NEW YEASTS – NEW BEERS

Different yeasts for different brewers

Many breweries have unfortunately seen a decline in sales during the Corona crisis. Some now have their backs to the wall, especially if a substantial part of their business is in supplying keg beers and the catering sector. Many small restaurant breweries and craft breweries have also been badly affected. Various breweries have already switched to using their free personnel capacities for plant and process overhauls and product development. As a result, the Research Center in Weihenstephan has already received several orders for rarely used, novel and innovative yeast strains. The team has seen plans for developing products from specialist alcohol-free beers to ultra-strong beer with special yeast flavors. With this article, the Research Center Weihenstephan for Brewing and Food Quality (FZW BLQ) of the Technical University of Munich wants to give breweries an overview of ever-popular yeasts and new, innovative yeast strains, and provide inspiration for product developments and modifications. Each yeast strain is described here in a short profile with possible application areas and product ideas.

Bottom-fermenting brewer's yeasts (Saccharomyces pastorianus) – the brewer's staple

Bottom-fermenting beer production is the internationally driving force of brewing and accounts for more than 90 percent of the world's beer production. Six main bottom-fermenting yeast strains are generally used around the world and these make up the majority of this bottom-fermenting proportion of beer. This article intends to present alternative technical, historical and regional bottom-fermenting yeasts.

Bottom-fermenting yeasts with historically significant roots

Frisinga – TUM 34/70® – the global reference of the Technical University of Munich

This strain was investigated by Prof. Ludwig Narziss during his doctoral studies and it was the strain with the best flavor profile and exceptional technological characteristics. This strain came to the strain collection of the Research Center Weihenstephan for Brewing and Food Quality of the Technical University of Munich from Augsburg via Nuremberg. The origin is likely to be found in Augsburg. Re-isolated from Weihenstephan State Brewery and stored in 1970, the date is the reason for the suffix 70 in its descriptor. It is not surprising that such a strain comes from Bavaria given its neutral flavor, widely accepted by consumers, and the fact it is easy to handle throughout the fermentation process and in how it acts generally. As brewers in this central European region have been developing and optimizing this form of Bavarian lager beer ever since the end of the Middle Ages. A beer that is formulated simply from water, barley malt, hops and bottom-fermenting yeast. Its properties have made this strain the most-used lager yeast strain worldwide.

Lipsia – TUM 26 – the mysterious one from eastern Germany

This yeast strain is one of the oldest strains in TUM's yeast collection. The lower the TUM number, the older the isolation date of the yeast strain. It comes from the Sternburg brewery in Leipzig-Lützschena. In 1829, the founder Maximillian Speck of the Sternburg brewery leased the Sankt Veit monastery in Bavaria, where bottom-fermenting beer was made according to the Bavarian brewing style. The Bavarian master brewer then replicated the Bavarian brewing process in Leipzig-Lützschena with the yeast he took back. Later, in the 19th century, the brewery was converted into a modern Dampfbier brewery using then state-of-the-art cellar technology based on the Munich model. This yeast strain creates unique bottom-fermenting beers at a lower attenuation, low pH value, appropriate diacetyl decomposition, low concentration of higher alcohols, with moderate ester formation, good foam formation and excellent flocculation.

Franconia – TUM 35 – Franconia's forgotten superstar, the dominant yeast since the Second World War

Although one of the most important yeasts of the post-war period, TUM 35 had gradually been forgotten due to its susceptibility to fluctuations in the raw materials. Fortunately, a research center employee discovered this yeast, freeze-dried in a cardboard box in the old vaulted cellar. As these fluctuations are becoming less relevant due to the current varieties of barley, global purchasing and modern malting techniques, the resurrected Franconia – TUM 35 – is becoming increasingly popular. Use this yeast, originally from Coburg in

Franconia, to brew beers with a crisp, pleasantly fresh yeasty flavor. The taste of these typical, well-balanced pale beers is pleasantly full-bodied, subtle, slightly bitter and with a mellow, balanced aftertaste. Ideally suited to producing typical well-balanced pale beers. The special feature of this yeast strain is in the extremely neutral beers it produces, which are enjoyed by many and have no sulfurous notes.

