

Raw Milk Bacteria Testing

Steve Kretchmer- Dairy Pool Quality/Routing Coordinator

Question: What is a PI Count?

Answer: Your raw milk sample is pre-incubated at 56 degrees F for 18 hours. Your sample is then diluted with sterile water at 1:1000. A PI plate count is then set up to identify colony-forming units. If 15 colonies are present, then the colony count is converted to a recorded count of 15,000 due to the dilution factor. The 56-degree incubation temperature is the optimum temperature for these enzyme-producing bacteria to grow. It takes several days to enumerate these bacteria at incubation temperatures at refrigeration temperature. Using the optimum temperature for growth gives us a better idea of the numbers of potential Psychrophiles faster. Low numbers on plates after pre-incubation at optimum growing temperatures assures low numbers of Psychrophiles will grow during the time before milk is processed.

Question: What is LPC?

Answer: The LPC or lab pasteurized count identifies colony forming units on a LPC plate after your milk sample has been pasteurized in a water bath at 145 degrees for 30 minutes. The dilution rate differs from the PI count procedure since the number of bacteria present after pasteurization is diminished. In all but one region, we run a LPC plate count from a dilution of 1:10 (One zero is added to convert the colony forming units to reflect the dilution factor). For example, when 15 colonies form on a LPC plate, the recorded count becomes 150.

Washington and Oregon producers are the exception to the 1:10 dilution for LPC. The lab in this region performs the LPC at 1:1. Your colony count is your recorded count at this dilution. The lab wanted to keep the procedures uniform through both the conventional and organic industries in this region. Either dilution is acceptable when measuring the total numbers of thermophilic bacteria.

Our premiums are set up in reference to recorded counts. A monthly average below 76 will generate a \$.40 premium per CWT, while a monthly average between 76 and 150 generates a \$.20 premium per CWT.

Question: Why does Organic Valley run so many different bacteria tests?

Answer: As a major manufacturer of organic milk products, we want to make sure all products stay fresh past the stamped code date. When we added our PI count to the quality program, it helped us extend the shelf life of bottled milk. With the LPC, producers will have more information on another group of bacteria that can shorten shelf life. The SPC is still a mandatory test in every state. The SPC test measures all types of bacteria present; it doesn't differentiate between what types of bacteria that may become a problem while milk is on the shelf.

Question: Doesn't pasteurization get rid of all bacteria.

Answer: Pasteurization is effective on ridding milk of pathogens; however, it doesn't make milk sterile or free of some other spoilage mechanisms. For instance, the cold-loving bacteria associated with your PI count are effectively killed by pasteurization. However, pasteurization has no effect on the enzymes that are produced by these bacteria prior to pasteurization. The enzymes, themselves, cause a breakdown of protein in milk, causing the shelf life to be shortened. Low farm PI counts translate into lower concentrations of protein attacking enzymes in the packaged product, which extends shelf life.

Thermophilic bacteria are measured by LPC. These bacteria have the ability to produce heat resistant spores both pre-pasteurization and post-pasteurization. Spores act as another spoilage mechanism to shorten shelf life.

Question: What should I look for to lower SPC, PI and LPC?

Answer: To put it simply-if cows are clean and dry, if milk contact surface (including rubber parts) are clean, if the vacuum lines are clean, and the milk cooling system is running at maximum efficiency then all three counts should be low.

Question: What should I look for if one bacteria test is low while others have numbers out of premium criteria?

Answer: Please refer to the following flow chart on bacteria count combinations it may help you eliminate some possible causes and direct you to the right starting point.