Brewline
SOLUTIONS FOR BREWERS

YEAST GUIDE

& Technical Tips
Usage Tricks

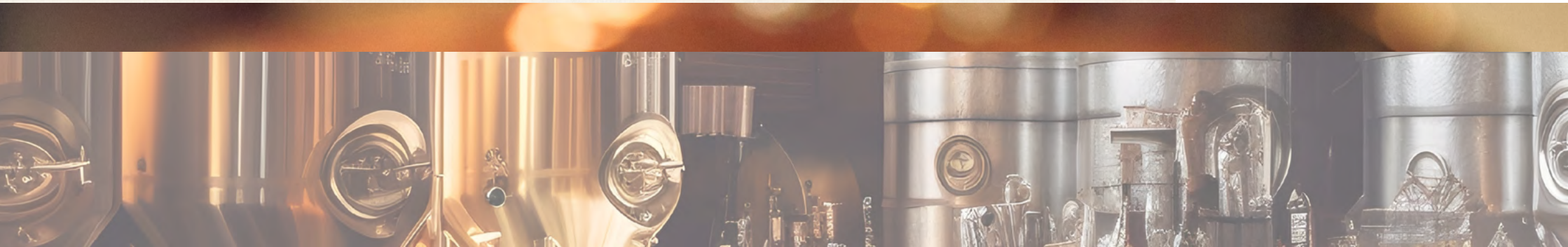
This guide has been designed for you, brewers, to help you understand how our Active Dry Yeasts (ADY) are produced, what factors influence fermentation, and how our yeast strains are characterised.

We hope you will find it useful and that it will help you craft the best possible products, supported by Brewline® and inspired by the **creativity** that has fuelled the «beer revolution» for years, driving it towards **ever greater** and **more exciting goals**.

Today's market not only demands a high level of quality in production but also a **wide range of products** to meet consumer expectations. In this context, it is clear that **yeast management** in brewing plays a **crucial role**.

More and more brewers around the world are placing their trust in ADY. Ready for inoculation after simple rehydration, they do not require propagation and ensure **high production consistency**.

Brewline® provides brewers worldwide with strains sourced from recognised origins, tested both in the laboratory and in real brewing conditions. These strains enable the production of **various high-quality beer styles**, from bottom-fermented **Lagers** to top-fermented **Ales**.



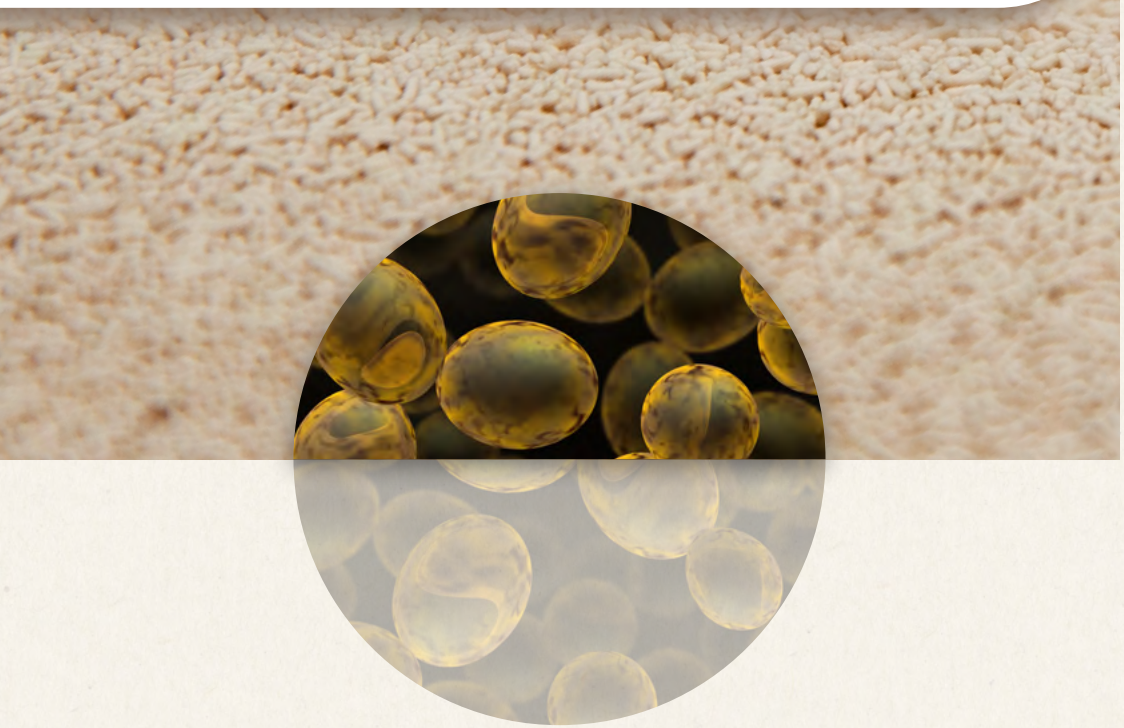
WHAT IS YEAST?

