



BrewTimes™

FEBRUARY 2024



BALAJI ENZYME & CHEMICAL PVT LTD

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Introducing BrewTimes :

We **M/s Balaji Enzyme & Chemical Pvt Ltd**, are pleased to bring to you our February 2024 month edition of BrewTimes.

We would like to use this platform to introduce our association with BetaTec, UK for their natural solutions for ethanol recovery in grain and molasses distilleries. The product is revolutionary and unlike any in the market is 100% natural and antibiotics free. Vitahop series of products helps in ensuring optimum yield and keeps the yeast healthy all naturally.

We are extremely proud of announcing our association with IIT Bombay Research Park. We have begun a journey together to work on sustainable, reliable and innovative solutions for the Food and Beverage Industry.

About Our Company :

We **M/s Balaji Enzyme & Chemical Pvt Ltd** are a leading supplier of Enzymes, Filter aid, Yeast, Hops, Processing aids, Clarifiers and food fortification products to breweries, distilleries, malt extract industry, starch industry, juice and beverage industry, and other food industry.



HopAid® Antifoam

Purpose

HopAid® Antifoam is used during fermentation to prevent excessive foam formation. It can be used for top and bottom fermented beers in all kinds of fermenters. Produced with deionised water and hop extract is considered food safe in both USA (GRAS) and EU.

Product Specifications

Appearance:	Creamy pale yellow emulsion
Odour:	Slight odour of hops
Solids:	< 12%
Yeast and Moulds*:	< = 10 cfu/g
TVC*:	< = 100 cfu/g
Centrifuge Test:	Pass / Fail

* Values monitored on a regular basis but not on every batch.

Composition

Ingredient	Range
Hop Extract fraction	5 – 10 %
Food grade emulsifier	0.1 – 2 %
Water	Balance

Application

HopAid® Antifoam should be dosed into cold wort. Either inline or, alternatively, dosed into the fermenter before the cold wort is transferred. This will ensure good mixing with the wort which is essential for optimum performance. Dosing into hot wort will lead to unpredictable losses in the hot trub.

Depending on the brewing recipe and fermentation regime the dose rate for most applications will lie between 5 and 50 g/hL. For a normal strength lager type a starting dose rate of 20 g/hL is recommended. However, fermentations with high levels of foam stabilizing substances such as hop acids and proteins, dark malts and higher fermentation temperatures may require higher dosing

rates. Products with high levels of adjuncts may require lower levels of HopAid® Antifoam addition. If the brewer is using a synthetic, silicone based product the dose rate can be used as an indication. In most cases HopAid® Antifoam should be dosed at 2x the concentration as the Silicone based product.

Effect of HopAid® Antifoam on the final beer

Technical studies and feedback from customers have not shown a negative impact on final beer foam, in fact some data suggest a positive one.

HopAid® Antifoam: Yeast and pH

Yeast removes the vast majority of the active components by adsorption on to the cell wall. Any remainder may be removed by filtration.

HopAid® Antifoam is incompatible with strong acids and bases.

Strong acids and strong bases will damage the antifoam, so HopAid® Antifoam should not be added to yeast directly after acid washing of the yeast. Beer pH is fine.

Trial Design:

The trial should consist of 2 initial trial fermentations, both with the same volume of wort and in tanks with the same dimensions. To the first fermentation no HopAid® Antifoam should be added (control sample) and the foam height should be monitored. Ensure that the tank is big enough to include the foam built in the control sample. The second fermentation with HopAid® Antifoam, added in the recommended starting dose rate, should use the same wort volume. To understand the required dose rate and the effects of HopAid® Antifoam, it is important to measure the following attributes if possible:

- Foam height in fermentation tank
- IBUs of the beer
- % of attenuation
- Beer foam stability

Safety

There are no known health hazards for this product. Please consult safety data sheet for full information.

Packaging

HopAid® Antifoam Antifoam is packaged in 1 kg Tetrapacks and 10 kg aluminium foils.

Transport

Transport temperatures should be maintained above 0°C to ensure the product does not freeze

Storage

Ideally store away from direct sunlight and between 5°C and 20°C if unopened. HopAid® Antifoam can be stored in the original unopened containers for up to 15 months. Do not freeze as this will cause the emulsion to collapse. If this occurs the product can be redispersed by shaking to restore its antifoam capacity. Open containers should be stored cool (+5°C) and used within 2 days.



INTRODUCING FLEX®

Flowable for Efficiency and Flexibility



John I. Haas, Inc. and the Barth-Haas Group introduce FLEX, a beer bittering hop product that provides improved brewhouse efficiency and flexibility. FLEX is designed to reduce wort losses and provide the clean bittering you need for your beer in a convenient, easy to use form. FLEX is formulated purely from hops and is an excellent alternative to standard and concentrated hop pellets and powders. Contact your Barth-Haas Group sales representative to request a trial sample.

For more than 100 years, Haas and the Barth-Haas Group have been providing innovative hops and hop products that help brewers brew great beer. It all begins with the finest hops that we source directly from our own Haas farms as well as our trusted network of growers. From there we use our proprietary technology, and decades of processing expertise, to produce quality hop products

that brewers demand. Our attention to detail during every step of the process, from the bale – to the industry's best pellets – to our reliable CO₂ technology, is what defines Barth-Haas as a leader in hop innovation. FLEX is the result of listening to brewers and your ever increasing need to effectively and efficiently brew great beers.



**FLEX is another example of the quality and innovation
that goes into every hop product we make.**

HIGH ALPHA ACID CONCENTRATION

FLEX contains approximately 65% alpha acids and provides greater efficiency in shipping and storage as compared to standard pellets and powders.

CONVENIENTLY POURABLE

Our proprietary processing technology results in a CO₂ hop resin with low viscosity at room temperature that makes it easy to measure and dose.

NO HOP SOLIDS!

With FLEX you needn't worry about costly losses and waste disposal associated with wort retention in hop solids. In addition, you'll avoid poor whirlpool performance due to excess trub.

HIGH BITTERNESS UTILIZATION

Because the alpha acids from FLEX are dosed in a liquid form, bitterness utilization is typically improved over T90 hop pellets by 10-20% (relative).

NOTHING BUT PURE HOPS

FLEX is formulated using only hop lupulin components in their native form.

**NO SPECIAL DOSING REQUIREMENTS
OR CALCULATIONS**

It is recommended that FLEX be dosed directly to the brew kettle at the beginning of boil. Use a typical formula for alpha dosing assuming 35% utilization to the final beer; adjust as needed.



BREWING BRILLIANCE: ENZYMES THAT SHAPE THE PERFECT BEER



BIJAY BAHADUR

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Introduction

Enzymes are catalysts that accelerate chemical reactions without altering their nature or structure. In brewing, they play a crucial role in converting cereals into beer. Barley malt is traditionally used as a source of enzymes for this process. Extreme conditions, such as high pH or temperature, can cause enzymes to lose their catalytic activity, a phenomenon known as denaturation. Denaturation can occur when wort is subjected to high temperatures, impacting the effectiveness of enzymes.

Key enzymes in brewing include amylase, protease, and β -glucanase. Amylases, like α -amylase and β -amylase, work simultaneously during wort production to break down starch into fermentable sugars, with optimal activity between 60-70°C. Proteases decompose proteins, releasing amino acids essential for yeast metabolism and beer quality— β -glucanase acts on gum materials in malt, improving wort viscosity and beer clarity.

Insufficient enzyme activity in the mash can lead to undesirable consequences, such as low extract yield, prolonged wort separation, slow fermentation, reduced alcohol production, lower filtration rates, and inferior beer flavor and stability. Enzymes from sources other than malt can be used during brewing, but their effectiveness depends on various factors and must be determined by brewers in their specific conditions.

Like break bright enzymes, protein coagulants are added to remove free-floating proteins from the brew. They bind proteins into coagulant masses that sink to the bottom, facilitating their removal. To understand the impact of enzymes on wort production, tests are conducted with additions of β -glucanase and break bright enzyme, measuring viscosity, filtration time, and wort turbidity. The goal is to investigate the influence of enzymes on wort quality and determine the optimal quantity for enhancing characteristics.

