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Top 10 Inoculant Questions Asked of Pioneer Sales Professionals

Q. Why should I pay more for your product, aren't most inoculants the same?

A: Strain differences between various silage additive products may appear similar to producers simply because they contain the same genus/species information on the label *(e.g. Lactobacillus plantarum* or *Lactobacillus buchneri*). However, there are tremendous genetic differences between individuals within a genus/species. If not, we would not have bull studs selling genetically different "Bos taurus" (zoological classification for Holsteins) or seed companies selling genetically distinct *"Zea mays"* (zoological classification for corn).

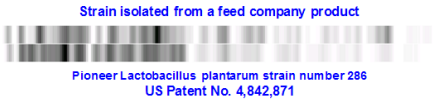
The same applies to silage bacteria. But in the silage additive world, we do not have the luxury of easily quantified measurements to compare responses (e.g. "daughters" to measure milk production transmitting ability of bulls or "weigh wagons" to measure hybrid differences). Therefore, it is very easy for some salesmen to confuse the consumer by claiming that inexpensive products are the same as highly-researched, cutting-edge products simply by holding up a label and saying…*"see, same bugs as theirs and even higher counts"*.

Many inoculant companies claim that all lactobacillus plantarum are the same and paying more for Pioneer products is simply *"paying for the Pioneer brand name"*. Remember that Pioneer is a genetics company…that applies to corn and to bacteria….and we protect both genetic forms with patents that attest to their uniqueness in the marketplace.

An analogy to show the difference between inoculant products is to compare them to buying cattle. If cows were bought using "label comparisons" then all Bos taurus should be the same price. If this were true, you could start buying cattle from any "cattle-jockey" and not worry about the genetic background of the cattle. Also, the entire artificial insemination industry would disappear.

Just because "product labels" read similar, there is still a world of difference in the genetic ability of the bacteria contained in the bottle just as there is among corn hybrids or the population of cows and bulls that are for sale.

A more scientific approach is to show actual DNA profiles to illustrate all Lactobacillus are not the same; just as not all *Homo sapiens* (humans) are genetically the same.



Q. Competitors claim that they have the same bacteria as Pioneer, but cheaper.

A: Not possible! All the strains in Pioneer brand inoculants were collected by Pioneer silage microbiologists and each Pioneer inoculant consists of proprietary strains selected from our proprietary collection of over 10,000 lactic acid bacteria (LAB) strains. Pioneer inoculant products are patented and are not found in any other product on the market. As with our seed genetics, Pioneer takes intellectual property rights very seriously and by utilizing state of the art technology, we can determine if competitor products contain any of our proprietary strains. Please alert us if you have competitors making this claim so the appropriate legal action can be taken.

Q: Why does Pioneer have so many inoculant products? Won't one product work on all crops?

A: During the course of evaluating the 10,000 proprietary strains in our collection for their ability to rapidly reduce pH in whole plant corn silage, alfalfa silage, grass silage and high-moisture corn, Pioneer microbiologists learned that some strains would do very well in one crop and poorly in another. In some cases, a strain would negatively influence not only pH decline, but also the digestibility of one crop-type while positively influence the digestibility of another crop-type. For that reason, Pioneer products consist of individual strains and combinations selected to optimize the fermentation of specific crops, hence Pioneer was the first and only company to commercialize crop-specific inoculants. Other companies claim that their products can work on all crops. While we still have an omnibus product like 1174, our research has advanced since the current formulation of 1174 was released in the mid-1980's. Today we offer silage producers 11C33 and 11CFT specifically formulated for corn silage, 11H50 for alfalfa and 1189/11B91 for high-moisture corn.

We also learned that homofermentative LAB *(e.g. L. plantarum)* were very good at generating a rapid pH drop but could not reduce heating during feedout while heterofermentative LAB *(e.g. L. buchneri)* were very good at reducing heating during feedout but not generating a rapid pH drop. This is because yeast, which initiate the cascade of microbial events leading to silage heating are not inhibited by lactic acid. However, yeast growth at feedout is inhibited by the *L. buchneri*. Pioneer inoculants which contain *L. buchneri* also have crop-specific homofermentative LAB to maximize the benefits of both "front-end" pH decline and "back-end" reduction in heating.

Q: What about products that claim to have higher counts?