When speaking about yeast in everyday life, we refer to **unicellular eukaryotic microorganisms** belonging to the fungi family. This family includes *Saccharomyces*, which is responsible for transforming sugar into alcohol.

In brewing, the most commonly used species are ***Saccharomyces cerevisiae*** (top-fermenting yeast) and ***Saccharomyces pastorianus*** (bottom-fermenting yeast). The term «**strain**» is used to define the smallest taxonomic unit, a subdivision of the species.

Hundreds of different yeast strains yeast strains are used in beer production, contributing to a **wide variety of styles**. They play a crucial role in **flavour** and **aroma** development in the final beer.

These aromas depend not only on **yeast genetics** but also on the **brewing conditions implemented** by the brewer, the water composition, minerals, types of malt, and hop selection. It is therefore essential to keep in mind that all these **factors influence yeast activity**.



BEER AND ITS MICROORGANISMS

The types of yeast used to ferment must into beer are generally classified as **Ale**, **Lager**, or «Spontaneous».

From a brewing perspective, *Saccharomyces cerevisiae* is referred to an **Ale** yeast (**top-fermenting** yeast), while *Saccharomyces pastorianus* is known as **Lager** yeast (**bottom-fermenting** yeast).

Saccharomyces cerevisiae encompasses a broad group of Ale yeasts used to produce beer, wine, cider, and other fermented beverages.

These yeasts differ from *Saccharomyces pastorianus*, which is commonly used in the production of pale lagers and is characterised by greater cryotolerance.

Bottom-fermenting yeasts are sometimes also referred to as ***Saccharomyces carlsbergensis***.

Without delving too deeply into nomenclature, Lager yeasts perform best at lower fermentation temperatures (8–15°C), whereas Ale yeasts thrive at higher temperatures (18–25°C).

Different yeast strains, with their varying ester and acetate production, enable the creation of **diverse beer styles**. It is no coincidence that yeast is often referred to as the «**true brewer**».

Yeast plays a key role not only in **primary fermentation** (the main alcoholic fermentation) but also in **bottle conditioning (secondary fermentation)**.

Some yeasts include variants of *Saccharomyces cerevisiae*, such as *Saccharomyces cerevisiae var. diastaticus*, which releases glucoamylase into the medium, breaking down dextrins and potentially leading to over-attenuation. Additionally, other species like *Brettanomyces* (also known as Dekkera) contribute to beer's distinctive «funky» and barnyard aromas.

Yeasts belonging to the same species can produce **very different aromas.**

One of the main distinguishing factors is the expression of the POF (Phenolic Off-Flavour) gene. Some yeasts are POF+, meaning they decarboxylate phenolic acids present in the must, producing 4-Vinyl Guaiacol (4VG). This compound imparts spicy, clove-like aromas, a signature characteristic of many Belgian beer styles.

