

WE BREW WITH YOU.™

THE OFFICIAL NEWSLETTER OF ALL THINGS LALLEMAND BREWING



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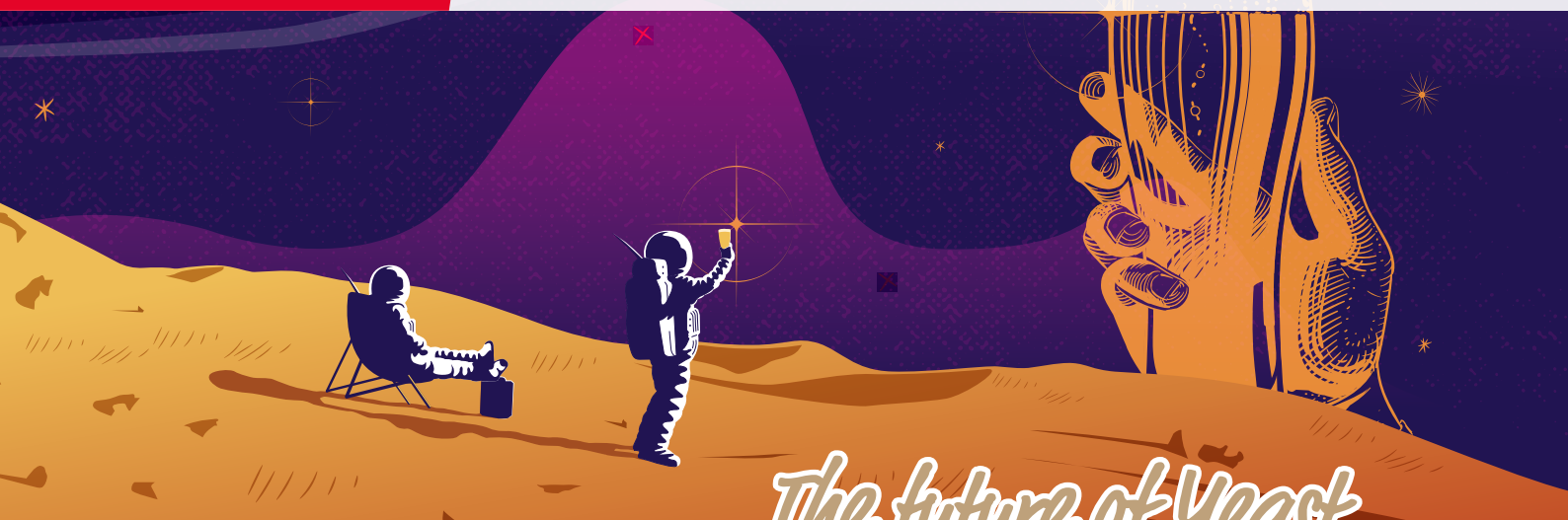
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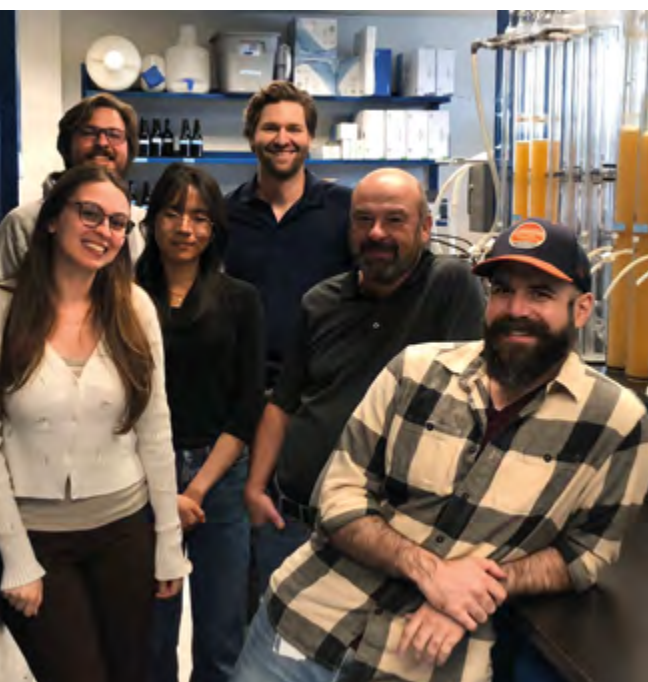
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#12: LalBrew NovaLager™ SPECIAL EDITION



The future of Yeast is here!