A: Competitive sales pitches focused on bacterial counts are not as common today as it the past. The reason is that customers are starting to realize that counts are meaningless without addressing the genetic ability of the bacteria. It would be like talking the merits of high planting populations for a hybrid with known genetic performance limitations.

Pioneer® brand inoculants applied correctly provide 100,000 colony forming units (CFU) per gram of fresh forage. This is consistent with industry standards. The only exception is Pioneer® brand 1189 which only applies 20,000 CFU/gram of high moisture corn. This is because Pioneer research showed this to be the optimum level for our proprietary strains. Our research, from strain selection to product testing, was conducted at the 100,000 cfu/gram application rate and other company application rates are irrelevant to our products. University research has shown that our product (11C33) out performed a competitor product even though the competitive product was applied at a rate 4X our product.

Ask any reputable microbiologist and they will tell you that **"activity"** is more important than **"counts"**. Activity (growth rate) is important so the additive strains dominate the fermentation by overwhelming the natural bacteria populations (epiphytes) found on the crop

It is like comparing dairy herds…not all herds with 1,000 cows have the genetic ability to produce the same amount of milk (even if they were given the same feed). Not all homo sapiens can run the 100 meters at the same pace. Activity (growth rate) is critical to performance in humans, in cows and in bacteria.

Q: Why doesn't Pioneer have more "head-to-head" comparisons against inoculant competitors?

A: At last count, there were more than 20 inoculant products on the market. It would be a tremendous financial drain to test against all competitive products because animal trials (the only true test) can cost upwards of $20-40,000 per trial. Undoubtedly, as soon as a comparison is made against one product, producers will want comparisons against yet another product. When we release new products, we have made the decision to make comparisons against control silage (without inoculant) and versus our current best product. Customers can then see the relative improvement in dry matter loss (shrink), fermentation parameters (e.g. pH, ammonia nitrogen, VFA profiles) and animal performance against a control silage.

We think this is being the best steward of our research funds…delivering new products rather

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than spending budget comparing Pioneer® brand products against competitors. One way for producers to make product comparisons is to ask competitors for their animal data against control silages. However, most competitors have no animal data (and often very little fermentation data as well) even against control silages. We have decided not to spend our resources comparing Pioneer against scores of competitors who do not think it important enough to prove their own product value over control silage.

Q: We've heard there is a research study showing that bacteria die in the applicator tank, how do our strains stand up?

A: Many choppers have their applicator tanks mounted next to the engine, causing heat to build up in the tanks and kill the bacteria. Research conducted with the Appli-Pro system, under harvest conditions with Pioneer's Inoculant Lactic Acid Bacteria, showed excellent survivability in the tanks. The findings of the Pioneer QC work revealed that 11C33 strains maintained above label guarantee colony forming unit (cfu) counts at 86°, 95°, 104°, and 113°F temperatures. Furthermore, bacterial viability at those temperatures remained the same when cfu population counts were determined at 6, 12, and 24 hours. Be sure to refer to Pioneer's thermotolerance work when customers ask you if bacterial strains contained in Pioneer inoculant products remain viable at high temperatures. The paper concludes that temperatures exceeding 35°C (95°F) is when inoculant bacterial viability will begin to decline, however, Pioneer's Forage Additive Research (FAR) group uses 98°F for standard incubation temperatures during bacterial strain research and development.

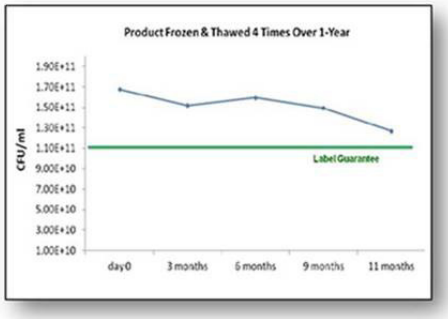
Q: How important is viability for silage inoculants.

A: Silage Inoculants only work if the bacteria are alive. Decreased counts will result in decreased benefits. For most silage inoculants, the level of bacteria listed on their label refers to the level of bacteria at the time of manufacture, not to the level of bacteria at the time of application. Each strain used in Pioneer brand inoculants is grown individually in large fermentation vessels and then validated using advanced DNA techniques to guarantee the identity and purity of the strain. Individual strains are then blended together at precise ratios based on the formulas developed by Pioneer's Research team. Each batch of blended strains is quality checked to ensure that the product meets its label guarantee.

