



BrewTimes™



DECEMBER 2022



Balaji Enzyme and Chemical Pvt Ltd

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Introducing BrewTimes :

We **M/s Balaji Enzyme & Chemical Pvt Ltd**, are pleased to bring to you our December 2022 month edition of BrewTimes.

It's the end of the year and we would like to Thank our readers/contributors for a successful and eventful year. We would also like to take this opportunity to wish all our readers and valuable customers a Merry Christmas and Happy New Year !!

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.





BEST PRACTICES GUIDE FOR FLEX®

Flowable Hop Product for Beer Bittering

John I. Haas, Inc.



DESCRIPTION:

FLEX® is a special formulation derived from pure hops, and its use is designed solely to provide bitterness to beer. FLEX eliminates a significant amount of the inert materials that come with the vegetative portion of hops and hop pellets, and thereby reduces weight, handling, and residual hop material that needs to be removed from the wort during brewing. The significant benefits from FLEX include its low viscosity, which allows it to be measured and dosed easily in the brewkettle, and the reduction of hop solids from wort, greatly reducing the process loss associated with the absorption of wort by the hop vegetative material.

FLEX is designed for dosage early in the brewkettle boil and because the product provides hop alpha acids the same as those found in whole hops and hop pellets the isomerization of these alpha acids into iso-alpha acids is still necessary by means of the boiling process in the brewkettle.

Switching from whole hops or hop pellets to FLEX will improve the utilization of the alpha acids for beer bittering, and the brewer can take comfort in knowing that the transition can be made with little or no effect on hop aroma.



FLEX has many advantages:

1. It is stable and can be stored for two years with negligible loss of brewing value.
2. Alpha acids utilization using FLEX in the kettle is better than whole hops and hop pellets; typically, between 10% and 20%, relative.
3. FLEX is extremely uniform and pourable at room temperature, with no need for sophisticated dosing equipment.
4. The alpha acids content is within a tight range, targeted at 65%.
5. Shipping, storage weight and volume are substantially reduced as only the hops extracted material is retained and packaged (typically less than 20-25% of the original hop material for high-alpha hops).

One caveat to the above statement: Brewers who use a high volume of hops in their process for beer styles with very high bitterness must be cognizant of the effect of the hop vegetative material on beer flavor. There are various water-soluble components from hop vegetative material that, at high-dosage rates, can contribute additional flavors and mouthfeel effects to the beer. Therefore, when transitioning to FLEX, it is essential that brewers conduct trials to ensure the desirable beer flavor profile be achieved.

Contact your Barth-Haas sales or technical representative to get recommendations for your particular circumstance and the goals you want to achieve.

RECOMMENDED TEMPERATURE RANGE FOR TRANSPORT AND STORAGE:

FLEX is most stable when stored at refrigerated temperatures and its packaging remains intact the colder the storage temperature the better its longevity. However, FLEX tolerates warmer temperatures, e.g. above 25 deg C. for short periods of time, as when staging the product in the brewhouse for a couple of days prior to dosing.

BEST-BY DATES

The best-by date is defined as the date until which that product should perform as expected without concern for product quality, if stored according to recommendations. When FLEX is stored under refrigeration, the product's best-by date is two years from the production date.

The best-by date is not an expiration date, and the product may be perfectly suitable for use past the best-by designation. It is merely the date at which the normal degradation of the components in the product may affect the bitterness potential and physical stability of the product. For many months beyond the best-by date, these deficiencies, if they occur, can be overcome with adjustments to the dosing rate for any diminished bitterness potential.

In addition, product that has been stored past the best-by date can show changes in its aroma profile due to oxidation reactions. Minor oxidation effects are of little or no consequence if the FLEX is used as recommended exclusively for beer bittering (added early in kettle boil).

If questions arise regarding the suitability of FLEX, whether related in regard to temperature extremes or best-by designation, please contact your BHG sales and/or technical representative.