Enzymes in Brewing

Enzymes work their magic within the brewer's cauldron, each with a unique talent and temperament. Key to the beer-making process, enzymes operate in four main stages:

germination, mashing, fermentation, and clarification. Like a conductor deciphering a complex score, the brewer must understand the intricate dance of enzymes, with each enzyme thriving at a specific temperature (see Figure 1).

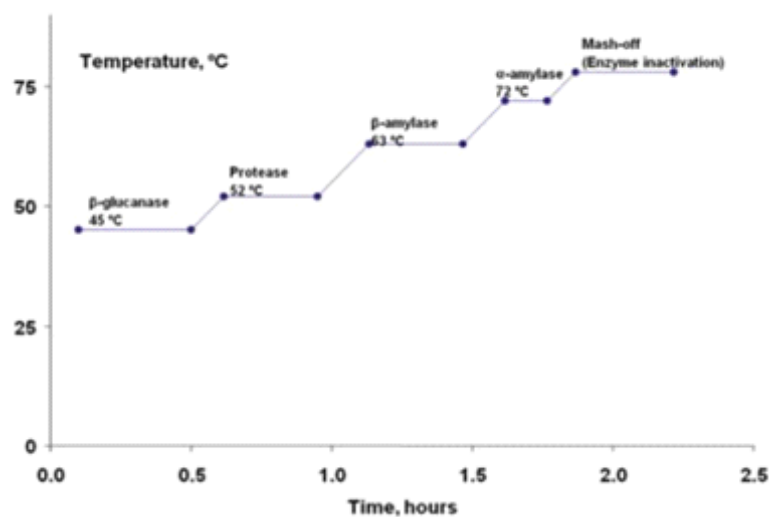


Figure 1: Optimum temperatures for different malting Enzymes

The brewing universe revolves around four powerhouse enzymes: beta-glucanase, protease, alpha-amylase, and beta-amylase. These enzymes, whether native or commercial, play a pivotal role in enhancing beer quality. Commercial enzymes, offering extra attributes like clarification, color, texture, or flavor, become indispensable when barley mashing falls short, jeopardizing starch breakdown and yielding low-quality beer and reduced output.

During malting, the dynamic trio of proteases, glucanases, and xylanase breaks down β- glucans, fibers, and proteins. Post-starch gelatinization, amylases kick in, driving liquefaction and saccharification processes, yielding sugars ready for fermentation. In the fermentation phase, the recycling of α-amylase and β-glucanase enhances fermentation yield and filtration.

To elevate beer quality, additional enzymes like alpha acetolactate decarboxylase (ALDC) expedite fermentation by reducing time, while commercial proteases maintain beer clarity during cooling and chilling. Table 1 concisely summarizes various brewing enzymes and their sources, unlocking the secrets to crafting exceptional brews.

Enzyme	Sources	Process	Function
α-amylase	Endogenous in the barley kernel. Bacillus licheniformis Bacillus subtilis	Malting	Starch hydrolysis
		Mashing	Improve Clarification
β-amylase	Endogenous in the barley kernel. Wheat Kernel Bacillus licheniformis	Malting	Starch hydrolysis
		Mashing	Improve malting Improve Saccharification Increase fermentation yield
β-glucanase	Endogenous in the barley kernel. Trichoderma sp. Orpinomyces sp.	Malting	Improve malting
		Mashing Fermentation	Lower Viscosity Improve Clarification Aid in production of a clear wort
Fungal α-amylase	Aspergillus sp.	Fermentation	Increase fermentation yield
Protease	Endogenous in the barley kernel. Aperguillus sp. Pineapple latex	Malting	Improve malting
		Mashing Storage	Improve fermentation Improve clarification Improve chilling and storage quality
α-acetolactate-decarboxylase (ALDC)	Bacillus subtilis recombinant	Fermentation	Reduce fermentation time
Amyloglucosidase	Aspergillus niger	Mashing	Increase the amount of glucose in wort

Table 1: Brewing Enzymes and their Effects

Beta glucanase

Beta-glucanase, a crucial enzyme in brewing, shines during malting and mashing. It cracks open starch granules during gelatinization, granting other enzymes access to the tasty sugars. Its specialty? Cleaving the beta-glycosidic bonds in glucans improves the flow of wort and reduces viscosity for lighter beers. While barley naturally produces some helpful glucanases (endo-b1, 3-1, 4-glucanases, to be precise), brewers often add commercially sourced varieties for consistent results. These microbial superstars contribute to lighter beers with lower carbs and faster maturation times.

Beyond its core functions, beta-glucanase works its magic on texture and light. While craft beers may celebrate their cloudy charm, commercial beers often benefit from clarification. Beta-glucanase tackles the haze head-on, dissolving protein clumps clinging to polyphenols, glucans, and starch. Brewers typically add 0.3-1 kg per ton of wort for optimal performance. Remember, this enzyme thrives at a pH of 6.0 and a temperature range of 45-50°C, so keeping things right is critical. And like any diva, it throws in the towel at 60°C.

Amylase

Amylases, vital in the malting and brewing processes, break down starch into fermentable forms. The malting process employs alpha and beta amylases to convert starch into dextrins, oligosaccharides, maltose, and glucose. Alpha amylase targets the internal α (1-4) glycosidic bonds in amylose and amylopectin, while beta amylase focuses on the external α (1-4) glycosidic bonds, producing maltose.

In brewing, these enzymes are released during the malting process, continuing to hydrolyze starch during mashing, ultimately creating a simple sugar solution ready for fermentation. Amylases, particularly alpha-amylase, play a role in increasing carbohydrate yield in light beers during fermentation. The control of amylases is critical for beer quality and alcohol content. Higher sugar concentrations increase ethanol, while lower sugar levels produce lower alcohol content.

Alpha and beta amylases operate optimally under different conditions. Beta-amylase functions best at pH 5.5 and 63°C, while alpha-amylase has a higher optimum temperature at 74°C and a lower pH of 5.2. Using commercial amylases, such as those from *Bacillus Subtilis*, in conjunction with endogenous enzymes can impact the ratio of fermented and unfermentable carbohydrates. Manufacturers recommend specific dosages for optimal starch liquefaction, with alpha-amylase requiring 1-2kg per ton of barley and beta-amylase needing external doses based on the starch source, especially vital in saccharification. Mastering the control of these enzymes is crucial in shaping the desired characteristics of the final brew.

Proteases

Proteases, a group of enzymes, play a crucial role in brewing by breaking down peptide bonds in proteins. Their primary functions include protein digestion for clarification and aiding in malting. By enhancing protein solubility, proteases reduce beer viscosity and create optimal conditions for yeast growth by providing essential free amino nitrogen. During mashing, proteases soften the kernel layer and make accessible starch to mashing enzymes, improving wort fermentability.

Careful protease monitoring is vital, as it can impact foam quality, a desirable characteristic in most beers. The optimum brewing temperature for protease is 52°C, deactivating at 70–75°C. Despite a preference for acidic pH, protease can still function at high pH levels, even up to 10. While naturally present in barley, external commercial protease is often necessary for maintaining beer quality, especially with lower-quality starch. Overdosing protease can lead to enzyme degradation and foam instability, emphasizing the importance of adhering to recommended dosages, typically between 0.3–1 kg per ton of barley. Mastering the art of protease use is critical to unlocking its benefits without compromising beer quality.

Additional enzymes used in brewing

In the dynamic world of brewing, cutting-edge enzyme technology significantly contributes to ensuring consistent beer quality throughout the brewing process. Beyond the conventional enzyme players, modern brewing harnesses additional enzymes to achieve and maintain optimal beer quality during processing, storage, and transportation.

Among these enzymes are ficin and papain, extracted from plants like figs and Pawpaw latex, classified as proteases. Commercially available, these enzymes serve as chill-proof agents, effectively hydrolyzing proteins responsible for chilling haze. By removing high molecular weight polyphenols and polypeptides through hydrolysis, these enzymes resist high temperatures between 60–65°C and function optimally at typical pH levels for proteases. Dosages for barley brewing typically range from 1 to 2 grams per hectoliter of beer, applied in storage vessels or before filtration.

