the milk has acquired a pleasantly sour taste. When this is attained, transfer to a clean milk bottle and place it in the refrigerator.

Succeeding cultures of *Lactobacillus acidophilus* are prepared by using about a teacupful (150ml) of milk culture; which is previously made to inoculate the diluted evaporated milk for the next run. Proceeding in such a manner, it will be found that acid is produced at a more rapid rate than when the first quart was prepared using the commercial broth culture as a starter. Approximately 13 to 17 hours is quite sufficient for acid production.

If fermentation is allowed to proceed for a longer time so much acid is developed that the taste becomes unpleasantly sour. After a little experience one may stop the action of the bacteria at any desired degree of sourness. This is affected by merely transferring the milk to a clean glass bottle and placing it in the refrigerator. It is perfectly safe to keep the culture at room temperature, but, as has already been mentioned, a considerable increase in acidity may be expected. This is of little consequence, however, if the product is consumed within 24 hours. On the other hand, if the milk is kept in a refrigerator it should be consumed within 48 hours for the reason that the organisms rapidly die out at such low temperatures.

One or two tablespoonful of lactose or dextrin maybe added to each glass of milk consumed, though the pleasant tart taste of the sour milk is to some extent injured by this addition. Most people prefer to take the carbohydrate separately. Typical acidophilus milk has a fine grained curd. It is rather viscous, especially at low temperatures, but not "stringy." It does not develop so high acidity as it is produced by the *Lactobacillus bulgaricus*. When a culture becomes rapidly very sour or bitter and is extremely viscous so that when poured, from a bottle it runs out in strings, it is an indication that the culture used was *Lactobacillus bulgaricus*. This should be discarded and a new commercial culture to be obtained from a different source. At any time when souring does not seem to be taking place normally a new start should be made. This process is similar to the one used to make yogurt but results in a thinner, drinkable product. It is possible to make acidophilus milk at home, as long as the cook has the correct bacteria. Starter cultures that contain *Lactobacillus acidophilus* are available, although they often contain other strains, including *Streptococcus thermophilus* and *Lactobacillus bulgaricus* that are commonly used to make yogurt. If fermented too long, the milk will turn into yogurt.

- d. **Storage-** Like other milk products, acidophilus milk should be checked regularly for changes in texture, color, or smell. If the milk begins to smell different or change color, it should be discarded. Active bacteria in the milk can continue reproducing as the product ages, causing it to become dangerous to consume. It is important to keep this type of milk chilled to minimize bacterial activity. When homemade, this milk should be used within a week; commercial products may have a longer expiration date.

Nutritional Information:

The nutritive value of this product is exactly the same as that of the ordinary cow's milk. Evaporated milk is whole cow's milk evaporated down to one-half of its bulk. Therefore, by diluting a can of it with an equal amount of water the composition will be the same as that of normal cow's milk. The evaporated milk flavour, which is objectionable to some people, is scarcely noticeable in acidophilus milk prepared from that product.

Most of the commercially available products have about 1% milk fat, providing about 110 calories per 8 ounces (236 mL); regular 1% milk has about 102 calories. Both have about the

same amount of protein (8 grams) and calcium (about 30% of the recommended daily allowance).

Nutrition Facts of acidophilus milk in serving size of 1 cup: Calories from Fat 43 / Calories 122

Ingredients		% Daily Values*
Total Fat	4.83g	7%
Saturated Fat	3.08g	
Polyunsaturated Fat	0.179g	15%
Monounsaturated Fat	1.372g	
Cholesterol	20mg	7%
Sodium	100mg	4%
Potassium	368mg	
Total Carbohydrate	11.47g	4%
Dietary Fiber	0g	
Sugars	12.4g	0%
Protein	8.08g	
Vitamin A		9%
Vitamin C		1%
Calcium		29%
Iron		0%

Health Benefits:

From the earliest times in Europe and the East, the use of a variety of soured milk preparations has been reputed to maintain health. Metchnikoff and others established the fact that it reduced the intestinal putrefactive bacterial flora, including colon, and that this materially reduced intestinal toxæmia.