USE OF FLEX

Designed for bittering, FLEX should be dosed into the brewkettle near the beginning of boil, much as is done with whole hops and hop pellets. Unlike whole hops and hop pellets, FLEX disperses much more readily and provides a 10-20% (relative) increase in alpha acids utilization as compared to standard T90 hop pellets. In a typical lager brewing process, the upper limit of alpha acids utilization is about 35% (FLEX to finished beer); hop pellets max out at about 30%.

FLEX contains about 65% alpha acids, thereby providing a five-fold reduction in product weight than the pellet dosing equivalent, and an even more significant reduction in volume. As with whole hops and hop pellets, FLEX should be dosed according to its alpha acids content to achieve the desired bitterness in the beer.

PACKAGE SIZES AND TYPES

FLEX is currently available in convenient 1 kg, 2 kg and 10 kg packages. These packages are re-sealable and recyclable. Larger packaging sizes may become available depending on demand.



TYPICAL ALPHA ACIDS UTILIZATION RANGES FOR HOP PRODUCTS

Whole Hops	15 – 25%
T90 Pellets	20 – 30%
FLEX®	25 – 35%



DOSING PROCEDURES

This is where FLEX really shines its ease of use. If the product has been stored cold, it should be brought to room temperature or above, either by briefly storing at room temperature until attemperated or by gently heating the product if used within a short period. To ensure homogeneity, mix the product by repeatedly inverting the package a few times prior to dosing. Typically, dosing calculations for FLEX will give values for the weight of the product to be added, e.g. grams per barrel, but the density of FLEX is close to 1 gram per milliliter, and as such, the product can be measured by volume in a beaker or other volumetric measuring vessel.

Residual FLEX will cling to the interior surface of the dosing vessel. This can be easily rinsed into the kettle by use of a laboratory squirt-bottle filled with a 50:50 ethanol/water solution (Everclear® grain alcohol works well for this).



DOSING CALCULATIONS

Conditions in different breweries vary so widely that no single formula is adequate for all breweries. From information provided by the brewer on hopping rate, type of hops used and hop boiling schedule, a recommended initial dosage rate will be provided by Haas sales/technical personnel.

When replacing hop pellets with FLEX for initial trials, we recommend that the alpha acids kettle dosage be reduced by 10 to 20%.

The basic calculation for hop dosing:

$$\text{Kg product to dose} = (\text{hL} \times \text{ppm}) / (\%U \times \%conc)$$

hL = Final beer volume in hectoliters
(1 bbl = 1.174 hL)

ppm = ppm iso-alpha acids desired in final beer;
roughly relates to bitterness units

%U = Estimated percent utilization = (iso-alpha acids in beer / alpha acids dosed) X 100

%conc = Percent concentration of alpha acids in hop product

Example: 100 bbl finished beer, 40 ppm IAA desired, 30% utilization, 65% alpha acids in FLEX

$$\begin{aligned} & ((100 \times 1.174) \times 40) / (30 \times 65) \\ & = 2.41 \text{ kg FLEX to dose} \end{aligned}$$

FLEX is produced with a target alpha acids concentration of 65%. Standard dosing calculations typically used for alpha-to-beer bitterness levels should be used for FLEX, taking into account differences in utilization and using the alpha-acids content listed in the FLEX certificate of analysis. As a general guideline, using the **65% FLEX** concentration and **30% bitterness utilization**, an initial trial dosage is calculated to be **6.0 grams of FLEX for every 10 BU desired in one barrel of beer** (= 1.174 hL beer). Of course, actual utilization may differ, and adjustments are normally required.



CLEANING AND SANITATION

Because of the tendency for hop acid resins to stick to surfaces and build up, we recommend that periodic cleaning be performed on any permanent dosing system. A cleaning procedure will usually be included in the operating instructions for commercial dosing units, and we recommend that those instructions be meticulously followed. For general periodic cleaning and maintenance, the system can be flushed with a caustic solution at a strength that is typically used for CIP cleaning; this can be performed during the scheduled CIP cleaning of the brew system.

The advantage of smaller, less sophisticated systems is that cleaning is simplified, with no routine cleaning or maintenance required. However, there's always a chance that FLEX will be spilled externally on equipment, flooring, clothing and skin. We recommend that personal protective equipment be worn when handling FLEX, including safety glasses, rubber or plastic disposable gloves, and protective clothing. FLEX is not particularly hazardous but can be an irritant and difficult to clean using traditional soap/detergents and water.