Another critical enzyme in the beer production flowchart is alpha-acetolactate decarboxylase, an innovative solution for large-scale production. Essential for reducing production time and enhancing yield without compromising quality, alpha-acetolactate decarboxylase catalyzes the conversion of α -acetolactic acid to acetoin by breaking down the molecule in α -acetolactate. This enzyme facilitates faster fermentation by operating optimally at temperatures between 25 and 40°C and within a pH range of 5 to 7. Manufacturers recommend doses ranging from 1 to 5 grams per hectoliter during initial fermentation or 0.4 to 1.0 grams per hectoliter post-fermentation.

Conclusion

In conclusion, the integral role of enzymes in modern-day brewing cannot be overstated. Enzymes act as biological catalysts, playing a crucial role in the biochemical and molecular reactions necessary for producing and maintaining various food products, with a particular focus on beer production.

Key enzymes such as amylases, proteases, glucanase, and cellulase are essential in beer production. α - and β -amylase, for example, is vital for the malting and mashing of barley, contributing to increased sugar yield for fermentation. Other carbohydrate enzymes like glucoamylase and pullulanase complementarily enhance glucose production, resulting in higher beer yield. The action of amylases is pivotal in determining dextrins' production levels and wort's fermentability.

Beta-glucanase, crucial for malting, disrupts the cell wall of the kernel and adjunct starch, initiating the release of other enzymes essential for malting. Additionally, glucanase and cellulase reduce viscosity in beer and aid wort clarification. Proteases contribute to improved yeast growth, enhanced malting, and reduced haze during beer storage.

Brewing is a complex process involving critical steps such as malting, mashing, and fermentation. The absence of malting or insufficient commercial enzymes to compensate for malting can lead to inadequate endogenous or external enzymes for starch hydrolysis, malt filtration, and proper fermentation. The sensitivity of these steps highlights the importance of precise enzyme administration, as any under or over-dosage can result in numerous unwanted and undesirable effects.

In essence, the modern brewing industry relies heavily on the intricate interplay of enzymes to achieve optimal outcomes regarding flavor, clarity, and overall beer quality.

References

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3. Application of Enzymes in Brewing, Ahmed M. Gomaa, Journal of Nutrition and Food Science Forecast, 2018
4. Handbook of Brewing, Edited by Fergus G. Priest & Graham G. Stewart

CRAFTING THE PERFECT FRUITY BREW: STANDARD QUALITY PARAMETERS FOR FRUIT BEERS TO MEET CONSUMER EXPECTATIONS



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Introduction

The world of beer has undergone a flavorful revolution with the emergence of fruit beers. Brewers are increasingly infusing their brews with a variety of fruits, creating a diverse and vibrant range of beverages. In this article, we will explore the standard quality parameters that define a top-tier fruit beer and delve into the factors that contribute to meeting the expectations of discerning consumers.

I. Understanding Fruit Beers:

A. Definition and Varieties:

1. Defining fruit beers and their distinct characteristics.
2. Exploring the diverse range of fruits used in brewing.

B. Historical Perspective:

1. Tracing the roots of fruit-infused beers.
2. Evolution of consumer preferences and market trends.

II. Quality Parameters:

A. Flavor Profile:

1. Balancing the essence of the fruit with the beer's base.
2. The impact of different fruit varieties on flavor complexity.

B. Aroma:

1. Importance of a pleasing and inviting aroma.
2. Achieving a harmonious balance between fruit and malt scents.

C. Appearance:

1. Assessing the visual appeal of fruit beers.
2. Clarity, color, and the influence of fruit pigments.

D. Mouthfeel:

1. Examining the texture and body of fruit-infused beers.
2. Achieving a satisfying and well-rounded mouthfeel.

E. Sweetness and Acidity:

1. Striking the right balance between sweetness and acidity.
2. Impact of fruit sugars on the overall taste profile.

III. Brewing Techniques:

A. Fruit Selection and Preparation:

1. Criteria for selecting high-quality fruits for brewing.
2. Different methods of fruit preparation and their impact on flavor extraction.

B. Fermentation Strategies:

1. Yeast selection and its influence on fruit beer fermentation.
2. Controlling fermentation temperatures for optimal flavor development.

C. Blending and Aging:

1. The art of blending fruit flavors for complexity.
2. Influence of aging on the integration of fruit and beer.

IV. Market Trends and Consumer Preferences:

A. Popular Fruit Beer Styles:

1. Analysis of trending fruit beer styles.
2. Consumer preferences and regional variations.

B. Craft vs. Commercial:

1. Differentiating between craft and commercially produced fruit beers.
2. Consumer perceptions and loyalty to craft breweries.

V. Challenges and Solutions

A. Quality Control:

1. Implementing rigorous quality control measures in fruit beer production.
2. Addressing challenges in consistency and batch-to-batch variations.

B. Sustainability Practices:

1. Sustainable sourcing of fruits and its impact on quality.
2. Eco-friendly packaging solutions for fruit beers.

VI. Future Outlook:

A. Innovation in Fruit Beers:

1. Exploring innovative ingredients and brewing techniques.
2. The role of technology in shaping the future of fruit beer.

B. Global Market Expansion:

1. Potential for growth in the global fruit beer market.
2. Emerging markets and consumer demographics.

Conclusion:

As the popularity of fruit beers continues to soar, breweries must adhere to stringent quality parameters to meet the expectations of a discerning consumer base. Balancing flavors, aromas, and appearance while incorporating sustainable practices are key to crafting the perfect fruit beer. By understanding the nuances of brewing techniques and staying attuned to market trends, brewers can ensure that their fruit beers not only meet but exceed consumer expectations, contributing to the ongoing evolution of the vibrant world of craft beverages.

HANDBOOK OF MILLETS AS SUPERFOOD OF INDIA

NUTRELIS AGRO FOODS

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Mashing, a first and really critical step in all grain brewing but A small error in strike water volume or temperature can affect wort sugar concentration to be produce. As we know enzymes from malt convert starch into fermentable sugar by partial hydrolysis reaction at optimum temperature and ph range.

But there is another factor which is really important if neglected can affect mashing efficiency, that is enzyme activity which is measured as total diastatic power in units as degree linter and Windisch-kolbach.

At the time of calculating malt bill if we consider diastatic power in any of above-mentioned units. If we have average value of those, we can estimate mash efficiency and can predict gravity of sugar produced during mashing.

Let's understand it all with an example.

If we are making a beer with using Vienna, Munich and dark speciality malt only. And malt bill is as follows.

Vienna 75 %, Munich 15%, 10 % of dark speciality malt.

And diastatic power value of each malt are 210-degree WK for Vienna and 170- WK for Munich and rest of speciality malt which have been roasted to an extent where no enzymes can survive, we can consider it nil.

So once malt bill is calculated our average diastatic power in WK was 190.43 and if we convert it back to degree linter its 58.98.

So now many brewers will think who cares about diastatic power?

"I just put milled malt into water, follow temperature and ph and that's mashing for me"

But what if we can consider this value to increase mashing efficiency and make more gravity with same malt and ultimately control our production cost.

Now from value of DP in degree linter which was 58.98 we can carry forward our calculation.

Lets suppose with step temperature mashing my total time for mashing was 80 minutes including protein rest and mash temperature during conversion phase was 65 degree Celsius my mash efficiency was only 64.57%. with this 64.57% of mash efficiency, I got 17.31 Plato gravity after mash out.

So now we can relate this thing with DP of 58.98-degree linter we achieved 64.57% mash efficiency and got 17.31 Plato of wort. But what if we increase diastatic power with enzyme supplement.

So, for example with 70-degree linter and following same mashing temperature profile mashing efficiency was increased to 76.63% and that resulted into achieving 20.54 Plato during mash out.

Now we have come to know just increasing DP we have achieved more conversion during mashing process. But how to do it and how to estimate quantity to use.