Acidophilus Milk is used in place of regular cow's milk for some individuals who are lactose intolerant. During fermentation, the bacteria feed on the lactose sugar in the milk, breaking some of it down. For people who are lactose intolerant, that means their bodies may have an easier time digesting this milk. Acidophilus milk is only lightly fermented, however, so it does still contain milk sugar; this can cause gas and bloating in some people.

Acidophilus milk is also sometimes recommended for use with infants who are old enough to drink cow's milk. One theory holds that, when consumed by infants, acidophilus milk might reduce the chances of the child of developing allergies later in life. There is no proof that drinking this milk will cure an already existing allergy.

Some studies also suggest that this type of milk may help lower cholesterol levels. The bacteria in the intestines may help prevent cholesterol in food from being absorbed so it does not enter the bloodstream.

- a. **Digestive Disorders-** *Acidophilus* products may prevent or treat a number of digestive problems. They can ward off the traveler's diarrhea that may be prone to when eating unfamiliar or contaminated foods away from home, and they may be helpful in relieving the stomach pain and bloating associated with irritable bowel syndrome. Acidophilus can help restore normal intestinal bacteria following a course of antibiotics, which can kill off beneficial as well as harmful microorganisms. In addition, drinking acidophilus milk can help prevent digestive upset if you are lactose intolerant. The process of manufacturing this type of milk reduces its lactose, or milk sugar, content, resulting in a product less likely to cause the stomach cramps and diarrhea associated with regular milk.
- b. **Respiratory Infections-** In young children who attend daycare, drinking acidophilus milk may reduce the number and severity of lung infections. This preventive effect appears when live cultures of the probiotic are consumed once or twice a day with another microbe called *Bifidobacterium*.

Considerations: Probiotics may or may not have approval by the U.S Food and Drug Administration, depending on the intended use, although most – marketed as dietary supplements – do not. They can therefore vary widely in quality, and labels may not accurately reflect the product's contents. They may even be contaminated with “unfriendly” microorganisms. Consuming fermented foods, such as yogurt, acidophilus milk, miso and tempeh, can offer the benefits of acidophilus supplements, provided they contain live cultures.

- **Lactose Intolerance-**

If your toddler is lactose intolerant, sweet acidophilus milk won't necessarily reduce his symptoms. Most studies don't show that adding *Lactobacillus acidophilus* to milk reduces the lactose content of the milk, probably because of the low concentration of *Lactobacillus acidophilus* in the milk, according to "Nutrition in the Prevention and Treatment of Disease." In

studies that did show a benefit, the amount of acidophilus given was higher than that typically found in sweet acidophilus milk.

- **Caution-**

Some toddlers should not drink sweet acidophilus milk. If your child has a milk allergy, sweet acidophilus milk, which contains cow's milk, will not be a safe alternative. *Acidophilus* does not alter the proteins in milk, which cause allergic reactions in susceptible children. Children with a compromised immune system also should not consume probiotics such as acidophilus milk unless approved by their physicians, the University of Maryland Medical Center cautions.

Although it is thought to be safe with few side effects, *Lactobacillus acidophilus* by mouth should be avoided in people who have intestinal damage, immune problems, or an overgrowth of bacteria in the intestines. These people may have a higher risk of having the bacteria leave the GI tract and possibly cause multiple organ failure. There have been reports that some *Lactobacillus* species, such as *Lactobacillus rhamnosus* and *Lactobacillus casei*, may be involved in infections, such as abscesses, meningitis, and septic arthritis.

Conclusions:

Acidophilus Milk can help restore the balance between good and harmful bacteria in the intestines. It is known to contain a “friendly” bacterium that helps to maintain a healthy balance of microbes in our body. Taken as a probiotic, acidophilus serves as a dietary supplement that may benefit a variety of conditions. We can also consume it in commercially available foods to which it has been added, such as yogurt or acidophilus milk.