Alcohol solutions such as 50% ethanol, 50% methanol or 70% isopropanol work well for cleaning spills, but be aware that these are volatile solvents and appropriate caution should be taken when handling them. For any cleaning that has exposure to the wort or beer steam, only ethanol should be used as opposed to the other alcohols mentioned. An alternative to ethanol is the use of a dilute potassium hydroxide solution (approximately 0.1 molar) for cleaning equipment. If using a caustic solution, it is important to follow with a generous flush of distilled/deionized water.

FREQUENTLY ASKED QUESTIONS:

What is the best temperature to store FLEX?

FLEX, when stored in its original unopened container, is quite stable. When refrigerated, Barth-Haas gives the product a best-by designation of two years from time of production, but it could be suitable for use well beyond that time. If you have product approaching or beyond the best-by date, Haas can analyze a sample of the product to determine whether any appreciable degradation has occurred. The colder the temperature at which FLEX is stored, the longer its longevity.

How soon should the FLEX be used once the original package is opened?

If stored at ambient or cooler temperature in its original container, the opened product should be used within a few days, or about a month at most. For longer storage, the headspace in the package can be flushed with nitrogen or CO₂ and then resealed.

Can I dose FLEX late in kettle boil or into the whirlpool?

This is not recommended. FLEX is designed only to provide hop bitterness, and therefore the earlier it is added to the kettle, the better its efficiency. For optimum consistency and bitterness utilization, FLEX should be dosed at kettle first-wort or the beginning of boil.



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.





Vitahop®

**Increase profits in
BIOETHANOL...naturally**

Vitahop® is a range of natural hop extracts, ideal for production of bioethanol from a range of raw material feedstocks, as they protect yeast from bacterial growth, and their acid by-products, during fermentation processes. When used as part of a planned process regime with regular additions, bacterial infections do not develop and spoil yeast fermentations.

When infections do develop, they can quickly get out of control and disrupt production, potentially causing substantial losses and lost revenue. By controlling bacteria and preventing bacterial growth, catastrophic infections can be a thing of the past.

Vitahop® is used in both continuous and batch fermentations. It helps ensure healthy, vitalised yeast growth and during fermentation suppress gram positive bacteria. If bacteria are allowed to prosper, they will compete with and eventually inhibit the yeast, slowing fermentation sometimes to a complete stop, resulting in a “stuck” fermentation. Bacteria will also use up valuable feedstock producing organic acids such as lactic acid, further reducing ethanol yields. Prevent this happening with **Vitahop®**.