FERMENTATION AND MATURATION

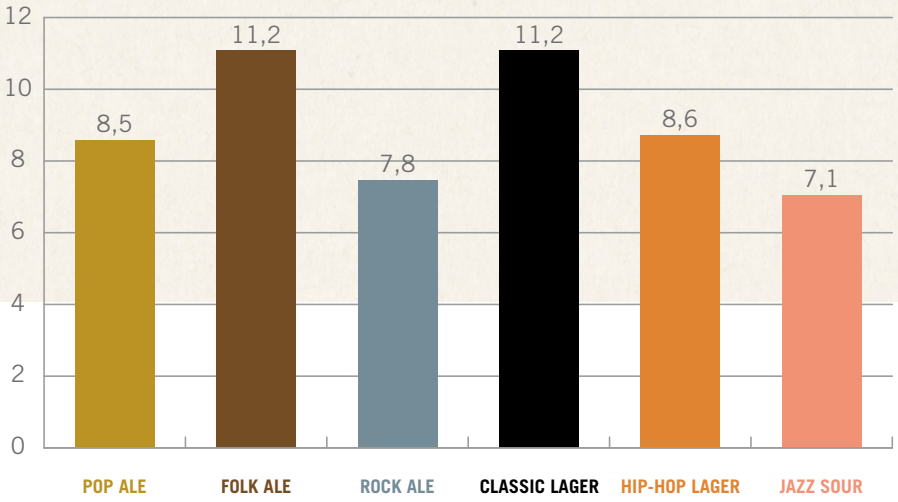
Bottom-fermenting yeasts typically take **one** to **two weeks** to complete fermentation, whereas **top-fermenting yeasts** tend to be faster, taking around **three** to **seven days**, depending on the must composition and temperature.

The yeast's metabolic activity is directly influenced by temperature. During **primary fermentation**, **specific aromas are produced** based on the yeast strain used and the process parameters. Traditionally, top-fermented and bottom-fermented beers are distinguished by the **type of yeast and the fermentation temperature applied**.

The choice of fermentation temperature is a critical factor, generally ranging between **8°C** and **28°C**. Higher temperatures **accelerate** the process but may also lead to a greater concentration of by-products - whether desirable or not - that influence the beer's flavour. During maturation, yeast activity is significantly reduced, and the yeast can be removed through sedimentation.

Another important factor to consider is the **alcohol tolerance** of the yeast strains used during **fermentation** and **refermentation**. Alcohol is toxic to yeast, and **each strain has its own level of resistance**.

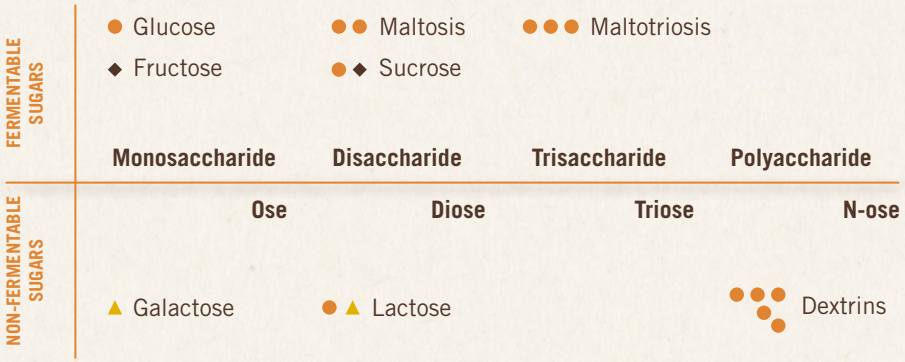
ALCOHOL TOLERANCE (%) OF DIFFERENT BREWLINE ADY (ACTIVE DRY YEASTS)



SUGARS INVOLVED

Beer yeast strains can use **various carbohydrates**, but there are **differences** between Ale, Lager, and Ale *v. Diastaticus*. A variety of sugars are present in the must:

SUGAR	MOLECULE	ACTION
Glucose	Monosaccharide	It is a unique hexose and is the first sugar to be assimilated by yeast. It is the structural basis of starch.
Maltosis	Disaccharide (2 glucose units)	All our LSAs have intense maltopermease activity, which enables maltose to be transported from the must through the cell membrane to the cytosol. The maltose is then hydrolysed into two glucoses by intracellular maltase.
Maltotriosis	Trisaccharide (3 glucose units)	Not all yeasts are capable of metabolising it, mainly bottom-fermenting yeasts, but there are exceptions among brewer's yeasts.
Dextrins	Polymers (multiple units) of glucose in a linear or branched chain	They are only fermented by brewer's yeast in the presence of enzymes that transform them into fermentable sugars. These non-fermentable sugars contribute to the body of the beer.



The must also contains **other functional nutrients** for yeast metabolism, such as minerals, sources of assimilable nitrogen (amino acids, ammonium ions, peptides) which are used by the yeast for **growth**, **protein synthesis** (structural and enzymatic) and **flavour precursors**.

OUR YEASTS

Brewline® develops and offers **bottom** and **top fermenting** yeasts. Their profiles allow the brewer to chose within different options, from the classicism of a lager or a white beer, to very distinct strains in esters and higher alcohols to **compose beers under optimal and reproducible fermentation conditions**.