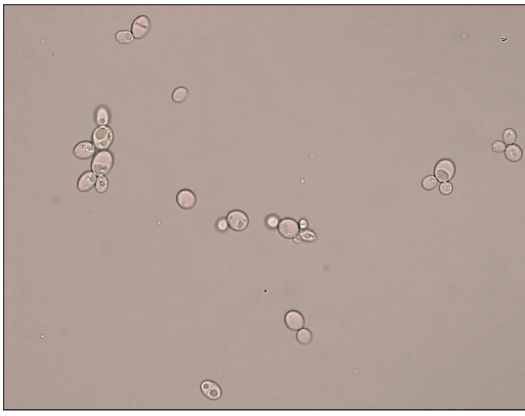
Austria – TUM 128 – following the footsteps of Anton Dreher, an original Austrian strain from the historical brewing center of Schwechat

In his youth, Anton Dreher took study trips to Germany, where he met Gabriel Sedlmayr (son of the Spatenbräu brewery owner), with whom he subsequently took educational trips to England. On his return, Anton Dreher became the first brewer on the European continent to implement the English malting process and adopt the bottom-fermenting fermentation and lagering technology from Bavaria.

In 1840/41 he created a pale bottom-fermenting lager, Schwechat lager beer, which gained recognition far beyond the borders of Austria. Good attenuation, average beer pH value, average flocculation, good diacetyl breakdown, good ester formation, and average formation of higher alcohols make this yeast strain robust with an appealing flavor profile.

BavariaPlana – TUM 84 – a yeast that reflects the Lower Bavarian down-to-earth attitude

This yeast strain originates from Passau in Lower Bavaria and scores very highly on sensory properties. It also has good attenuation, a low pH value, moderate flocculation (lots of cells in suspension), excellent diacetyl reduction, high ester production and moderate formation of higher alcohols. This yeast strain is a good compromise between technological robustness and a balanced bottom-fermenting flavor profile, and is a very good Lower Bavarian alternative to Frisinga – TUM 34/70®.



Microscopic image of BavariaPlana – TUM 84

TerraNova – TUM 145 – an American pioneering yeast that found its way back to Europe

This yeast comes from the Wahl-Henius laboratory. Dr. Robert Wahl and Dr. Max Henius ran the Institute of Fermentology in Chicago from 1886 to 1921, a brewing science laboratory and a school for training brewers. After the Second World War, the yeast strain TUM 145 found its way back to the TU München. It was given the name TerraNova as it had already

traveled to the "New World." Dr. Wahl visited the major brewing institutes and brewing centers in Europe and took yeast strains with him to the United States. The Wahl-Henius Institute of Fermentology was the key source of pure cultivated yeasts in the United States. Dr. Wahl worked with the extraordinary bottom-fermenting beer from the Michelob brewery (Mêcholupy in Czech) in the Czech Republic and so it is very possible that the strain originated from there. There are few technological studies on this strain to date and its roots were only rediscovered recently. Because of its history, the strain is part of a large-scale genetic study. To date it has been sourced by American breweries and has not yet been used in central Europe. So, why not create a bottom-fermenting beer with this European repatriate?

Bottom-fermenting yeasts with special technological characteristics

Brewers are frequently confronted with the most diverse technological problems in the brewery. Often, the yeast used can handle fluctuations in raw materials and physical modifications, however, in situations where even the Frisinga – TUM 34/70® strain that is adapted to the brewing industry can no longer help, there are other, promising bottom-fermenting yeasts.