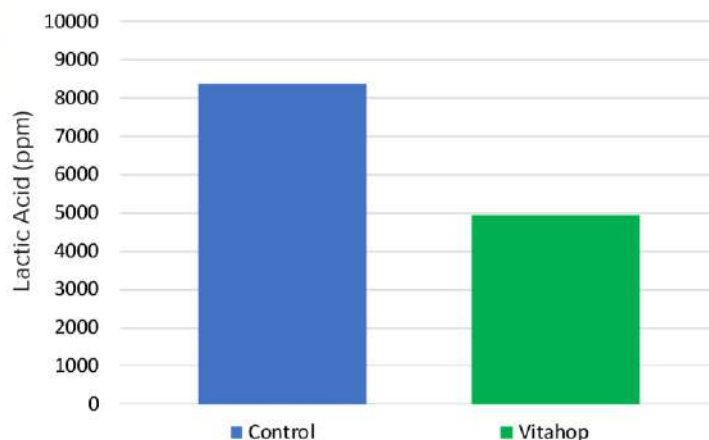


Key Benefits of Vitahop®

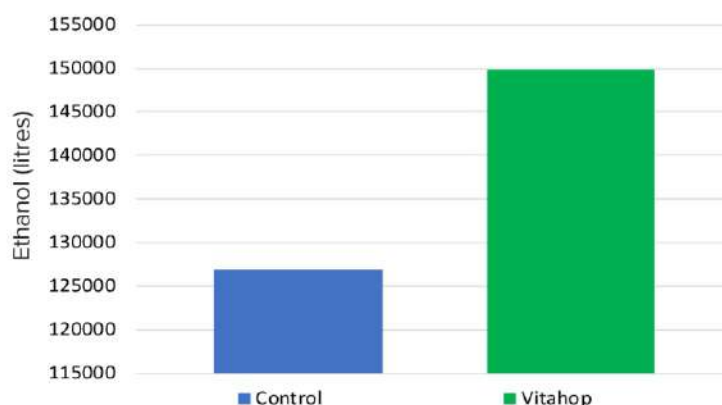
- Maintains optimum ethanol yields
- Ensures reliable fermentations
- Keeps yeast healthy
- Controls bacteria
- Demonstrated benefits in ethanol production plants worldwide
- Safe and natural, easy to use
- Safe DDGS for animal feed
- A natural alternative to antibiotics



Effect of Vitahop® on Average Lactic Acid Production at Fermenter Drop



Effect of Vitahop® on Ethanol Production



Unpublished data BetaTec 2015



BetaTec is the first company worldwide specialising in the application of hops and hop-derived compounds for use in “beyond brewing” industries. Our product portfolio includes natural fermentation aids, antibacterials, flavours and functional ingredients. Our key business areas are alcohol, yeast and sugar production. All BetaTec products are accompanied by on-site support, process optimisation and consulting.

Please contact our technical experts to learn how Vitahop® can help you sustain improved ethanol yields.

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BetaTec®
hop products

“Transforming your world with our natural hop solutions”



BetaStab® XL

Reduce your sugar losses ...naturally

BetaStab® XL controls problematic Gram positive bacteria found in sugar extraction

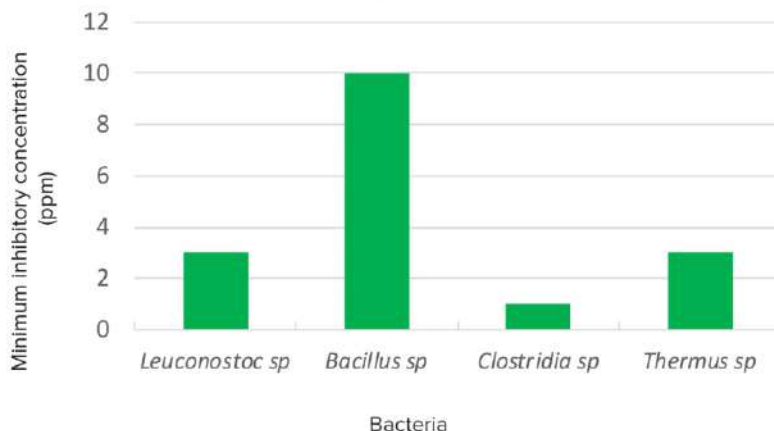
Microbial sugar losses are a major problem in sugar production resulting in lower yields, increased processing problems and higher impurities such as lactic acid and dextran.

The hop product BetaStab® XL is a natural food processing aid. For more than 10 years it has proven effective at controlling bacteria in factories worldwide and is a cost effective alternative to synthetic biocides.

Our product can be applied during the production of sugar from either beet or cane. It is an aqueous solution of natural hop acids and is active over a wide range of temperatures and pH values.