The main strains were characterised in collaboration with the «**Brewing Sciences and Fermentation Technology**» department of the Institut Meurice in Brussels.

OUR BOTTOM FERMENTATION YEASTS (500G)

CLASSIC LAGER

Classic Lager is a true «must» for producing Helles, Pilsner, Schwarzbier, Bock, India Pale Lager, and Dopplebock. A delicate strain, capable of **highlighting the organoleptic qualities of the malts and hops selected** by the brewer.

It presents excellent alcohol tolerance (HGB up to18°P) and excellent flocculation.

HIP-HOP LAGER

Hip-Hop Lager is a **flexible** yeast, ideal for standardizing production in the brewery. It is able to ferment at **different temperatures**.

- **From 12 to 15 degrees:** round beers with a neutral Berliner-type profile.
- **From 15 to 17 degrees:** Altbier, Kölsch, Steam Beer.
- **From 18 to 22 degrees:** perfectly accommodates beers with cold hopping (IPA, NEIPA).

OUR TOP FERMENTATION YEASTS (500G)

POP ALE

Pop Ale is the ideal yeast for producing various styles of top-fermented beer. It ensures respect and expression of the brewer's recipe thanks to its neutrality and **slight fruity notes**.

It brings **harmony** to your beer. Ideal for producing Golden Ale, Bitter Ale, Amber Ale, IPA, APA, Porter, and Stout....

ROCK ALE

Rock Ale is a fast-fermenting yeast that has already won over many Craft brewers with its great aromatic intensity and **fruity**, **floral**, and **spicy notes**.

Its aromatic profile, good attenuation, and low sedimentation make it ideal for producing light and refreshing beers such as Wheat, Saison...

FOLK ALE

Folk Ale is a strain suitable for Belgian-style beers. It produces **floral** and **spicy esters**. Its **authentic** profile and average attenuation guarantee the smoothness and **roundness** of your beers.

Tailored for specific beers production.

JAZZ SOUR

Jazz Sour (*Lachancea Thermotolerans*) is a yeast that enables the production of **sour** beers.

It is able to **ferment your must** to produce **lactic acid** and **alcohol**. Lactic acid production mainly occurs during the first days of fermentation.

This lactic acid brings the **typical freshness** of these beer styles while **limiting the risks of contamination**.

Jazz Sour can also be used in secondary fermentation, after a classic first fermentation (bottom with Classic Lager and top with Pop Ale or Rock Ale).

EXCELLENCE® E2F

Excellence® E2F is a re-fermentation yeast highly appreciated by brewers.

Its characteristics of **tolerance to high concentrations of alcohol** and **CO_2**, combined with its **great aromatic neutrality**, **strong sedimentation**, and **resistance to low pH**, make it an indispensable tool for the re-fermentation of your beers.

Excellence® E2F is used with the addition of sugar, before packaging.

CHARACTERISTICS

YEASTS	FLOCCULATION / SEDIMENTATION	LIMIT ATTENUATION	ALCOHOL TOLERANCE (% VOL. ALC.)	DIACETYL PRODUCTION	FERMENTATION KINETICS	DOSAGE
CLASSIC LAGER	High	82 %	11 %	Low	Rapid 5 days*	80 - 120 g/hL
HIP-HOP LAGER	High	10 - 16 °C : 70 - 75 % 16 - 22 °C : 80 - 85 %	8,5 %	Low	Rapide 4 - 7 days*	
POP ALE	High	78 - 82 %	8,5 %	Low	Rapid 4 - 7 days*	50 - 100 g/hL
ROCK ALE	Low	85 %	7,5 %	Low		
FOLK ALE	High	75 - 80 %	11 %	Low		
JAZZ SOUR	High	75 %	7 %	Low	Slow > 10 days*	80 - 120 g/hL
EXCELLENCE E2F	High	85 - 90 %	17 %	Low	Depending on T°C conditions 2 - 5 days	2 - 10 g/hL

***TEST CONDITIONS:**

12°P must, inoculated at 80 g/hL and primary fermentation at 20°C

HOW IS ACTIVE DRIED YEAST (ADY) USED?