Robusta – TUM 44 – the robust lifeline for many technological problems

All raw materials can fluctuate in their quality. Starting with water, which can come from a brewery's own well (slower shift) or the public supply (rapid shift). About the grain: Hardly any batch of malt is absolutely consistent in meeting specified attributes for the brewing process. Varying conditions during its growth (e.g. rise in pH value in the past 20 years as a result of the rise in the CO_2 content in the air) and in some cases during malting cause this problem. Issues can also arise during fermentation depending on the type of hops and hop addition. However, the yeast Robusta – TUM 44 has proven to be highly stable to raw material fluctuations. This bottom-fermenting flocculating yeast is barely influenced by this issue and consistently delivers a clean, fresh yeasty beer with a pleasantly full-bodied taste.

Obscurus – TUM 120 – a Munich original for dark beers

Dark, bottom-fermenting beers need a clear and rounded flavor, accentuated by dark malt. Many bottom-fermenting yeasts produce outstanding pils, lager and export beers, but still cannot achieve the typical flavor of a dark beer in most cases. However, the strain Obscurus – TUM 120 has also proven to be excellent for this type of beer. This yeast combines all the resulting components of a dark, bottom-fermenting beer and ferments well in cold conditions.

Securitas – TUM 193® – your guarantee for taste stability

This yeast strain not only stands out for its flawless sensory taste, it is also characterized by an elevated SO_2 formation which ensures flavor stability and consistent enjoyment. Even at high fermentation temperatures in the bottom-fermenting sector it develops a slightly fruity yet clean flavor that can serve as a particular distinguishing feature compared with other bottom-fermenting beers.

Pressus – TUM 194® – the pressure-resistant deep-sea diver for tall tanks and liquid columns

When breweries need greater fermentation and storage capacities, this is usually achieved where space permits by installing vertical tanks. However, the tall liquid column proves to be a stress factor for the yeast, which can cause delayed fermentation and consequently undesired secondary fermentation products. Pressus – TUM 194® can handle this increased pressure more easily and yields a pure beer with a balanced aftertaste.

Accretio – TUM 195® – the propagation performer

Time is money also applies to the brewing sector. If you want rapid yeast propagation and a rapid fermentation onset, the strain Accretio – TUM 195® is ideal and achieves final attenuation quickly. Due to the quick cell propagation, it is also possible to work as usual with a low pitching yeast cell count. Despite rapid attenuation, this strain still guarantees that the resulting beer has a clean flavor.

Top-fermenting brewer's yeasts (Saccharomyces cerevisiae) – a matter of diversity

Wheat beer yeasts – forgotten stars of Bavaria

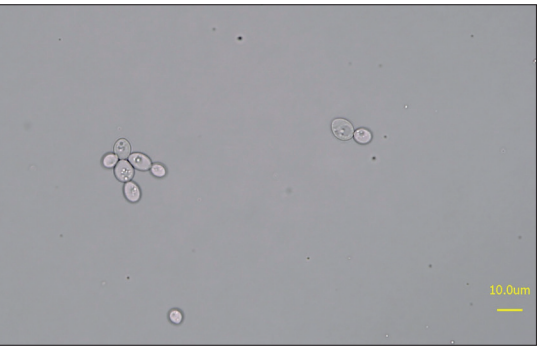
An extremely high proportion of the wheat beers produced in Germany and other countries are created using the yeast strain LeoBavaricus – TUM 68®. However, there are some alternative yeast strains that also yield an appealing top-fermenting flavor.

LunaBavaria – TUM 127®

This yeast strain features a special characteristic among wheat beer yeasts: it has what is called a maltotriose gap. This means that LunaBavaria cannot instantly utilize maltotriose, which in turn leads to a slightly lower degree of attenuation. However, this does not have a negative effect on the overall flavor of the beer. It has even been shown that despite the lower attenuation of this yeast strain it is still able to form similar concentrations of isoamyl acetate or ethyl acetate (both primary components for fruity wheat beers), in contrast to other strains, which reach a higher attenuation. In some cases, in conjunction with a slightly higher residual extract, the esters are particularly emphasized. This strain yields a very soft and balanced mouthfeel and achieves a very pleasant full-bodied taste in the finished beer. Should a low attenuation not be desired, then multiple runs (3-4 times) of this yeast strain are needed as it 'learns' the ability to utilize maltotriose over time.