It's basically really easy and simple to follow

The enzyme supplement I have considered here is "Alphalase Ap4".

It has 12700 LU per gram of alpha amylase activity.

So as per target and current linter values we have estimated 867 gram of Alphalase AP4 for batch of 1000 kg mash size.

Dosage varies as per malt bill style and DP from it and target DP as desired.

For example if want to increase from 68 degree linter to 70 degree linter you just need to used 137 gram of Alphalase AP4 for 1000 kg of malt. We will talk more about it how to use it well to get more gravity and avoid problem during lautering next time , till then cheers.

TECHNICAL NOTE ON WHEAT BEER: BREWING PROCESS, STYLES, AND CHARACTERISTICS



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ABSTRACT

This comprehensive technical note delves into the intricate process of brewing wheat beer, providing an in-depth exploration of its historical roots, ingredients, and diverse styles. Originating from medieval Europe, wheat beer has evolved into a cherished category within the brewing landscape. The note meticulously examines the formulation, emphasizing the interplay between malted wheat and barley malt for optimal flavor balance. The mashing process, characterized by step-mashing techniques, contributes to the development of unique flavors and mouthfeel. The pivotal role of yeast strains, specifically Weizenbier yeasts, and the significance of fermentation temperature control are highlighted for achieving the desired fruity and spicy esters. The note also underscores the restrained hop profile in wheat beers, employing noble hop varieties to complement, rather than overshadow, the delicate wheat malt flavors. Diving into the diversity of wheat beer styles, from the iconic Hefeweizen to the nuanced Dunkelweizen and Belgian Witbier, this technical note explores the unique attributes and characteristics that define each. Aesthetic elements, including the hazy appearance and color spectrum, add visual intrigue to the sensory experience. The aromatic complexity of wheat beers, marked by fruity esters, and the light, refreshing flavor profile with subtle sweetness are examined, providing a comprehensive understanding of the sensory journey. Serving rituals, from glassware choices to garnishes, contribute to the overall appreciation of wheat beer. In conclusion, the technical note emphasizes the enduring popularity of wheat beer, a dynamic and evolving category that continues to captivate beer enthusiasts globally. As brewers innovate and explore, the legacy of wheat beer promises to evolve, ensuring its lasting significance in the diverse realm of craft brewing.

Keywords: Wheat, beer, brewing, malt, grains

INTRODUCTION

Wheat beer, known for its rich history and diverse styles, is a prominent and cherished category within the world of brewing. Wheat beer, a time-honoured libation with roots embedded in the brewing traditions of medieval Europe, has carved a niche for itself in the global beer landscape. Renowned for its refreshing qualities, diverse styles, and nuanced flavour profiles, wheat beer remains a perennial favourite among enthusiasts and connoisseurs.

As we delve into the world of wheat beer, it becomes evident that this libation transcends mere fermentation; it encapsulates centuries of brewing expertise, regional nuances, and a commitment to preserving the essence of tradition. The evolution of wheat beer has witnessed the convergence of art and science, as brewers carefully balance malted wheat and barley, employ unique mashing techniques, and select specialized yeast strains to create a beverage that is not only a testament to craftsmanship but also a sensory delight.

This technical note aims to unravel the complexities woven into the fabric of wheat beer brewing. We will navigate through the diverse styles that have emerged over time, each with its own distinct attributes and cultural influences.

From the initial mashing stages, where the alchemy of enzymes transforms grains into fermentable sugars, to the final pour that reveals a spectrum of hazy hues, every step in the brewing process contributes to the multifaceted identity of wheat beer. The exploration of wheat beer – a libation that bridges the past and the present, a canvas where innovation meets tradition, and a sensory experience that transcends the confines of a glass. This comprehensive technical note delves into the intricate process of brewing wheat beer, exploring various styles, ingredients, and key characteristics.

HISTORICAL PERSPECTIVE

Brewers, grappling with challenges in barley cultivation, turned to wheat, unwittingly laying the foundation for a unique beer style. The 16th-century Beer Purity Law (Reinheitsgebot) in Bavaria inadvertently legitimized the blend of barley and wheat malts, solidifying wheat beer's place in brewing history. Wheat beer traces its roots back to medieval Europe, with notable contributions from German and Belgian brewing traditions. The use of wheat alongside barley brought about a distinctive flavour profile, making wheat beer a staple in the beer landscape.

The centuries that followed witnessed the ascendancy of wheat beer, particularly exemplified by the iconic Hefeweizen style, known for its hazy appearance and distinctive yeast-driven flavors. As brewing practices spread across Europe, Belgium introduced its own twist with Witbier, spiced with coriander and orange peel, showcasing the adaptability of wheat beer to regional preferences.

In contemporary times, wheat beer has become a global phenomenon, transcending its European origins. The craft beer movement has embraced and reinterpreted this historical elixir, experimenting with ingredients and techniques. Wheat beer, once a regional necessity, has evolved into a celebrated style, embodying the enduring spirit of brewing innovation and cultural exchange. As we delve into the technical intricacies of brewing wheat beer, it is essential to recognize and appreciate the rich historical tapestry that has shaped this iconic beverage.

INGREDIENTS AND FORMULATION

The formulation of wheat beer involves meticulous consideration of ingredients. While malted wheat takes centre stage, the inclusion of barley malt is crucial for enzymatic activity. Brewers carefully select these grains to achieve the desired balance of sweetness, mouthfeel, and fermentability.

Brewing wheat beer is an art that begins with a meticulous selection of ingredients and a precise formulation. The distinctive characteristics of wheat beer, including its hazy appearance and unique flavour profile, are intricately tied to the careful balance of grains, hops, and yeast (Rošul et al. 2019).

1. Malt Selection: Central to the formulation of wheat beer is the choice of malted grains. While barley malt is a common ingredient in many beer styles, wheat beer distinguishes itself by the significant inclusion of malted wheat. The ratio of wheat to barley malt varies, influencing the beer's

body, mouthfeel, and overall character.

2. Hop Varieties: Wheat beers typically exhibit a more subdued hop profile compared to other styles. Noble hop varieties, known for their mild bitterness and delicate floral or herbal notes, are often favored. The goal is to complement the malted wheat flavors without overpowering them, allowing the beer's refreshing qualities to shine through. Wheat beers typically showcase a more restrained hop profile compared to other styles. Noble hop varieties are favored for their subtle bitterness and delicate floral or herbal notes, complementing rather than overpowering the nuanced wheat malt flavors.

3. Yeast Strains: The yeast selection is crucial in shaping the distinctive flavors of wheat beer. Specialized yeast strains, such as Weizenbier yeast, contribute fruity and spicy esters, enhancing complexity. The fermentation process, guided by these yeast strains, adds the signature nuances that make wheat beer unique. The selection of yeast strains plays a pivotal role in defining the character of wheat beer. Specialized Weizenbier yeasts, with their ability to produce

fruity and spicy esters, are frequently utilized. Fermentation temperature control is crucial for achieving the desired flavor balance, with recommended ranges between 62-72°F (17-22°C).

4. Adjuncts and Spices: While the core ingredients define the base of wheat beer, some styles incorporate adjuncts and spices for added complexity. Belgian Witbiers, for example, may include orange peel and coriander, imparting citrusy and aromatic notes to the final brew.

5. Water Profile: Water chemistry plays a subtle yet crucial role in wheat beer brewing. Brewers often tailor the water profile to enhance the characteristics of the malted grains and achieve the desired mouthfeel. The mineral content can influence the clarity and overall perception of the beer.

In summary, the art of brewing wheat beer lies in the thoughtful combination of ingredients and the precision of formulation. The selection of malted grains, hops, yeast strains, and potential adjuncts contributes to the unique identity of wheat beer, setting it apart from traditional malt beers (Table 1).