1. **Rehydrate** the dry yeast by **dispersing it evenly in water** or in a **sterile must** equal to **10 times its weight**, at a temperature of between **10 and 28°C** depending on the fermentation temperature.

2. **Leave to stand** for around **15 minutes**, **stirring gently** from time to time.

3. Finally, the cream obtained is **inoculated** into the fermentation tank.

   The aim of rehydration is to allow the yeast to **restore all its metabolic functions** before inoculation.

- **ALE yeasts :** 50 - 100 g/hL
- **LAGER & SOUR yeasts :** 80 - 120 g/hL

WATER OR MUST?

All our LSAs can be rehydrated with **water** or **must**, but particular attention must be paid to the **sterility of the medium used**.

However, wherever possible, rehydration in **2/3 sterile** water and **1/3 sterile hopped must reduces the osmotic difference** between the rehydration medium and the must and **takes advantage of the isoalpha acids** present in the medium to **protect it against the growth of Gram-positive bacteria**.

DOSAGE OF INOCULUM

Correctly dosing the yeast at the time of inoculation enables **rapid fermentation**, which **reduces the risk of contamination** and **improves the reabsorption of by-products** and **flocculation.**

MUST OXYGENATION

Our LSAs are sufficiently rich in the sterols (lipids) and minerals needed for cell reproduction, so they do not **require must oxygenation**. Oxygenation is necessary when yeasts are recovered and re-inoculated over several generations.

FERMENTATION TEMPERATURES

Follow the fermentation temperatures suggested in the technical data sheets for our LSAs. The higher the temperature at the start of fermentation, the faster it will start.

- For top-fermenting yeasts, a diacetyl reduction period of **24 hours at 23°C** before cooling is recommended.

- For bottom-fermenting yeasts, the recommended diacetyl reduction period is **48 hours at 16-18°C**.

At the end of fermentation, low temperatures (0-6°C) are essential for good yeast sedimentation.

YEAST RECOVERY

Yeast recovery requires **specific equipment**, **advanced technical skills** and a **totally sterile environment**. A viability test must be carried out and the dosage calculated on the basis of the live cells required at the start of fermentation.

After a few generations, it is possible to create **genetic variants**, which can **alter the organoleptic profile** of the beer. The maximum number of generations depends strictly on the process and assessments of product uniformity.

MATURATION IN BOTTLE OR BARREL

Yeast is used for refermentation in bottles or kegs. Although the main aim is to **saturate the beer with CO_2**, refermentation has **other advantages**.

Firstly, the presence of live yeast in the bottle or cask **protects the beer from oxidation** and **improves its keeping qualities**. Before refermentation, you need to consider:

- Yeast tolerance to high levels of alcohol and CO_2
- Its ability to develop aromas that can create organoleptic variations in the product
- Its ability to settle and remain at the bottom of the bottle or barrel at the end of refermentation
- Its sugar assimilation profile

At the end of primary fermentation, the yeast has generally exhausted its capacity, so we do not recommend using it for a new fermentation. The **addition of sugar** should be calculated **according to the amount of carbon dioxide** you wish to have in the finished beer, bearing in mind that **2g of sugar** provides around **1g of CO_2**.

TO KNOW

Excellence® E2F is our LSA specially designed for refermentation. Its tolerance of high concentrations of alcohol and CO_2, combined with its great aromatic neutrality, high sedimentation and resistance to low pH, make it an indispensable tool for refermenting your beers. Please note that this yeast is not suitable for primary fermentation due to its inability to reduce complex sugars.

FLOCCULATION

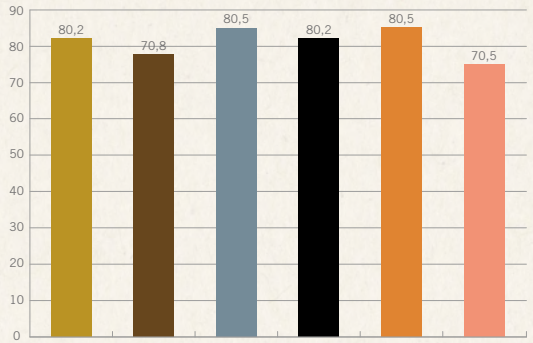
Flocculation is the ability of yeast cells to form aggregates. The more **flocculent** the yeast, the **clearer** and **more easily filtered the beer.**

A minimum concentration of **100 mg/L $Ca^{2}+$** is essential for good flocculation.