The two biggest causes of decreased microbial counts in silage inoculants are heat and moisture. Pioneer's inoculants are packaged in special bottles and bags that are specially designed to keep out moisture. Furthermore, Pioneer is unique in the inoculant industry, in that being a leading seed company concerned with seed germination, all our inoculants are stored in refrigerated warehouses until they go to the rep warehouses. Unlike some inoculant distributors, who sell through all product without any annual viability testing, any Pioneer carry-over inoculant is shipped back from rep warehouses to refrigerated seed warehouses at the end of each silage season. Returned products that do not meet Pioneer's quality standard for viability (bacterial counts) are removed from the system to ensure that they are not sold to a customer.

Q: What should I do if there is a delay once I add water to the inoculant?

A: During harvest, once water is added to the inoculant bottle, bacterial viability is good for 3-days without refrigeration, and up to 7-days under refrigeration. Freezing the product is required if storage will extend beyond 7-days. Pioneer Microbial Quality Control research showed that the bacterial strains remained above the labeled guarantee for 12 months even with repeated thawing cycles as shown on the graph.



Q: Will 11CFT turn my conventional silage into BMR?

A: 11CFT will not reduce the amount of lignin in your conventional silage, which is the hallmark of BMR silage. However, the unique strain of L. buchneri in 11CFT produces an esterase enzyme, which breaks the bond between the lignin and the fiber. This allows the rumen bacteria to access the fiber more quickly, resulting in a faster rate of digestion. In turn, that stimulates rumen bacteria growth providing additional bacterial protein to the cow's digestive tract and more volatile fatty acids in the rumen, which the cow can then use for energy. 11CFT improves the efficiency of fiber digestibility, allowing for the removal of some protein and energy from the diet while maintaining the same milk production.

Q: Can I use 11CFT on my BMR silage?

A: You can use 11CFT on BMR but research has not shown it to be cost-effective. We recommend 11C33 for use on all BMR silages. 11C33 contains homofermentative LAB strains in combination with L. buchneri (a different L. buchneri strain than found in 11CFT because this one does not produce an esterase enzyme) to deliver rapid pH decline and significantly improve bunklife. 11C33 also contains the "Rapid React" strain which confers excellent bunklife after only 7 days of fermentation.

Q: I treated with your *L. buchneri* product and my silage is still heating, what's going wrong?

A: If you have a well-managed silage pile that is experiencing heating despite high levels of acetic acid *(from L. buchneri)* and low yeast counts, acetobacter may be the cause. Acetobacters are gram-negative bacteria that are strict anaerobes and very acid tolerant. They have the ability to preferentially convert ethanol (from yeast) to acetic acid in the presence of oxygen (like at feedout). They are also capable of increase dry matter loss by converting lactic and acetic acids to C02, water and heat when ethanol levels are depleted. An easy way to identify acetobacter is if the silage smells similar to nail polish. This telltale odor may account for reduced intakes when cattle are fed silage with high acetobacter populations. Research shows that this nail polish aroma becomes noticeable approximately 24-hours before the onset of heating. Acetobacter can be found in well-managed, highly compacted silages that have elevated ethanol levels from yeast growing in anaerobic conditions. While L. buchneri doesn't inhibit acetobacter levels, reducing ethanol-producing yeast populations helps limit their negative impact.

Q: My silage has mold balls and I used an inoculant, what went wrong?

A: These molds were formed during the first couple of weeks of fermentation and likely not during feedout. Molds grow very slowly and take a week or two to reach the size of small balls. Molds that grow during feedout don't have enough time to grow to this size and would be spread throughout the whole silage face. In most of the situations where we see mold masses of this nature, poor packing density or poor feedout face management is the issue, allowing the molds to have exposure to oxygen for an extended time. The basic principle is that molds need oxygen to grow....no oxygen, no mold growth.

Q: Which forage additive should I use when moving silage from one silo to another?

A: For those producers that are looking to move silage after initial fermentation, it is NOT recommended to inoculate again when moving. The success of moving silage really comes down to its condition in the original storage structure. Well-ensiled, stored silage can be successfully moved if:

- The silage was treated with a combination forage additive containing *L. buchneri* at harvest/initial ensiling.
- Silage can be moved to the new storage structure quickly.
- The move is made during the coldest time of year to minimize fueling bacterial/fungal growth.
- The move is managed carefully to prevent as much oxygen penetration into the silage mass as possible.