Table 1: Comparison between ingredients and formulation of wheat beer vs. malt bee

Aspect	Wheat Beer	Malt Beer
Malt Composition	Significantly includes malted wheat	Primarily relies on barley malt
Hop Profile	Subdued, with emphasis on noble hc varieties	Varied, can range from subtle to pronounced.
Yeast Selection	Specialized strains like Weizenbie yeast	Broad range, often dependent on the beer.
Adjuncts/ Spices	May include spices like coriander and orange peel	Typically focused on malt and hop flavors
Water Chemistry	Tailored to enhance malted grain characteristics	Considered, but emphasis may vary by style.

MASHING TECHNIQUES (Bush, 2011)

The mashing process in wheat beer brewing is a nuanced procedure. Brewers often employ a step-mash approach, incorporating rests at specific temperature ranges. This method optimizes the enzymatic activity necessary for converting starches into fermentable sugars and contributes to the development of unique flavors.

The mashing process stands as a pivotal stage in the brewing of wheat beer, where the alchemical transformation of grains into fermentable sugars unfolds. Mashing techniques are employed with precision to extract the desired flavors, mouthfeel, and characteristics that define wheat beer.

1. Dual-Grain Bill: Wheat beer's distinctive character is rooted in the use of malted wheat alongside barley malt. The dual-grain bill is carefully balanced, influencing the beer's body, haze, and overall texture. The proportion of wheat to barley can vary, allowing brewers to tailor the recipe to the desired style.

2. Step-Mashing: A hallmark of wheat beer brewing is the utilization of step-mashing techniques. This method involves multiple rests at different temperature ranges during mashing, each activating specific enzymes responsible for different aspects of starch conversion. The initial protein rest breaks down proteins, while subsequent rests in the beta and alpha amylase ranges target starch conversion into fermentable sugars. This stepwise approach contributes to the nuanced flavour development and mouthfeel.

3. Protein Rest: The protein rest, typically conducted at a lower temperature range (around 113°F or 45°C), facilitates the breakdown of proteins. In wheat beer brewing, this is crucial for achieving a desirable haze and enhancing the beer's mouthfeel. It promotes the formation of long-chain proteins that contribute to the characteristic haze associated with wheat beers.

4. Beta and Alpha Amylase Rests: Following the protein rest, step-mashing progresses through temperature ranges conducive to beta and alpha amylase activity. The beta amylase rest (around 140-145°F or 60-63°C) produces fermentable sugars that contribute to the beer's alcohol content. The alpha amylase rest (around 158-162°F or 70-72°C) further breaks down starches, enhancing the body and mouthfeel of the beer.

5. Mashout: The final step in mashing involves a mashout, where the temperature is raised to halt enzymatic activity and facilitate the lautering process. This ensures that the sugars extracted during mashing are preserved and ready for fermentation.

The meticulous application of these mashing

techniques distinguishes wheat beer brewing from other styles. The step-mashing process not only maximizes starch conversion but also allows brewers to fine-tune the beer's characteristics, resulting in a brew with a complex flavour profile, refreshing qualities, and a characteristic haze that is synonymous with many wheat beer styles.

Diversity in Styles: Wheat beer manifests in a variety of styles, each distinguished by specific characteristics. Hefeweizen, with its prominent banana and clove notes, contrasts with the maltier Dunkelweizen. Belgian Witbiers introduce additional elements like orange peel and coriander, contributing to a broad spectrum of wheat beer experiences (Abernathy, 2023).

The world of wheat beer is a canvas painted with a diverse palette of styles, each contributing its unique hues to the overall tapestry of brewing. From the iconic Hefeweizen to the spiced Belgian Witbier, the diversity in wheat beer styles reflects the creativity and regional influences within the brewing community.

1. Hefeweizen: Hefeweizen, meaning "yeast wheat" in German, is perhaps the most renowned style within the wheat beer spectrum. It is characterized by its hazy appearance, a result of suspended yeast, and a prominent yeast-derived flavor profile. Hefeweizens often showcase fruity esters, with banana and clove notes taking center stage. This style is a quintessential representation of Bavarian brewing traditions, capturing the essence of German craftsmanship.

2. Dunkelweizen: Dunkelweizen, meaning "dark wheat," introduces a maltier dimension to the wheat beer family. While retaining the characteristic haze, Dunkelweizens exhibit a darker color and a richer malt profile. The interplay between malted wheat and darker malts imparts caramel and toasty notes, offering a contrast to the lighter and fruitier Hefeweizens.

3. Belgian Witbier: Belgian Witbier brings a Belgian twist to wheat beer, infusing it with spices and

citrusy elements. This style often incorporates ingredients like orange peel and coriander, contributing to a zesty and aromatic profile. The hazy appearance is complemented by a refreshing and slightly tart flavor, making Belgian Witbier a delightful and distinctive variation within the wheat beer family.

4. American Wheat Beer: Across the Atlantic, American brewers have put their spin on wheat beer. American Wheat Beers often showcase a cleaner yeast profile, allowing the malted wheat to take the spotlight. The hop character may also be more pronounced, adding a touch of American craft brewing flair to the traditionally European-inspired style.

5. Weizenbock: Weizenbock represents a robust and higher-alcohol version of wheat beer. This style combines the fruity and spicy characteristics of a Hefeweizen with the strength and complexity akin to a bock. Weizenbocks are characterized by a fuller body, rich maltiness, and a warming alcohol presence.

The diversity in wheat beer styles not only offers a broad range of options for enthusiasts but also showcases the adaptability of wheat as a brewing grain. Each style tells a story of regional brewing traditions, innovative experimentation, and a commitment to pushing the boundaries of what wheat beer can be. Whether sipped in a German beer garden, a Belgian café, or an American craft brewery, wheat beer styles provide a global and flavorful journey for beer aficionados.

Aesthetic Attributes: The visual appeal of wheat beer is notable for its hazy appearance, resulting from suspended yeast and proteins. The color spectrum ranges from pale straw to amber, reflecting the diverse nature of wheat beer styles.

The visual allure of wheat beer is a symphony of aesthetic attributes that sets it apart from other beer styles. From its hazy appearance to the diverse color spectrum, wheat beer captivates the senses even before the first sip, contributing to a

holistic and immersive drinking experience.

1. Hazy Appearance: Perhaps the most distinctive visual trait of many wheat beers is their hazy appearance. This haze is a result of suspended yeast and proteins in the beer, giving it a cloudy and unfiltered look. The haze is not a flaw but rather a deliberate characteristic that enhances the beer's texture and mouthfeel. It has become a hallmark of styles like Hefeweizen, where the yeast is intentionally left in suspension, contributing to both visual and flavor complexity.

2. Color Spectrum: Wheat beer spans a diverse color spectrum, offering a range of hues from pale straw to amber, and even darker tones in styles like Dunkelweizen. The choice of malts, including both barley and wheat, influences the beer's color. Lighter styles maintain a golden to straw-like appearance, while darker styles exhibit richer amber tones. This broad spectrum allows for a visually captivating array of beers within the wheat beer category.

3. Lively Carbonation: Wheat beers are often associated with lively and effervescent carbonation. The bubbles dance in the glass, contributing to a refreshing and crisp mouthfeel. The effervescence enhances the overall drinking experience, creating a lively and dynamic presentation as the bubbles rise to the surface.

4. Head Retention: A well-crafted wheat beer typically boasts a creamy and persistent head. The proteins from the wheat and barley malts contribute to the formation and stability of the foam. The head not only adds to the beer's visual appeal but also releases aromatic compounds, enhancing the overall sensory experience.

5. Garnishes: Traditional serving rituals often include garnishes that further augment the aesthetic attributes of wheat beer. While not universal, adding a slice of lemon or orange to the rim of the glass, especially in styles like Belgian Witbier, introduces a splash of color and citrus aroma. This garnish ritual has become a symbolic

and visually appealing tradition associated with certain wheat beer styles.

In essence, the aesthetic attributes of wheat beer are an integral part of its identity. The hazy, colorful, and lively presentation in the glass sets the stage for the sensory journey that follows with each sip. As brewers craft and enthusiasts savor wheat beers worldwide, these visual elements contribute to the overall enjoyment and appreciation of this diverse and beloved beer category.

