

## **A Hard Look At Lactic Acid Bacteria And Nutrient Sugars**

In the sausage making world, two specific families of lactic acid bacteria have been almost universally chosen to meet the needs of fermented type sausages. These are lactobacillus and pediococcus – both are symbiotic, facultative anaerobic, and gram positive. Each includes its own strains and depending upon the qualities desired in a specific product, more than one strain may be combined in one culture. Some do well in higher salt content, others do not. Some do better than others at higher (or lower) temperatures. The strains most beneficial (therefore most commonly used), of lactobacilli include: lactobacillus pentosus, lactobacillus curvatus, lactobacillus plantarum, lactobacillus farciminis, lactobacillus sakei, et.al. Of the pediococci, two widely used strains are pediococcus pentosaceus and pediococcus acidilactici. These are the workhorses of fermentation, thriving on sugar - dextrose ideally - as glucose (dextrose) is the most simple of all forms of sugar, being utilized quickly to produce rapid fermentation. Glucose, produced from cornstarch, is only about 70% as sweet as sucrose refined from sugar beets or sugar cane, then being combined with fructose from fruit. Lactose (called milk sugar) binds water very well but has poor fermenting quality and non-fat dry milk contains about 52% lactose. For this reason, I choose to add dextrose to fermented sausage rather than powdered milk composed of more than half lactose – the worst choice of fermenting sugars. Also, there are limits to be considered in using added sugar as the more that is used, the more sour or “tangy” the product will become.

Although lactobacilli and pediococci bacteria are ideal acid-producers for fermentation, they also produce acetic acid, bacteriocins, various enzymes, but do almost nothing to contribute to the development of flavor and color. This is where the use of strains from the micrococcaceae family becomes vital – especially the bacterial strains staphylococcus and micrococcus (now called Kocuria). These are the strains chiefly responsible for the reduction of nitrate to nitrite. In checking with Professor Ron Ragsdale, head of the Chemistry Department at the University Of Utah, he further explained that as nitrite reacts with oxygen, additional nitrate is created which must subsequently be broken down into nitrite by micrococcaceae.

### ***Chr. Hansen’s Bactoform™ LHP – (With Pediococcus Acidilactici And Pediococcus Pentosaceus)***

#### Specifications:

Bactoform LHP is for extra fast acidification where a pronounced sour flavor is desired. Bactoform LHP culture induces the pH to drop to under 5.3 in 30 hours or under 5.0 in 2 days. LHP is ideal for thin products similar to pepperoni or sausages less than 1” in diameter or any extra-fast culture targeted for fermentation temperatures 90°F-105°F. where both pediococcus pentosaceus (optimal growth at 95°F.) and pediococcus acidilactici (optimal growth at 104°F.), do very well. Dextrose is recommended as the nutrient for growth (not table sugar). Typically, LHP is used in products requiring less than 2 weeks to completely develop, including drying. Note: Use Cure #1 with this culture. \*Bactoform L-HP is so fast, it requires a nitrite cure instead of a nitrate/nitrite cure. It works in far less time than it would take for nitrate (in Cure #2) to break down into nitrite for curing the meat.

Preparation:

For every 10 lbs. of meat, dilute ½ teaspoon LHP culture in ½ cup distilled water (or chlorine-free tap water). Allow the mixture to sit for 15-20 minutes while the bacteria “wake-up”. Use the time to mix the seasonings, spices, and cure into the minced meat, developing the proteins of the actomyocin. Finally, pour the solution over the mixed meat and distribute it thoroughly, being sure the meat stays cold throughout the entire mixing process. Be sure to use Cure #1 with this culture.

Storage:

Keep any remaining culture sealed and frozen. The shelf- life of frozen cultures is 6 months. Unfrozen, cultures will last only a couple of weeks.

Best Wishes,

Chuckwagon