VirgoBavaria – TUM 149®

This yeast strain is highly popular outside of Germany as the top-fermenting wheat beer flavor is quite subtle and well-balanced. It is extremely robust at good levels of attenuation. The strain utilizes maltotriose completely. It delivers a relatively neutral, yeasty wheat beer with subtle clove and fruit



Microscopic image of VirgoBavaria – TUM 149®

notes. The strain is an old Munich original.

FaexBavaria – TUM 214

Those who are not necessarily in favor of fruity "banana bombs" in their wheat beer, may prefer to use FaexBavaria. The lower formation of isoamyl acetate (banana), ethyl acetate (fruity, solvent-like) and 4-vinylguaiacol (clove) creates more neutral wheat beers. The onset of fermentation as well as other fermentation properties are entirely normal for this yeast strain, which produces attractive sleek wheat beers.

SolBavaricus – TUM 175®

Another well-established yeast strain in the wheat beer segment is SolBavaricus – TUM 175®. Unfortunately, this yeast is rarely found in breweries despite having great potential. Compared with LeoBavaricus – TUM 68 and other wheat beer yeasts, trial fermentations under standardized conditions already show that SolBavaricus appears to have a good genetic make-up with regard to ester and 4-vinylguaiacol production. It therefore produced high levels of isoamyl acetate and ethyl acetate. 4-vinylguaiacol was also formed in greater quantities. By using the relevant technology (wort aeration, original wort, fermentation temperature etc.), it is entirely possible to create the preferred beer type (fruity, yeasty, neutral or clove-like) from this yeast strain.

Koelsch, Altbier and ale

ColoniaVetus – TUM 165 – an all-rounder

Wouldn't it be nice to create all types of beer with just one yeast? That would be the ideal situation, but unfortunately not possible for all beer varieties. In the bottom-fermenting sector we can produce all known types with one bottom-fermenting yeast strain. However, in the top-fermenting sector we often experience extreme characteristics, for example in the phenolic category, which is desired in wheat beer but perceived as an abnormal flavor in ales. Still, there are top-fermenting yeasts that can use special characteristics to conceal their secondary fermentation products and enable different types of beers. Which is the case for the strain ColoniaVetus – TUM 165. This yeast can be used to produce an Alt beer, ale or even a fruity Koelsch by means of highly variable temperature management and targeted wort composition. The yeast initially ferments sluggishly but quickly adapts to the different wort specifications to produce typical varieties of these beer types.

Ale yeasts – aroma and fermentative power

As part of the craft beer movement in particular, the modern term for ale yeasts has become a synonym for intensely aromatic, predominantly fruity beers in the German-speaking region. However,

the origin of the term is found in English language usage and includes all yeasts of the species Saccharomyces cerevisiae, which German brewers describe as top-fermenting yeasts. Compared with the bottom-fermenting lager yeasts, top-fermenting ale beer yeasts are genetically, and in terms of their phenotype, more diverse, which is why when ale yeasts are correctly used they create intensely aromatic beers with a highly pronounced fruity character. In addition to well-known top-fermenting beer types such as wheat beer, stout, Koelsch and Altbier, others include specialist Belgian beers such as witbeer, lambic and Trappist beer. Several ale yeast strains are enjoying increasing popularity on the international beer market. Used appropriately, they give the beer an especially high aromatic sensory impression and are exceptionally well suited to hoppy beer types such as pale ales, India pale ales, and various, sometimes seasonal specialist beers. Their character, which is specific to the yeast strain, gives the beers a pronounced fruity-estery to citrus-like flavor impression and can dominate entire beer types, accentuating their malty or hoppy body.

Pensum – TUM 210®

This English ale yeast strain is characterized by its robust and highly effective fermentation properties along with its pure flavor profile.

Mel – TUM 211®

The special feature of the Mel – TUM 211® yeast strain is in its fermentation characteristics. After a slightly delayed fermentation onset and at a consistent rate of fermentation, the yeast strain reaches its final attenuation, which is lower based on its low maltotriose utilization. The higher residual extract is emphasized by the yeast's honey-like and distinctively fruity-berry notes.