BE PASSIONATE BE LALLEMAND

Our Brewing R&D team, composed of Florencia, Tobias, Rodd, Avi and our interns Teresa and Jan, works from our laboratory based at the National Research Council of Canada in Montreal, Canada. Many other Lallemand R&D teams work there, including the Strain Improvement Laboratory, Lallemand Bio Ingredients, Lallemand Biofuel and Distilled Spirits, and the Lallemand Yeast Culture Collection, where all yeast slated for production start their life cycle. This close proximity allows for many exchanges between the teams that helps facilitate innovation and yeast improvement.

#bepassionatebellemand

In this edition, we bring you to the brewing universe of lagers, which are historically the most popular beers worldwide. Today, more and more breweries of all sizes are increasing their efforts to place their own signature on this ubiquitous style.

Faithful to our commitment to develop and introduce innovative biotechnological tools to the brewing community, we launched the LalBrew NovaLager™ yeast product at the Drinktec trade show last month in Munich, Germany. Our goal, as always is to promote the diversity and creativity of all brewers, from homebrewers to those working for industrial size operations.

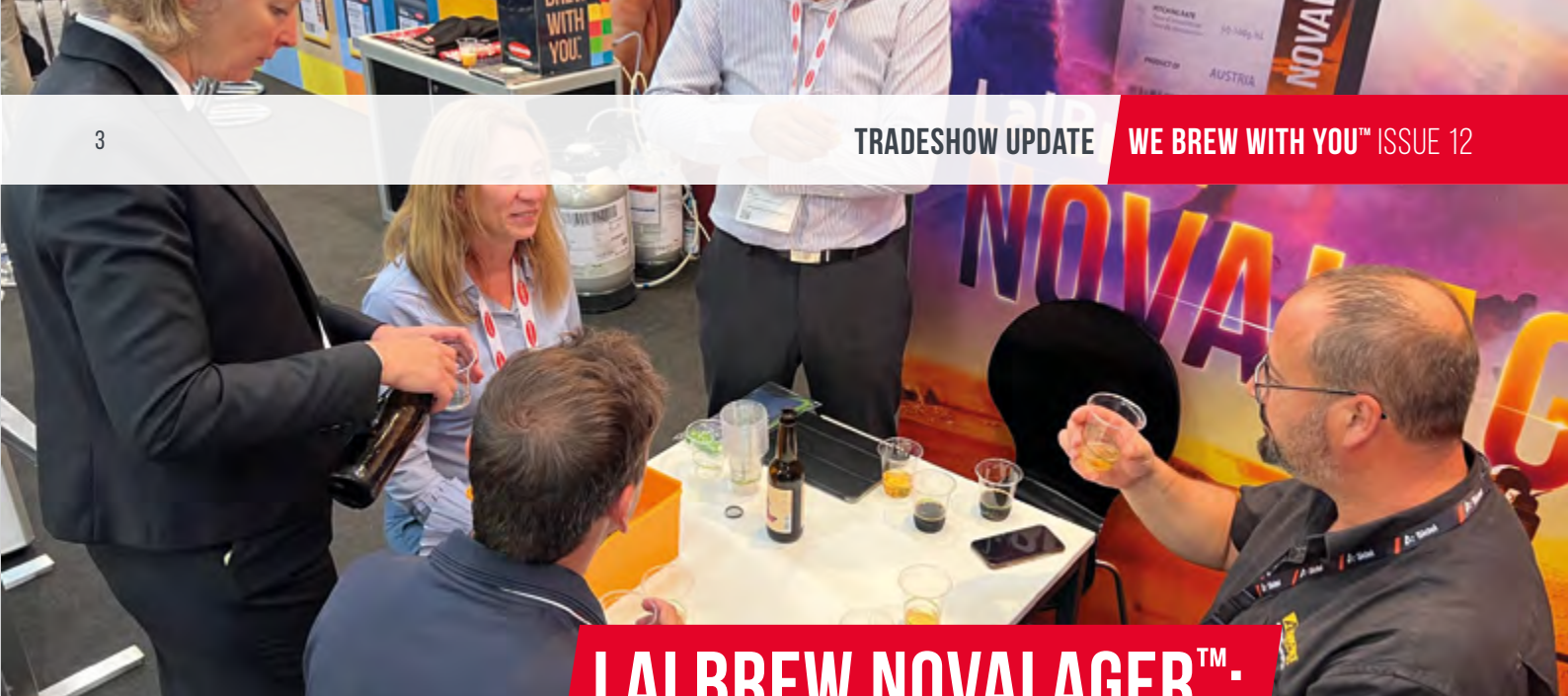
LalBrew NovaLager™ is the result of the collaborative work between Lallemand Brewing and Renaissance Yeast (Vancouver BC, Canada). Both parties contributed their expertise to select and produce an active dry lager yeast that matched with market trends and brewers' needs. This true and pure *Saccharomyces pastorianus* strain was born from a mix of tradition and science. Indeed, specific to traditional lager beer style production, this family of yeast has the ability to ferment at low temperatures to obtain clean and neutral beer profiles with low levels of esters and fusel alcohol. Recent scientific research has shown that all lager yeast strains in use today are likely descended from one or two (natural and spontaneous) hybridization events between *S. cerevisiae* and *S. eubayanus*. Using their expertise in non-GMO breeding methods, the Renaissance Yeast R&D team developed a novel hybrid strain that defines a completely new lager lineage (Group III – Renaissance) that is different from traditional *S. pastorianus* strains. During the development process, special attention was paid to select traits of interest that overcome challenges brewers face when brewing lager beers. This selection process culminated in the first major lager yeast innovation in hundreds of years.