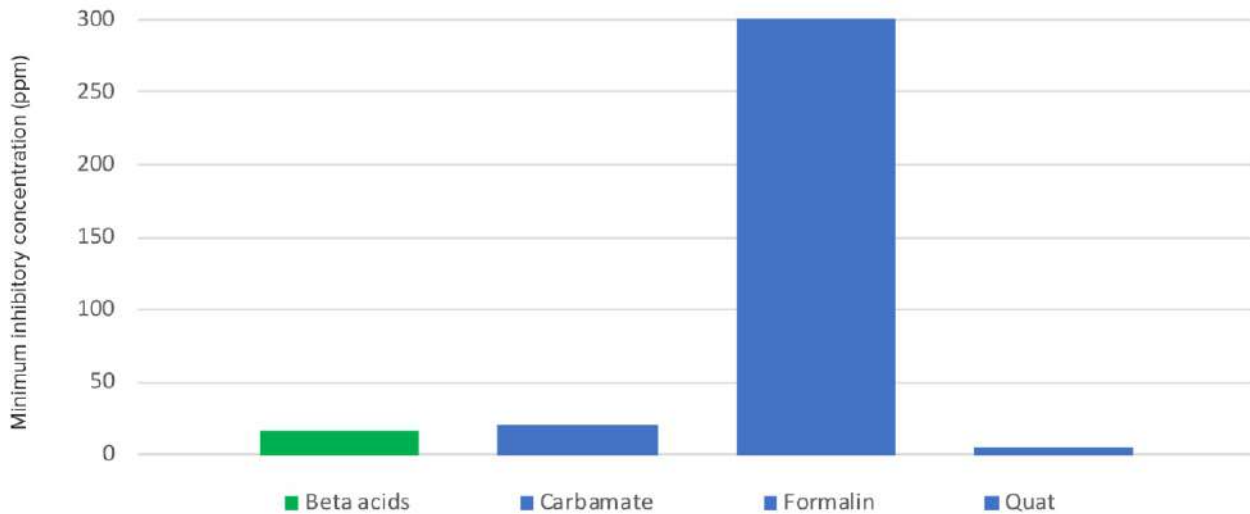
Lab measured minimum inhibitory concentration of
beta acids against various bacteria



Key advantages of BetaStab® XL

- Active against bacterial contamination at ppm levels. Immediately stops bacterial growth
- Control of lactic acid, dextran and nitrite production
- Effective over a range of pH values and temperatures
- Demonstrated activity in sugar cane mills and sugar beet factories worldwide
- Cost effective alternative to synthetic biocides
- Can be used in thick juice storage, prolonging storage times
- Products are water based for ease of dosing
- Safe to handle and non-corrosive to equipment
- Coproducts suitable for animal feed
- Residues are beneficial for yeast and ethanol fermentation processes

Comparison of Biocides against *Bacillus stearothermophilus*



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All BetaTec products are accompanied by on-site support, process optimisation and consulting.

Please contact our technical experts to learn how BetaStab® XL can help you.

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BetaTec®
hop products

“Transforming your world with our natural hop solutions”

BREWING YEAST



BIJAY BAHADUR

**B.Sc. (Hons.); B.Tech. (Gold Medallist); PGDEE; FIE;
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Introduction

Taxonomically, the two species *Saccharomyces uvarum* (carlsbergensis) and *Saccharomyces cerevisiae* have been distinguished on the basis of their ability to ferment disaccharide melibiose. There is problem classifying strains in the brewing context; the taxonomist dismisses the minor difference between the strains encompass brewing, baking, wine distilling and laboratory cultures, are of great technical importance to the brewer.

Strains of *S. uvarum* (carlsbergensis) possess the MEL genes. They produce the extracellular enzymes alpha-galactosidase (melibiose) and are able to utilize melibiose, whereas strains of *S. cerevisiae* do not produce galactosidase and therefore unable to utilize melibiose. In 1984, yeast taxonomists consolidated *S. uvarum* (carlsbergensis) and *S. cerevisiae* into one species, *S. cerevisiae*.

Yeast Selection

Specific selection of appropriate brewing yeast for the specific process is mainly carried out through comparison of specific requirements with the information contained about the individual strains of yeast. In order to match the requirement of the brewery in the best possible way, the following information is required:

- Raw materials to be used
- Wort specifications
- Yeast characters required
- Beer profile required
- Fermentation characteristics

Single Cell Culturing

A yeast sample may consist of several strains of yeast. Single cell pure culturing is carried out to ensure 100% pure yeast. The single cell culturing includes the following steps:

1. Transfer of single cells to moisture chamber
2. Propagation of 2 x 20 yeast cells in wort drops for approx. 2 days
3. Transfer of 10 single cell suspensions to 10 ml wort.

Yeast Strain Improvement

Using the single cell culturing and yeast typing methodology, improvements in the brewery's existing yeast strain performance is a possible option to replacing the strain.