Baca – TUM 503®

Similar sweet aromas are created by fermentation using this yeast strain. However, compared with Mel – TUM 211®, beers produced with Baca – TUM 503® have a more prominent berry flavor within the mild fruity flavor note.

Tropicus – TUM 506®

The name says it all for this ale yeast strain. Beers fermented with Tropicus – TUM 506® are distinguished by an overall highly fruity sensory impression. Dominant aroma compounds are tropical fruits such as passion fruit, underpinned by citrus-like flavors. The fermentation capacity is moderate.

Harmonia – TUM 511®

Trials at the Research Center BLQ have shown that yeasts can strongly influence the raw materials of malt and hops. Harmonia – TUM 511® ferments vigorously and its fruity notes blend with virtually all intensely aromatic hop varieties. The desired hops aroma is supported without suppressing it. Its strain-specific property of being phenolic off-flavor (POF) positive means it also develops clove notes in the finished beer. Depending on the fermentation conditions and hops addition, this aroma can be suppressed or accentuated by means of synergistic effects. This yeast strain is therefore not only used for fruity, hoppy beers, but is already used in the industry to produce what is known as Bavarian ale – a blend of ale and Bavarian wheat beer.

Strong Belgian yeasts for that typical Belgian note

Adjunctio – TUM 378®

This strain is a Belgian witbeer yeast which produces a complex flavor profile with a pronounced phenolic note. Depending on the brewing process and fermentation control, both mildly bitter and mildly fruity beers can be produced, meaning that besides witbeer, this yeast strain is also suitable for Belgian dubbel and triple as well as spiced beers. Additives (adjunctio = addition) such as citrus fruits, coriander and spices can be combined with the flavor profile to create an exciting taste experience. These applications are of course for beers produced outside of the German purity law.

Cupa – TUM 380® Lambic

This Belgian lambic yeast is ideally suited to producing beers which are ultimately going to be stored in wooden casks (cupa = cask). It is characterized by a pleasant, top-fermenting flavor profile with vanilla and clove flavors, along with subtle wine notes, which round off the smooth and slightly dry taste.

Monacus – TUM 381®

This yeast strain ferments vigorously in a gradual fermentation process and is characterized by a distinctive spicy aroma. Its strong malty aroma with subtle floral yeasty notes makes it well suited to producing Trappist beers.

Specialist yeasts for alcohol-free, low-alcohol beers

The trend towards alcohol-free or low-alcohol beers with significantly reduced alcohol content is reflected in the rising sales figures over the past ten years in Germany. It has long been unnecessary to perform additional alcohol reduction, a process which would not be possible for all breweries for both technical and cost reasons. There are several low-fermenting yet aroma-intense yeast strains that only metabolize specific beer wort sugars. These specialist yeasts do not ferment maltose or maltotriose so only the small quantities of sugar glucose, fructose and/or saccharose present in the beer wort are fermented. Depending on the fermentation properties of the respective yeast strain, the wort composition can be optimized by selectively controlling the mashing process to maintain a maximum alcohol content of 0.5 %vol. at an original wort of about 7 °P without interrupting fermentation. If you wish to produce a low-alcohol beer, it is possible to maintain fermentation without needing to control the sugar at fermentation onset as the beer will not exceed the limit of 1.5 %vol. alcohol. The flavor profiles of alcohol-free or low-alcohol beers created using these special non-Saccharomyces yeasts are extremely diverse and range from sweet and honey-like to a broad spectrum of fruity notes. As most of these specialist yeasts have only been studied recently for their suitability to produce alcohol-free or low-alcohol beer, there is still creative freedom for individually flavored beers.