We hope all this information will be useful in your continuous journey to improve your brewing process and make your mark. We wish you enjoyable reading!

EDITORIAL

by **Didier Théodore**

New Business Development/Product Manager



LALBREW NOVALAGER™: LAUNCH AT DRINKTEC

By Natalie Anderson,
Event Manager

DID YOU KNOW...

Lager is the German word for “storage”.



The first lager beers were fermented in caves and underground tunnels in 15th century Bavaria. The cool fermentation temperatures inhibited growth of spoilage micro-organisms and resulted in the selection and domestication of cold-tolerant lager yeast strains. Finished lager beer was traditionally lagered for extended periods in these caves.

Drinktec, a major tradeshow for the brewing industry

This past September, the Lallemand Brewing team was very excited to attend this much-anticipated event in Munich, Germany. Only taking place once every four years, the Drinktec trade show is well known as the world’s leading trade fair for the beverage and liquid food industry. Always a massive gathering, attendance this year for Drinktec included a total of 1,002 exhibitors from 55 countries and nearly 50,000 visitors from 169 countries. The international presence and diversity were an incredible experience. It is truly an event unlike any other. Always a team favorite to get a current feel for the pulse of the industry, this year proved no different.

LalBrew NovaLager™ launch at Drinktec

Additional excitement surrounded our attendance this year as Drinktec set the stage for the launch of our newest product, LalBrew NovaLager™, a hybrid lager strain with a novel lineage. To showcase our new lager strain,

we collaborated with the Research Center Weihenstephan for Brewing and Food Quality to prepare three trial beers, each made using the same wort but fermented with a different lager yeast strain. Attendees had the chance to taste for themselves and hear about the innovation that went into the creation and selection of LalBrew NovaLager™. As LalBrew NovaLager™ has been bred to produce little to no diacetyl, no H₂S flavors and provide slight esters, it was easy for attendees to differentiate between the strains trialed, which included lager strains from traditional lineages.

A place to share

One of the best takeaways from the event, as always, was feedback from brewers. We were privileged to hear stories of our products in use, and authentic opinions, which always prove invaluable to us. We are constantly listening to the perceptions, needs and wishes of our community, as this helps motivate us to continue developing products that respond to brewers’ needs and for the success and sustainability of the industry.



PARTNER BREWERIES ARE THE FIRST TO TEST INNOVATIVE NEW YEAST STRAINS

By **Eric Abbott**,
Technical Support Manager
and **Kevin Somerville**
Technical Sales Manager, Canada

Partner breweries from around the world play a critical role in our new product innovation process. Once a new strain is validated in our R&D lab, the next step is to see how it performs in a commercial brewery.

A collaboration with many benefits for both sides

Through these trials, partner breweries have the chance to use a new and innovative strain before it hits the market. We benefit from these collaborations by seeing how a new product performs under commercial brewing conditions with tangible data. Brewers have creative freedom in designing recipes, which gives us a great feel for how a new strain could be used. Just as important as the feedback and testimonials we get from these trials is the close working relationship we are able to form with brewers from around the world.