Sensory Experience: Aromatically, wheat beers are known for their fruity esters, offering a complex bouquet that varies with the style. The flavor profile is often characterized by a light and refreshing quality, with a subtle sweetness derived from the malted wheat and a harmoniously balanced finish.

The allure of wheat beer extends far beyond its visual appeal, embracing a rich sensory experience that engages the palate, nose, and overall senses. From the moment the first whiff of aroma tantalizes the senses to the refreshing finish, wheat beer is a symphony of flavors, aromas, and textures that captivates beer enthusiasts.

1. Aromatic Complexity: The sensory journey of wheat beer begins with its aromatic complexity. Fruity esters, a hallmark of many wheat beer styles, introduce enticing notes of banana, clove, and other subtle spices. The yeast strains, especially in styles like Hefeweizen, contribute a bouquet of aromas that elevate the drinking experience. The interplay between malted wheat, barley, and specialized yeast strains creates a nuanced and inviting aroma profile.

2. Light and Refreshing Flavor Profile: At the heart of wheat beer's sensory charm is its light and refreshing flavor profile. The inclusion of malted wheat imparts a subtle sweetness, contributing to a smooth and easy-drinking character. The overall mouthfeel is often crisp and effervescent, making

wheat beer an ideal choice for warm days or leisurely enjoyment.

3. Fruit and Spice Notes: Wheat beer styles, particularly Hefeweizen, are celebrated for their distinctive fruit and spice notes. Banana and clove esters, derived from the fermentation process, add layers of complexity to the flavor profile. These elements, while subtle, play a pivotal role in defining the identity of wheat beer and contribute to its broad appeal.

4. Subtle Sweetness: The use of malted wheat introduces a subtle sweetness that balances the overall flavor profile. This sweetness, often perceived as a gentle malt character, enhances the beer's drinkability and complements the fruity and spicy notes derived from the yeast.

5. Balanced Finish: Wheat beer's sensory journey concludes with a well-balanced finish. The interplay of flavors, from the initial burst of fruity esters to the malt-driven sweetness, culminates in a harmonious and satisfying conclusion. The balanced finish is a testament to the craftsmanship in brewing, where each element contributes to the overall enjoyment without overpowering the palate.

6. Effervescence and Mouthfeel: The lively carbonation, a characteristic feature of many wheat beers, contributes to a lively and effervescent mouthfeel. The bubbles dance on the palate, enhancing the overall sensory experience and adding a refreshing quality to the beer.

In essence, the sensory experience of wheat beer is a multi-faceted journey that unfolds with every sip. The aromas, flavors, and textures create a holistic and delightful encounter, making wheat beer not merely a beverage but a celebration of craftsmanship and sensory exploration.

Serving Rituals: Traditionally, wheat beers are presented in tall, narrow glasses designed to accentuate their effervescence. Some styles, such as Belgian Witbiers, may be garnished with a slice

of lemon or orange to enhance the overall sensory experience.

The enjoyment of wheat beer extends beyond the brewing process and sensory experience to encompass unique and cherished serving rituals. These traditions, often steeped in cultural practices and regional customs, add an additional layer to the overall appreciation of wheat beer, creating a holistic and immersive experience for enthusiasts.

1. Glassware Selection: The choice of glassware is a fundamental element of wheat beer serving rituals. Tall, slender glasses, such as the weizen glass or hefeweizen glass, are traditional vessels designed to showcase the beer's effervescence and haze. The shape of these glasses allows for the development and retention of a frothy head, enhancing both visual and aromatic aspects of the beer.

2. Garnishes: Wheat beers, particularly certain styles like Belgian Witbier, are often served with garnishes that complement and elevate the flavor profile. A classic example is the addition of a slice of lemon or orange to the rim of the glass. This garnish introduces citrusy aromas and flavors, enhancing the overall sensory experience. While not universally applied, the practice has become symbolic and is associated with specific wheat beer styles.

3. Pouring Technique: The pouring of wheat beer follows a distinct technique aimed at preserving the beer's effervescence and visual appeal. The beer is typically poured with a bit of yeast sediment, contributing to the characteristic haze. The yeast sediment, often found at the bottom of the bottle, adds complexity to the beer's flavor and aroma, enriching the overall drinking experience.

4. Presentation: Wheat beer presentation goes beyond the mere act of pouring. The visual presentation, complete with the beer's hazy appearance, creamy head, and, if applicable, a garnish, adds to the anticipation and excitement

of the tasting experience. The beer is often presented as a work of art, inviting enthusiasts to savor not just the flavors but also the aesthetics of the brew.

5. Temperature Considerations: Serving wheat beer at the appropriate temperature is a crucial aspect of the ritual. While preferences may vary by style, wheat beers are generally served slightly cooler than room temperature. The refreshing qualities and nuanced flavors are more pronounced when the beer is not overly chilled, allowing the complexities of the brew to shine through.

6. Ceremonial Practices: In some cultural and beer-centric regions, the serving of wheat beer is accompanied by ceremonial practices. This may include specific toasts, customary expressions, or even communal drinking traditions that add a communal and celebratory element to the overall experience.

In conclusion, the serving rituals associated with wheat beer are a testament to the reverence and appreciation for this beloved beverage. From the careful selection of glassware to the artful pouring techniques, each ritual is designed to enhance the sensory journey and provide enthusiasts with a holistic and immersive encounter with the world of wheat beer.

CONCLUSION

In conclusion, this technical note provides a comprehensive insight into the fascinating world of wheat beer. From its historical origins to the meticulous brewing process, diverse styles, and sensory experience, wheat beer emerges as a dynamic and beloved category in the brewing landscape. The careful balance of ingredients, yeast selection, and fermentation control showcased in this note underscores the artistry involved in crafting the unique flavors and characteristics of wheat beer. As a versatile and enduring beverage, wheat beer continues to captivate enthusiasts worldwide, promising a refreshing and nuanced

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Wine production in India has seen many ups and downs in past centuries. We have references of wine in Vedic scriptures, many kingdoms had their various types of wines, and lately British produced wine in India. In 1980 wine production got a reboot in independent India.

Maharashtra, Karnataka and Telangana are India's major wine producing states in India. In Maharashtra, vineyards are found on the Deccan Plateau, around Nashik, Baramati, Sangli, Pune and Solapur.

Nashik is not only the best quality grape growing area in Maharashtra, but it is the largest wine producer in India. Nashik is called as '[Wine Capital of India](#)', as half of the Maharashtra's wineries are based in the district. The wineries from Nashik contribute to a whopping 80% the total sale in the domestic market.

Historical and literary sources may trace wine in India back to centuries BCE, but the origins of the modern Indian wine industry are found in the early 1980s. Mr Shymarao Chowgule and Mr Kanwal Grover, pioneering industrialists and businessmen, started producing their own wines on Indian soil. In 2000, Sula Vineyards, the largest Indian wine producer today, entered the market and changed the scenario of entire wine industry.

Maharashtra was the first state to introduce a wine policy in India in 2001, leading to a large number of new wineries being established. The policy was followed by 3 other states: Madhya Pradesh & Tamil Nadu in 2006, and Karnataka in 2007.

The government of Maharashtra has set up specialized wine parks to ease the winemaking process. Godavari Wine Park, Vinchur, Nashik district and Krushna valley wine park, Sangli. The main objective of developing wine parks is to provide any farmer an opportunity to set up his own winery at less investment. This has resulted into increasing the number of wineries and wine production.

The wine industry in Nashik district has achieved continuous growth with the development of wine quality, production and sales. Along with the favourable conditions for grape cultivation like temperature, soil, rainfall; the foreign collaborations and support from State Government has helped for the progress of wine industry.

Wine Grapes:

Though Bangalore Blue and Bangalore purple are native Indian grapes, many vineyards import grape rootstocks from various parts of the world to produce different varieties of wine grapes. They also have appointed foreign master wine makers and advisors for making world class wines.