Saccharomycodes ludwigii – TUM SL17

Saccharomycodes ludwigii, a yeast strain that has been well known for decades, has attracted greater attention over the past few years due to its suitability for producing alcohol-free or low-alcohol beer. TUM SL17 is distinguished by its sweet to honey-like flavor profile at an original wort of about 7 °P and a fermentation temperature of 15–20 °C. Compared with the secondary fermentation products typical of top-fermenting wheat beers, TUM SL17 has no appreciable concentrations of isoamyl acetate, ethyl acetate or 4-vinylguaiacol. However, higher quantities of aliphatic alcohols were detected, which positively impact the beer's flavor profile.

Cyberlindnera misumaiensis – TUM 238

If TUM 238 is pitched at an original wort of 7 °P and a fermentation temperature of 20 °C, it remains far below the permitted 0.5 %vol. of an alcohol-free beer, giving scope for raising the original wort. By doing so, it is possible to gain benefits such as a fuller body and a more intense flavor. At an original wort of 7 °P, the pH value in the finished beer is between 4.6–5.0; the use of acidified wort (Sauergut) is therefore recommended. The profile of the alcohol-free beer produced using this *Cyberlindnera misumaiensis* strain is distinguished by a refreshing and well-rounded sweet and sour fruity flavor, reminiscent of gooseberry and stone fruit.

Cyberlindnera saturnus – TUM 247

This new addition to the Research Center for Brewing and Food Quality called TUM 247 has an impressive aromatic fruity character that combines banana, pear, cool mint sweets and berry flavors. To date, the yeast strain has been tested in a 12 °P wort and at fermentation temperatures of 20–27 °C. While the alcohol content only fluctuates marginally between 0.8 and 1.0 %vol. when increasing the temperature, the flavor profile intensifies at increasing fermentation temperature. As with TUM 238, the drop in pH is not sufficient when using TUM 247 and the use of acidified wort is therefore recommended. A little experimentation with TUM 247 would not only create exceptionally aromatic alcohol-free or low-alcohol beer, it could also produce fermented wort-based soft drinks.

Kluyveromyces marxianus – TUM 653

Kluyveromyces marxianus, originally known from the fermentation of dairy products (e.g. whey beer), this yeast strain TUM 653, when fermented with brewer's wort, surprises with its fruity aroma properties, which impart a pleasant apple impression with fruits of the forest notes. Fermentation trials have also been conducted with this strain at an original wort of 12 °P and a fermentation temperature of 20 °C, which results in an alcohol content of 0.5 %vol. and a pH of 4.7. Due to the low degree of attenuation, there is a perceptible sweetness in the alcohol-free beer, which can be reduced either with an adjusted mashing process or by reducing the original wort.

Saccharomycopsis fibuligera – TUM 652

Saccharomycopsis fibuligera TUM 652 is a specialty in this category of yeasts. If it is used at 27 °C, this

yeast strain can partly metabolize maltose and, at an original wort of 12.5 °P, subsequently generate a finished beer with an alcohol content of about 3.0 %vol. However, if you regulate the fermentation temperature to 20 °C, the alcohol content of the beer remains below 1.0 %vol. Accordingly, this can help produce either a low-alcohol beer or, by reducing the original wort, an alcohol-free beer. Acidified wort is not needed in this case as the pH drop to 4.3–4.5 takes place during fermentation. The resulting beer reveals plum and strawberry-like flavors.

Torulaspora delbrueckii – TUM T1

This yeast strain is also maltose-negative and produces pleasant, slightly fruity aromas with a neutral overall profile. It can be used in a technologically similar way to *Saccharomycodes ludwigii* TUM SL17. It is frequently used for alcohol-free wheat beers or other top-fermenting beer types to introduce a pleasant fruit note that balances well with slightly acidic beers (e.g. for wheat beers with low pH values). The beer can be blended easily with other original beers used to produce alcohol-free products or the yeast can also be effective in a mixed fermentation.