Testing LalBrew NovaLager™ in real conditions

Our R&D trials of LalBrew NovaLager™ showed that this true *S. pastorianus* strain had ideal characteristics for lager beer production, including high attenuation and a unique and remarkably clean flavor profile over a broad temperature range. Data from our lab suggested that LalBrew NovaLager™ would produce very low levels of typical lager off-flavors including H₂S and diacetyl, allowing for shorter maturation times. These were strong claims that needed to be proven in a commercial brewery.

Trials were organized at dozens of breweries from around the world with recipes ranging from traditional light pilsners to darker Baltic porters to more modern hoppy lager styles such as cold IPA. Brewers overwhelmingly confirmed the absence of off-flavors, which was listed as the most important characteristic of this strain.

Trials from Canada showcase LalBrew NovaLager™ performance

- **Solstice Cold IPA, Lake of Bays Brewing Company** (Baysville, Ontario)

The Solstice Cold IPA brewed by Lake of Bays ran into equipment failure that provided an unanticipated real-world challenge that showcased what LalBrew NovaLager™ could do. Andrew Walsh, Head Brewer, tells the story:

"A thunderstorm and eventual power outage kicked our chiller off on the same day we pitched LalBrew NovaLager™. We didn't get back to check the tank at our small batch facility until more than 48 hours later. By that time the Cold IPA we intended to ferment at 14°C was sitting at 23°C and rocketing through fermentation. At that point, I figured I was going to have to dump it and schedule a second trial, but to my surprise it tasted great: Clean, fruity, and crisp. I couldn't believe it! That's when I knew I needed to get my hands on a few more bricks because LalBrew NovaLager™ seemed bulletproof. I'm extremely excited to move forward with more brews and discover all of its capabilities."

- **Golden Lager, Junction Craft Brewery** (Toronto, Ontario)

Junction Craft Brewery did a more controlled high temperature fermentation challenge. They brewed one wort and split it three ways to make lagers to compare:

- **Batch #1:** LalBrew NovaLager™ fermented within the recommend temperature range
- **Batch #2:** LalBrew NovaLager™ fermented without temperature control (max temp of 27°C)
- **Batch #3:** Control fermentation with another popular lager yeast for comparison

They proceeded to conduct a blind-tasting with 14 participants, including other local craft brewers. The three beers were evaluated for aroma, color, flavor, mouthfeel and overall impression. Remarkably, the warmer LalBrew NovaLager™ fermentation came out as the overall winner in this side-by-side trial!

These trials have more than demonstrated the versatility and resilience of the LalBrew NovaLager™ strain in different recipes and brewing conditions. Thank you to everyone who worked with us on these trials – this is one of the most rewarding parts of working at Lallemand Brewing. We love the ongoing collaboration with brewers as we provide innovative solutions to the brewing industry, and we look forward to working with you again for our next new product.

LAGERING METHODS DIGEST

By Alexei Titov,
Technical Sales Manager - Russia and Baltics

Lager Production Methods

Lager is one of the most popular beer styles in the world. Light in color, crisp and refreshing, it has a delicate, clean and balanced flavor profile. The recipe for lager brewing may appear simple, but this simplicity is deceptive. Sensory defects cannot hide behind the complex flavors of malt and hops – laying bare every potential misstep in ingredient selection, sanitation, mashing, boiling, fermentation, maturation and filtration.

The most defining ingredient of the lager style is the *Saccharomyces pastorianus* yeast – a natural hybrid of *S. cerevisiae* and *S. eubayanus* that was selected and domesticated in European lager breweries over hundreds of years. Traditional lager strains ferment at lower temperatures resulting in clean and neutral profiles with low levels of esters and fusel alcohols. Modern yeast breeding techniques have been used recently to select novel *S. pastorianus* strains with ideal characteristics for lager styles.

[Find out more in our Lager Strain Selection bifold, here.](#)¹

Ingredient quality and freshness are important since there is no single dominating flavor or aroma in a lager. The quality and characteristics of the water, malt, hops and yeast all play an important role. The water profile traditionally used for lager production is very soft. Light kilned malt should be well-modified to avoid problems with FAN deficiency and DMS off-flavor. Traditional lager beers were brewed with local varieties of noble hops from Germany and the Czech Republic. The intense tropical or citrus notes of many American hops are not appropriate for delicate lager styles.