The four most significant varieties in terms of quantity produced are Sauvignon Blanc, Chenin Blanc, Cabernet Sauvignon and Shiraz. The versatility of Chenin Blanc and the fruit-forward character of the Cabernet-Shiraz blend, suits the Indian palate. Cabernet-Shiraz is the classic red blend of India with ripe fruits and rich tannins. The less common varieties include Sangiovese, Riesling, Tempranillo, Pinot Noir, viognier, Malbec etc.

Wine Styles:

The Indian and Western styles of wines are quite different. The Indian style includes constantly off-dry wines: suiting the spicy nature of Indian food.

- Indian port: a problematic category for naming and quality reasons, but the thirst of the low-income consumer for sweetness and alcohol.
- wine coolers: fizzy drinks designed to convert beer drinkers.
- sub-entry-level wines: technically maybe flawless but completely unsuitable for the Western palate.

Among the Western styles the range spreads from dry still wines, via blush and sparkling to sweet, late-harvest wines.

Premium wines are often barrel aged with American and French oak casks. There is a growing thirst among Indians for bottle-fermented sparkling wine. Many Western style wines are earning recognition at international wine competitions and are the ones to look out for if you wish to get a taste of Indian wines.

A Few Remarkable wineries in Maharashtra

Sula Vineyards, Soma Vineyards, York wines, Grover Zampa vineyards, Fratelli Wines, Vallone wines, Chandon India, Good Drop wine cellars, Oakwood vineyards, four seasons winery, Reveilo wines, Resvera wines, KLC wines, Indospirts etc. The list is followed by many small wineries with brands in their local market and bulk wine production for other big brands.

The wine drinking culture in India is growing at a certain pace. Market is flooded with various wine brands launched regularly. There are enthusiastic wine producers entering the market and developing boutique wineries. Many wineries are exporting wines all over the globe. The future of wine industry looks bright and sparkling, and it is difficult to cover it in one article. Sante!

UNDERSTANDING THE IMPORTANCE OF YEAST NUTRIENTS IN BREWING

BY AKSHAT JAIN



AKSHAT JAIN

Business Development Manager-Craft Brewing

Introduction:

In the art and science of brewing, yeast is the unsung hero responsible for transforming a sugary liquid into the delightful beverage we know as beer. However, yeast cannot perform its magic without proper nutrition. Just like any living organism, yeast requires essential nutrients to thrive and carry out fermentation efficiently. In this article, we delve into the significance of yeast nutrients in brewing and explore their role in producing high-quality beer.

The Role of Yeast Nutrients:

Yeast is a single-celled organism that metabolizes sugars through fermentation, converting them into alcohol and carbon dioxide. During this process, yeast also synthesizes various flavor compounds and by-products that contribute to the beer's aroma and taste profile. However, to maintain optimal fermentation activity and produce desirable flavors, yeast cells need more than just sugar.

Yeast nutrients serve as vital building blocks for yeast metabolism and growth. These nutrients include nitrogen compounds such as amino acids, vitamins, minerals, and trace elements. Each component plays a specific role in supporting yeast health and fermentation performance:

Nitrogen Compounds: Yeast requires nitrogen for the synthesis of proteins and other essential molecules. Amino acids, which are the building blocks of proteins, are particularly crucial. Nitrogen deficiency can lead to sluggish fermentation, off-flavors, and incomplete attenuation. Common nitrogen sources used in brewing include ammonium salts, diammonium phosphate (DAP), and yeast extract.

Vitamins: Yeast relies on vitamins for various metabolic processes, including energy production and cell growth. B vitamins such as thiamine (B1), riboflavin (B2), and pantothenic acid (B5) are especially important. Inadequate levels of vitamins can hinder yeast activity and result in stuck fermentations or off-flavors.

Minerals and Trace Elements: Minerals like zinc, magnesium, and potassium play essential roles in enzyme activation, pH regulation, and osmotic balance within yeast cells. Trace elements such as copper, manganese, and molybdenum are also required in small amounts for specific enzymatic reactions.

Deficiencies in these minerals and trace elements can compromise yeast health and fermentation efficiency.

Yeast Nutrient Sources:

Brewers have several options for providing yeast nutrients during the brewing process:

Wort Composition: Malted barley, the primary ingredient in beer, contains nitrogen compounds and other nutrients that can support yeast growth. However, the availability of these nutrients varies depending on factors such as malt quality and mashing conditions.

Yeast Strain Selection: Different yeast strains have varying nutrient requirements and sensitivities. Some strains may perform well with minimal supplementation, while others benefit from additional nutrients to reach their full potential.

Commercial Yeast Nutrient Blends: Many brewers opt to supplement their wort with commercial yeast nutrient blends formulated specifically for brewing applications. These blends often contain a balanced combination of nitrogen compounds, vitamins, minerals, and trace elements to support robust fermentation.

Yeast Rehydration: When rehydrating dry yeast before pitching, brewers can add nutrient supplements to the rehydration water to ensure yeast vitality and reduce stress during the initial stages of fermentation.

Conclusion:

Yeast nutrients play a critical role in shaping the fermentation process and influencing the final characteristics of beer. By understanding the importance of nitrogen compounds, vitamins, minerals, and trace elements, brewers can optimize yeast health and fermentation performance, leading to consistently high-quality brews. Whether through wort composition, yeast strain selection, or commercial nutrient supplementation, providing adequate nutrition for yeast is essential for unlocking the full potential of the brewing process.



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Savoring Tradition: The Art of Mulled Wine

Introduction:

As winter blankets the world in a chilly embrace, there's a comforting ritual that warms both the body and soul – the indulgence in mulled wine. Originating from ancient times, mulled wine has traversed centuries, evolving into a beloved winter tradition that brings people together in the spirit of warmth and celebration.

History and Origins:

Mulled wine has a rich history that can be traced back to the second century, where it was first concocted by the Romans. Originally known as "hippocras," it was a mixture of wine, honey, and various spices. The name 'mulled wine' itself is derived from the Old English word "mull," meaning to heat, sweeten, and flavor.

Ingredients and Preparation:

The beauty of mulled wine lies in its simplicity and versatility. While there

are countless variations, the basic recipe involves red wine, sweeteners such as honey or sugar, and a harmonious blend of spices. Common spices include cinnamon, cloves, star anise, and citrus peels. Some recipes also incorporate additional ingredients like nutmeg, cardamom, or ginger, allowing for a personalized touch.

The preparation process is straightforward. The chosen red wine is gently heated on the stove, avoiding boiling to preserve the alcohol content. Sweeteners and spices are then added, infusing the concoction with a fragrant aroma. Patience is key as the mixture simmers, allowing the flavors to meld into a harmonious symphony.

Serving and Presentation:

Mulled wine is not just a beverage; it is an experience. Traditionally served in mugs or heat-resistant glasses, the warm elixir invites sippers to cradle the vessel in their hands, inhaling the heady



fragrance before taking that first delightful sip. Garnishes such as orange slices, cinnamon sticks, or star anise not only add visual appeal but contribute to the overall flavor profile.

Social and Cultural Significance:

Beyond its delightful taste, mulled wine holds a special place in various cultures and celebrations. In Europe, it is a staple at Christmas markets, where the scent of spices fills the air and mugs are clinked in festive toasts. In Nordic countries, mulled wine, or glögg, is a cherished part of winter festivities, often accompanied by traditional treats.

Health Benefits and Moderation:

While mulled wine is synonymous with winter indulgence, it's essential to enjoy it in moderation. Red wine itself contains antioxidants and polyphenols, which may offer health benefits when consumed responsibly. However, excessive alcohol consumption can have adverse effects, so it's crucial to savor mulled wine in the context of a balanced lifestyle.

Conclusion:

As winter winds howl and temperatures plummet, the allure of mulled wine beckons, inviting us to savor a timeless tradition that transcends eras and cultures. A sip of this aromatic elixir not only warms the body but also kindles the spirit of togetherness, making mulled wine a delightful companion in the chilly embrace of winter.