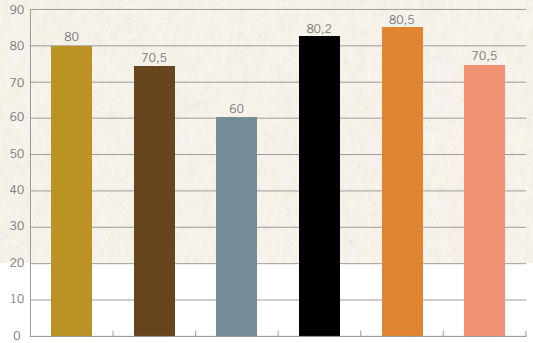
LIMIT ATTENUATION (%) AND FLOCCULATION OF BREWLINE LSAS

Pop Ale | Folk Ale | Rock Ale | Classic Lager | Hip-Hop Lager | Jazz Sour

ATTENUATION



FLOCCULATION



THE AROMAS OF BEER

The aromatic profiles of beer depend mainly on the **biochemical activities within the yeast cell during fermentation**, as well as on the **other raw materials** and **process parameters**.

Aromatic compounds derived from yeast include carbonyls (aldehydes/ketones), proketones, fatty and organic acids, sulphur compounds, higher alcohols/fuselols and esters (acetates and ethyl esters).

Esters, for example, are a family of compounds closely linked to **lipid metabolism** and **yeast growth**; there are dozens of different esters present in beer. They are responsible for **fruity** and **floral notes**.

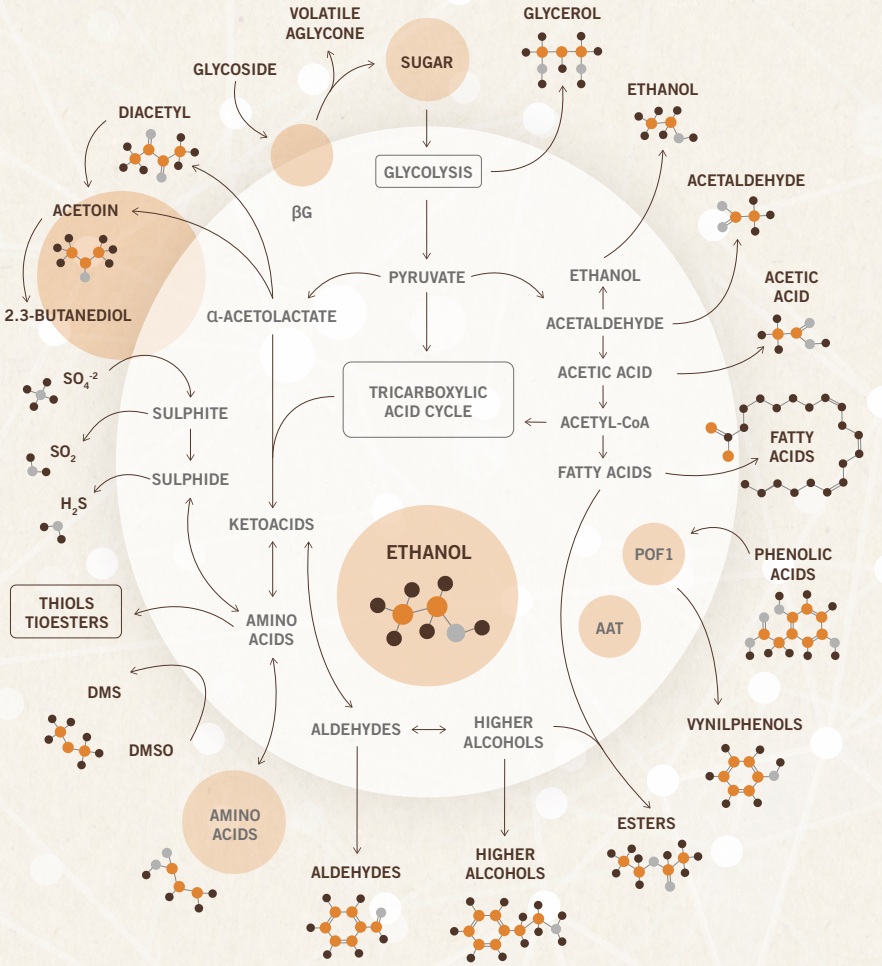
THERE ARE TWO MAIN GROUPS:

- **Acetate esters**, in which the acid group is **acetate** and the alcohol group is **ethanol** or a complex alcohol derived from the metabolism of amino acids. Examples include ethyl acetate (solvent flavouring), isoamyl acetate (banana flavouring) and phenylethyl acetate (roses, honey).