Lager brewing process requires special attention

Mashing method (step mash, single infusion, or decoction) should be chosen based on your equipment and the quality of the raw materials you use. An adequate level of FAN will ensure healthy fermentation and help the yeast to remove some off-flavors such as diacetyl, H₂S, and acetaldehyde.

A well-crafted lager is expected to be crystal clear despite the recent popularity of hazy beer styles. **Vigorous boiling** helps form protein-polyphenol complexes that can be separated from the wort, so they do not affect the clarity of the beer. Finings, such as carrageenan, can be added to the kettle where they bind soluble proteins that contribute to haze. An active boil will also reduce the amount of DMS, the precursor of which is more abundant in the light-kilned malt usually used for lager production.

To ensure **healthy fermentation** and avoid off-flavors, special attention should be paid to pitching rate and proper maturation period. Lager fermentations require more yeast compared to ales, generally 1.0-1.5 million cells/ml/°P. Addition of **nutrients** can impact beer quality by supporting yeast health. Many off-flavors are produced as by-products of yeast fermentation, and these can be removed by the yeast as well during the maturation period. A **diacetyl rest** is normally performed closer to the end of fermentation by raising the temperature of the beer by a few degrees to keep the yeast active and in suspension in order to remove unwanted flavors such as diacetyl, H₂S and acetaldehyde. Under-pitching or poor nutrition may result in slow fermentations and premature flocculation, which will reduce the ability of the yeast to reabsorb off-flavors.

Lager fermentations require more yeast compared to ales.

Normal **yeast management** best practices apply to lager production. Harvest only the middle creamy layer of yeast and store it at 2-4°C (36-39°F) for no longer than 48-72 hours. Check yeast viability and cell density before pitching to the next fermentation vessel, and limit re-pitching

to 8-10 generations to avoid mutations causing under-attenuation, reduced flocculation, flavor defects and other issues.

Enzymes and process aids like beer clarifiers, antioxidants and stabilizers can help brewers achieve greater clarity and shelf life, especially when a filter or centrifuge is not available.

Lager is the most popular beer in the world with its demand and acclaim having stood the test of time. Brewing with careful consideration for ingredients and brewing process pays respect to this iconic and traditional beer style.

¹: https://www.lallemandbrewing.com/wp-content/uploads/2022/09/LAL-bestpractices-Lallemand_Lager_Strain_Selection-bifold-digital-2.pdf



THE SOFT SCIENCE OF SENSORY PERCEPTION

By Keith Lemcke,
Director of Marketing at the Siebel Institute
of Technology

In summer of 2022, our Siebel Institute research brewer created two batches of beer as part of a project to develop a new beer recipe. The two batches were practically identical in their formulas and methods of production, but they had one glaringly notable difference, namely in their bitterness. In the finished versions, beer No. 1 had measured bitterness of 33 BU's while beer No. 2 had 25 BU's. With our trained tasters, we agreed that this was easy to spot, and that there were very few other differences. However, we then conducted taste panels asking about 270 tasters, mostly average beer consumers, which of the beers they preferred. Many of the tasters also offered comments on characteristics of the beers that were in some cases quite surprising.

One trend among respondents was to label beer No. 2 as being more bitter or more dry, which was quite the opposite of what the majority of tasters perceived, especially given the decidedly higher tested bitterness of beer No. 1, a beer which was on the edge of being overly bitter. Bitterness and sweetness are usually something on which most tasters agree, so finding so many "outliers" on these basic tastes was something of an eye-opener.

A more common issue is the capacity of people to find characteristic differences between samples that aren't really there, or in most cases, aren't perceivable to most tasters. Both of the beers were very straightforward pilsner-style brews, with aromas dominated by graininess, a bit of fruity esters, and slight corn aromas (DMS, for those who know brewing aromas) from the grains. However, comments from tasters included flavors of butter, tannins, vanilla, sourness and a claim that one of the beers was "watery". It could be that the people perceiving these compounds are hyper-sensitive to these specific flavors and aromas and that the compounds truly are present in the beer, but it could also be true that the taster is simply incorrect.