Small-scale trial fermentation using the yeast Quercus – TUM 628

Non-Saccharomyces yeasts for a pronounced flavor

In addition, it is also possible to use the following non-Saccharomyces yeast strains for top-fermenting specialist beers:

Torulaspora delbrueckii – TUM T9

Torulaspora delbrueckii TUM T9 is maltose-positive and does not develop any phenolic off-flavors. It can be used to produce beers of normal alcohol concentrations and develops intense fruity notes reminiscent of blackcurrant at 20 °C. It can also be used successively and in mixed fermentations. Some craft beer breweries already use this yeast strain for specialist beers.

Brettanomyces TUM yeasts

For secondary or mixed fermentation to obtain typical phenolic, fruity Brettanomyces notes ("Brett flavors") with a specific acid profile (ethyl acetate, acetic acid) in acidic beers (often together with *Lactobacillus spp.* and *Pediococcus spp.*), the following three strains are frequently used: *Brettanomyces bruxellensis* TUM Bretta 1, *Brettanomyces lambicus* – TUM 635 (taxonomically correct *Brettanomyces bruxellensis*), *Brettanomyces clausenii* – TUM 636 (taxonomically correct *Brettanomyces anomalus*). Each strain develops a different ratio of phenolic flavor, fruit flavor and acidic profile.

Yeast strains from the yeast hunting project

Quercus – TUM 628 *(Saccharomyces paradoxus)*

"See, the good that lies so near," said Johann Wolfgang von Goethe in his poem Erinnerung (Memento). This holds true in the case of TUM 628 as this yeast strain was discovered and isolated from an old oak tree near the Research Center Weihenstephan for Brewing and Food Quality. In the times of Celts and Teutons, oak bark was used as a starter culture to ferment certain beverages. For good reason, it seems. Beers brewed with Quercus – TUM 628 certainly support this tradition. They have a clean, fruity odor with a trace of orange notes and touch of cloves. The taste is sleek with a full-bodied aftertaste as well as being pleasantly tart with slight bitterness, accentuated in the aftertaste. The aromas are identified as being both ortho and retronasally balanced.

Ceret – TUM 547 *(Saccharomyces cerevisiae)*

You need to look a little deeper to discover our Ceret – TUM 547. Because this strain was isolated from the inside of an old sherry cask. The effort was worthwhile as this strain delivers a pure, pleasant, mildly acidic odor with fruity notes of passion fruit and citrus fruits. These aromas are validated in the taste, producing a full-bodied, tart beer, with a dry to slightly acidic aftertaste. Possible applications: Belgian beer types and wheat beers with fruit notes.

Cella – TUM 594 (*Saccharomyces uvarum* × *Saccharomyces eubayanus* hybrid)

This wild yeast hybrid was isolated from an old bottle that the State Brewery Weihenstephan found in its old cellars after an estimated 70 years and passed on to us. A lucky event. It became apparent that this strain provides a clean, pleasantly fresh-yeasty flavor with subtle impressions of cloves and vanilla. With a clean taste, very full-bodied, a mild flavor and a hint of bitterness in a delicate finish.

LatinumAmerica – TUM 541 *(Saccharomyces cerevisiae)*

Presumably originating from Caribbean rum fermentation, this yeast strain provides aromas reminiscent of plum, red fruits and gingerbread. These olfactory impressions are reflected in the taste and create a full-bodied, subtle beer with a well-balanced aftertaste, which can be enjoyed throughout the year.

Conclusion and outlook

What can brewers do? They can handle large volumes. They can create a wonderful beverage from a material that starts off being insoluble. They are experts in extraction, specifically in fermentation, and every step of the process – right down to filling the product in the most appropriate container.

Corona crisis or not. People are still enjoying beer. And consumers are becoming more discerning, more willing to experiment, even though the German government sets various restrictions (such as the blood-alcohol limit). This small, and we emphasize small, review of some yeasts held by the Research Center demonstrates the fantastic diversity of these fermentation microorganisms. And all of the strains presented in this article are already tried and tested! When you consider what incredible treasures still lie dormant in nature – probably only a thousandth of the potentially existing strains have been studied – then you can only imagine what wonderful surprises still lie ahead of us. This is why the Research Center continues to hunt down yeasts and open up further yeast possibilities for the world of brewing. □

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