- **Ethyl** esters (where the alcohol group is ethanol and the acid group is a medium-chain fatty acid) include ethyl hexanoate (aniseed and apple flavour), ethyl octanoate (fruity, apple flavour) and ethyldecanoate (floral/fruity).

The quantity and/or variety of aromatic compounds in beer depends on the **metabolism of a given yeast strain**, **the composition of the must** and the **process parameters**. The effect of some of these aromatic molecules can be pleasant.

COMPOUNDS PRODUCED BY YEAST DURING BEER FERMENTATION



BREWLINE YEAST REPERTORY

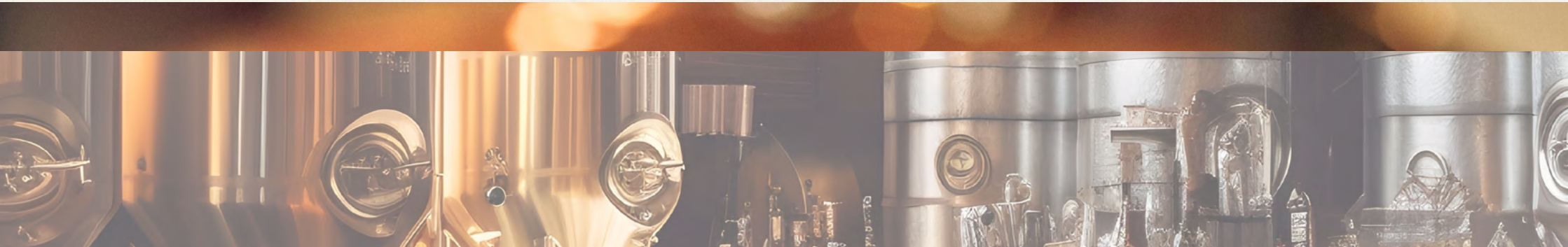
	YEASTS	BENEFITS	TYPES OF BEERS
BOTTOM FERMENTATION	**CLASSIC LAGER**	A delicate strain for the production of Bavarian-style lagers or Pilsners. Excellent alcohol tolerance.	Helles, Pilsner, Schwarzbier, Bock, India Pale Lager, Dopplebock...
BOTTOM FERMENTATION	**HIP-HOP LAGER**	Originally developed for lager production, this strain creates an ideal balance between esters and higher alcohols, including for ales fermented above 20°C.	Depending on the fermentation level: Altbier, Kölsch, Steam Beer, India Pale Ale, American Pale Ale...
TOP FERMENTATION	**POP ALE**	For your finest ales, the Pop Ale yeast offers subtle fruity notes and brings true harmony to your beer.	Golden Ale, Bitter Ale, Amber Ale, IPA, APA, Porter et Stout...
TOP FERMENTATION	**ROCK ALE**	Great aromatic intensity with fruity, floral, and spicy notes. This yeast has been consistently awarded medals thanks to the excellent recipes created by brewers.	Belgian specialty beer, Saison, NEIPA...
TOP FERMENTATION	**FOLK ALE**	Floral and spicy esters, between Trappist and abbey profiles. It pairs ideally with Pop Ale or Rock Ale yeast to ensure a residual attenuation of > 25%.	Tripel, Belgian Strong Ale, Blonde...
TOP FERMENTATION	**JAZZ SOUR**	*Lachancea Thermotolerans* yeast for producing tart and refreshing beers.	Sour beers, such as: Berliner Weisse, Gose, Sour IPA, Stout...
TOP FERMENTATION	**EXCELLENCE E2F**	Yeast for bottle conditioning beers. Selected for its resistance to pressure and alcohol, as well as its aromatic neutrality and ability to flocculate.	Bottle conditioning for all types of beers.

Through this booklet, Brewline® hopes to have provided you with information on understanding the role of yeast and some tips on how to **best express** its influence on beer. Our technical services are **at your disposal** for further information and technical support.

FOR MORE INFORMATION ON OUR PRODUCTS:

SITEWEB

CATALOG



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