A lot can be gained from the results of taste panels like this, not just in assessing the products but in understanding people. Breweries that conduct taste panels need to be aware of the variability and fallibility of human tasters, and that needs to be taken into account when asking

their employees to be part of a taste panel program. Well-trained taste panel managers are acutely aware of the failings of human tasters, yet humans are still incredibly important to maintaining beer quality through tasting programs. The best way to assure the results coming back from taste panels are accurate is by training tasters using methods designed by groups like the American Society of Brewing Chemists (ASBC) as well as other sensory training specialists.

The best way to assure that the results coming back from taste panels retains accuracy is by training tasters

Offering regular training using sensory training kits isn't difficult, yet it can be time-consuming to set up, and to record and analyze panel results. The majority of breweries don't have the training nor staffing required to run a full-scale, data-driven sensory panel program, yet it shouldn't stop the brewery from offering basic sensory training. Setting up sensory training on a regularly occurring schedule can be done simply by using pitchers of beer prepared with "spikes" from a sensory kit, allowing staff to sample beer as their time permits during breaks or at the end of the work day. The Siebel Institute Sensory Station channel on YouTube offers fully narrated videos regarding sample preparation, tasting and experiencing the range of flavors and aromas found in the Siebel sensory kits, helping any overcome "the human factor" building professional-level tasting skills. If you want to improve the accuracy of brewery taste panel results, frequent sensory training just makes sense.

Go to the Siebel Institute
Sensory Station Channel on YouTube:



<https://youtube.com/playlist?list=PLNS7LR43RuJK67Q522Nd8Qyh0Ek1viiW>



THE WAIT IS OVER: SOURVISIAE® 10G SACHETS ARE HERE

By Caroline Parnin,
Technical Marketing
Manager

Sourvisiae® has quickly become a favorite among professional brewers in the United States for achieving rapid, risk-free and consistent sour style beers. For more than two years now, we've received comments from the homebrew community asking when they will get this yeast in sachet. Finally, here it is! We are delighted to announce the long-awaited launch of Sourvisiae® GMO yeast in vacuum-sealed homebrew size (10g) sachets.



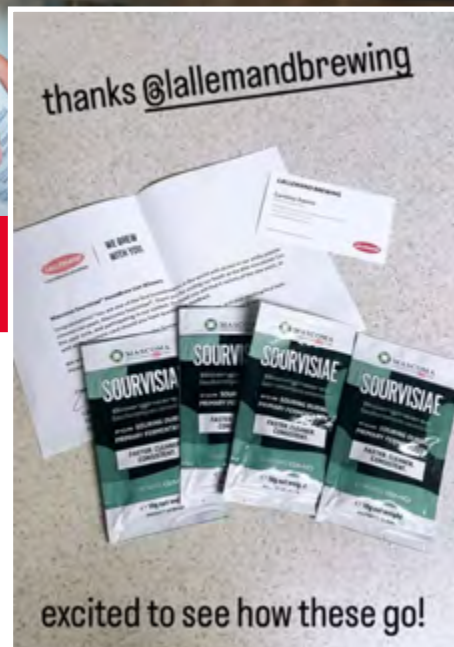
New Innovative tools for Homebrewers

At Lallemand Brewing, we very much believe the homebrew community plays a vital role in driving innovation and pushing style evolution within the beer industry. There is an unmatched passion for beer and fermentation that exists among homebrewers, which continuously inspires the industry as a whole and keeps us moving forward.

Lallemand Brewing is a perfect fit with the passion of homebrewers. We wish to provide exciting tools to continue to push boundaries of beer styles around the world. Lallemand Brewing is at the forefront of innovation, and offers full label transparency on our products. Mascoma (a Lallemand company) is a leader in research and development of new industrial biotechnology products. Their expertise in yeast improvement is highly recognized, most predominantly in the bioethanol field. Sourvisiae® was the first GMO yeast created specifically for brewing to come from Mascoma R&D. We plan to continue this strategy of engineering innovative products that serve the beer community in the years to come.

Sourvisiae® is a GMO *Saccharomyces cerevisiae* yeast that contains a single modification, enabling the yeast to produce high levels of lactic acid during primary fermentation. Sourvisiae® will produce alcohol and lactic acid simultaneously in less than 5 days with no off flavors and no production of biogenic amines. These features save precious time during the brewing process by avoiding performing separate souring steps and make it extremely safe and easy to clean and prevent cross contamination, since bacteria and wild yeast are not needed. The level of acidity produced by Sourvisiae® is easily controlled either by blending the yeast with another strain or alternatively by blending the final beer.