THE MAGIC OF ROASTED MALT IN BEER

BREWING: A FLAVORFUL JOURNEY



Priyanshi Sharma

Introduction:

In the world of craft brewing, the use of roasted malt is akin to adding a dash of alchemy to the brewing process. This humble ingredient, derived from malted grains, brings forth a spectrum of rich, complex flavors and aromas that define some of the most beloved beer styles. From the velvety darkness of stouts to the robust character of porters, roasted malt is the unsung hero behind many cherished brews. This article delves into the art and science of incorporating roasted malt in beer brewing, exploring its origins, production, and the delightful outcomes it imparts to the final brew.



The Origins and Evolution:

The roots of using roasted malt in brewing can be traced back centuries, where early brewers discovered that subjecting malted grains to higher temperatures transformed not only the color but also the flavor profile of the beer. What started as a means of preserving grains turned into a nuanced practice, with brewers experimenting to achieve distinct tastes. Over time, this technique evolved, leading to the development of specialized roasted malts with varying degrees of roastiness, from pale to chocolate to black.

The Production Process:

Roasted malt is a product of meticulous craftsmanship. The journey begins with malted grains, usually barley, which undergoes germination and drying. The grains are then subjected to controlled roasting, a process that accentuates the Maillard reaction and caramelization. This step is crucial, as the level of roasting significantly influences the beer's color, aroma, and taste. Brewers carefully select the type and intensity of roasted malt to achieve the desired characteristics in their brews.

The Impact on Beer Styles:

Roasted malt plays a pivotal role in shaping the flavor profile of various beer styles. In stouts, it contributes deep, dark hues and imparts notes of coffee, chocolate, and caramel. Porters, known for their robust character, owe much of their complexity to the careful addition of roasted malt. Brown ales and certain lagers also benefit from the addition of roasted malt, offering a balance of malt sweetness and roasted bitterness. The versatility of this ingredient allows brewers to craft a wide array of beer styles, each with its unique expression.

Crafting the Perfect Brew:

Brewers often experiment with different types of roasted malt and blending techniques to achieve a precise flavor profile. They may opt for lighter roasts for a subtle toasty character or go for a deep, dark roast to intensify chocolate and coffee notes. The art lies in finding the right balance, ensuring that the roasted malt complements other ingredients and harmonizes with the overall beer composition.



Conclusion:

Roasted malt, with its ability to transform beer into a flavorful masterpiece, stands as a testament to the artistry of brewing. Whether you're sipping a velvety stout by the fireside or enjoying the complexity of a well-crafted porter, take a moment to appreciate the role that roasted malt plays in bringing these brews to life. As craft brewing continues to thrive, the magic of roasted malt is sure to captivate beer enthusiasts and brewers alike, offering endless possibilities for innovative and delicious creations.

A photograph of a neon sign that reads "CRAFT BEER" in red, outlined letters. The sign is mounted on a wooden structure, and the background is dark with some foliage visible on the left.

Understanding DP1 and DP2 in the Glucose Industry



Sales Executive

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Introduction

In the glucose industry, the terms DP1 and DP2 refer to two crucial aspects of glucose production: dextrose equivalent (DE) and its implications in various applications. Glucose, a simple sugar, serves as a fundamental component in numerous industries, including food and beverage, pharmaceuticals, and biotechnology. DP1 and DP2 play significant roles in determining the properties and applications of glucose products. Let's delve into a detailed explanation of these terms and their significance.



1. What is DP1 and DP2?

DP1 (Dextrose Equivalent 1):

DP1 represents the percentage of reducing sugars in a glucose product. It indicates the extent to which a glucose solution behaves like a glucose monohydrate solution concerning its reducing power. Glucose monohydrate ($C_6H_{12}O_6 \cdot H_2O$) serves as the reference substance, having a DE of 100.

DP2 (Dextrose Equivalent 2):

DP2, on the other hand, refers to the percentage of non-reducing sugars in a glucose product. It signifies the presence of disaccharides, primarily maltose, in the glucose solution. Maltose, composed of two glucose molecules, contributes to DP2. In simpler terms, DP2 represents the proportion of maltose in the glucose product.

2. Significance of DP1 and DP2 in the Glucose Industry:

a. Sweetness and Flavor:

DP1 plays a vital role in determining the sweetness of glucose syrups. Higher DP1 values indicate a sweeter taste due to the higher concentration of glucose. In contrast, DP2 contributes to the flavor profile, as maltose offers a distinct taste compared to glucose. Balancing DP1 and DP2 levels is crucial in achieving the desired sweetness and flavor in various food and beverage products.

b. Viscosity and Texture:

The DE of glucose syrups influences their viscosity and texture. Glucose syrups with lower DE values (higher DP1) tend to be more viscous, while those with higher DE values (higher DP2) exhibit lower viscosity. This property is crucial in applications such as confectionery, where the texture of products like candies and gummies relies on the viscosity of the glucose syrup used.

c. Fermentation and Biochemical Processes:

In industries such as pharmaceuticals and biotechnology, glucose serves as a substrate for fermentation and various biochemical processes. The DE of glucose syrups determines their fermentability, with higher DE syrups (higher DP2) being more readily fermentable due to the presence of maltose. This aspect is critical in processes like ethanol production, where the efficiency of fermentation depends on the availability of fermentable sugars.



d. Browning and Maillard Reaction:

During food processing, particularly in baking and caramelization, glucose participates in the Maillard reaction, contributing to flavor and color development. The DE of glucose syrups influences the extent of browning and Maillard reaction products formed during heating. Higher DE syrups (higher DP1 and DP2) tend to undergo more significant browning reactions, resulting in darker color and intensified flavor profiles.

3. Applications in Various Industries:

a. Food and Beverage:

In the food industry, glucose syrups with specific DE values find applications in various products ranging from soft drinks and candies to baked goods and sauces. Different DE syrups offer manufacturers flexibility in controlling sweetness, texture, and flavor, allowing for the production of a wide range of food products with tailored characteristics.

b. Pharmaceuticals:

In pharmaceutical formulations, glucose serves as an excipient in various dosage forms such as tablets, syrups, and injections. The DE of glucose syrups used in these formulations influences factors such as solubility, stability, and taste, thus impacting the efficacy and acceptability of the final pharmaceutical product.

c. Biotechnology:

In biotechnological processes, glucose serves as a carbon source for microbial fermentation in the production of biofuels, enzymes, and other bioproducts. The DE of glucose syrups affects the growth and metabolic activity of microorganisms, thereby influencing the yield and productivity of biotechnological processes.

4. Quality Control and Regulation:

Given the critical role of DP1 and DP2 in determining the properties and applications of glucose products, quality control measures are essential to ensure consistency and compliance with regulatory standards. Manufacturers employ analytical techniques such as high-performance liquid chromatography (HPLC) to determine DE values accurately and monitor product quality throughout the production process.

Conclusion:

DP1 and DP2 are fundamental parameters in the glucose industry, governing the sweetness, texture, flavor, fermentability, and functionality of glucose products. Understanding these parameters is crucial for optimizing product formulations, achieving desired product attributes, and meeting the diverse needs of various industries reliant on glucose as a key ingredient. As technology advances and consumer preferences evolve, continued research and innovation in glucose production and application will further enhance the versatility and utility of glucose-based products in the global market.



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Apex Wine Club India
1 February 2024, Thursday

Information regarding health on alcohol products permits consumers to make informed choices about alcohol consumption. Ireland is the first country in the European Union where all alcohol products will have comprehensive labelling about health impacts due to alcohol consumption. The law will take effect from 22 May 2026 to give time to businesses to adapt.

The Public Health (Alcohol) (Labelling) Regulations 2023 and remaining provisions of Section 12 of Ireland's Public Health (Alcohol) Act were officially signed by Minister of Health Stephen Donnelly on 22 May 2023. According to the regulations, alcohol product labels in Ireland will include important information, such as calorie content and grams of alcohol.

Alcoholic drink providers will be required to display information on product packaging and also to direct consumers to the website of Ireland's Health Service Executive for further information on alcohol consumption. Besides, information will also be made available in pubs and other licensed premises.

The intention behind the new regulations is to empower individuals to make healthy choices with respect to alcohol consumption.





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