The advantages of Sourvisiae® are clear and have been widely accepted by craft brewers, a fact which makes us confident in offering this innovative product for the homebrew community.



Social media post from a follower on Instagram

Premiere at Homebrew Con

Homebrew Con, a famous American homebrew conference, took place in Pittsburgh, PA, USA this past June. There, 20 lucky homebrewers won samples of Sourvisiae® sachets ahead of the public release. These homebrewers are busy fermenting now and we cannot wait to see the results of their creativity! There is a lot of room for originality in the sour beer arena. If you are looking for inspiration on creating a sour style, our team worked up a best practice showing blends and styles they have succeeded with in the past. Check out our Sour Solutions Strain Selection document, which includes Sourvisiae® [here](#).¹

Next up for our homebrewer community will be our newest LalBrew Premium Series yeast, LalBrew NovaLager™.

LalBrew NovaLager™ is a true bottom fermenting *S. pastorianus* hybrid from the novel Group III lineage that has been selected to produce clean lager beers with distinct flavor characteristics and superior fermentation performance. We look forward to hearing and seeing all the interesting and creative beers being made with these two new innovative tools!

¹: https://www.lallemandbrewing.com/wp-content/uploads/2022/11/LAL-bestpractices-Lallemand_Sour_Solutions_Strain_Comparison-bifold-digital.pdf



STRENGTHENING OUR ROOTS

Lallemand Brewing currently offers three distinctive lines of products and services, grouped under a different set of brands. One of those brands is AB Vickers, a global leader in the field of brewing process aids and services with strong local roots in Burton upon Trent, United Kingdom.

The local AB Vickers team recently partnered with Narrow Lane Market Garden in Ticknall, U.K., to provide three plastic tanks for rainwater collection and storage. Narrow Lane Market Garden grows and sells fresh produce for the local community and uses rainwater for irrigation of its crops.

Reuse, reuse, reuse

During a review of the use of plastics in our business as part of our wider Sustainability Program, we considered alternative applications for plastic tanks for which we no longer have use. The tanks have already been reused multiple times for delivering AB Vickers products such as finings for beer clarification. The tanks are returned to our factory, cleaned and used to supply products several more times. We identified several opportunities to extend the usable life of these plastic tanks and concluded that they would be very useful for collecting and storing rainwater!

We recently delivered three of these 1000-litre tanks to Narrow Lane Market Garden, which is close to our factory in Burton upon Trent. The tanks will be used to collect and store rainwater, which will be used for crop irrigation. The proprietor of Narrow Lane, Paul Clough, informed us that this additional rainwater handling capacity will allow him to become 100% self-sufficient for his irrigation water requirements.

Although only a small part of a bigger sustainability improvement program at AB Vickers, we believe that this extension to the usable life of plastic tanks, while at the same time assisting a small local business to use more rainwater, is a great example of how small actions to improve our sustainability footprint can be done quite easily.

¹: <https://www.hec.ca/en/news/2022/hec-montreal-andt-university-of-oxford-create-unique-partnership-on-esg-measurement-standardization.html>

Paul Clough is pictured above, receiving one of the three tanks from Brent Jordan, General Manager of AB Vickers.

Connecting with Narrow Lane Market Garden has helped them to provide fresh, local produce to the local community and is one small way that Lallemand Brewing is helping to improve the sustainability of the entire beer production chain.

Lallemand Inc., the parent company of AB Vickers is also sponsoring [an initiative to determine evaluation criteria for corporate performance related to environmental, social, and governance factors.](#)¹

Sustainable future

At Lallemand, we are keeping our eye to the future in other areas, too. For example, microorganisms such as yeast and bacteria present huge opportunities to craft solutions to many sustainability issues. The scientists at Lallemand engineered the genome of a brewing yeast to produce large quantities of lactic acid, which is very useful for brewers of sour beers but hardly significant when it comes to saving the planet. And yet, there is enormous potential for manipulating the genomes of yeast (and bacteria) to produce molecules with far greater potential benefit for mankind.

A yeast cell is a factory simply waiting for humans to provide the necessary raw materials for sustainable solutions to today's biggest issues. Imagine if we could have our friend, the yeast, present us with building blocks for materials in the modern world that are currently fossil fuel based.

At Lallemand Brewing, we strive to usefully employ process aids, yeast, and bacteria to make great beers. However, there is much more at stake.