By screening individual cells taken from brewery culture for specific technical or aromatic properties (e.g. improved flocculation or aromatic properties) improvement in the yeast performance can be obtained.

Many breweries have seen that this is a more acceptable way of improving yeast performance and beer quality compared to the introduction of new strain.

Brewing Yeast Nutritional Requirements

The brewing yeast will be growth successfully and good vitality if adequate supply of nutrients, fermentable sugar, amino acid, vitamins and minerals. These nutrients are always enough in wort that it is not limiting the growth of yeast.

1. Carbohydrates (Carbon source)

Low molecular weight sugars such as glucose, fructose, maltose, sucrose and maltotriose are available for yeast growth. The bigger carbohydrates (such as dextrose) are not used by the yeast cell. The wort consists about 80% of fermentable extract. The balance 20% consists of non-fermentable products such as dextrose, beta-glucans, pentosans, and oligosaccharides.

2. Amino Acid (Nitrogen source)

The yeast cells use amino acid to synthesize more amino acids and in turn, to synthesize proteins. Amino acids collectively referred to as “free amino nitrogen (FAN),” are the principal nitrogen source in wort and are an essential component of yeast nutrition. Followings are the three groups of essential amino acid:

Group A: this group will fastest take by the yeast cell in the beginning of fermentation, but synthesized later e.g., Aspartic acid, Asparagine, Glutamic acid, Glutamine, Threonine, Serine, Methionine.

Group B: the yeast cell will be synthesis at early stages of fermentation, but prevented later e.g., Isoleucine, Valine, Phenylalanine, Glycine, Alanine and Tyrosine.

Group C: these amino acids the yeast cell only taken from wort, it cannot synthesize it owns e.g., Lysine, Histidine, Arginine and Leucine.

3. Vitamins

Vitamins such as Choline, Thiamin (B1), Folic acid, Nicotinic acid, Calcium pantothenate, Pyridoxin and Biotin are essential for enzyme function and yeast growth. These vitamins are always enough in wort that it is not limiting the growth of yeast. In wine and cider production you may have to add nitrogen containing salts (e.g., ammonium phosphate), sometimes even thiamine and riboflavin.

4. Minerals

The yeast cells are unable to grow unless provided with a source of essential minerals. These include P, K, Ca, Mg, S and trace elements. For example, phosphate (P) is involved in energy conservation, is necessary for rapid yeast growth, and is part of many organic compounds in the yeast cell.

5. Zinc

Zinc (Zn) is the most important trace element; the optimum content should be 0.15 ppm. Need of zinc depends largely on yeast strain, some yeast strain may need even more zinc and therefore some breweries add it to wort. Zinc assists in protein synthesis in yeast cells and controls their nucleic acid and carbohydrate metabolism.

It very important for stabilization of proteins and membrane systems, activity of enzymes, protection of enzymes against denaturation, speeding up riboflavin synthesis, simulation of sugar uptake. Zinc may reduce enzyme activity in mashing. To increase zinc level, brewer can theoretically select proper malt, higher malt modification, lower mash pH, lower mashing-in temperatures, shorter mashing times, use low mash concentrations and use some amount of husk or spent grain extracts.

Yeast Autolysis

Autolysis of yeast cell is break-up of the yeast cell on its own. Deficiency of nutrients, high temperature and alkaline condition enhance autolysis. If yeast is left to fully fermented beer for too long time, they will be autolysis and cause of off-flavor in the beer. When a yeast cell dies, reductase enzyme will be opening cell wall protein and make it ruptures – releasing several off-flavors into the beer.

“In biology, autolysis, more commonly known as self-digestion, refers to the destruction of a cell through the action of its own enzymes. It may also refer to the digestion of an enzyme by another molecule of the same enzyme.”

The Effect of Yeast Autolysis

- Yeasty flavor
- Creosote-like foreign taste
- Increase of beer pH – release of amino acids
- Change in beer color
- Decreased biological and chemical stability
- Poor head retention (foam stability)
- The bitterness is broader and more persistent
- Lower diacetyl removal rate
- Beer infection occur more frequently
- Decrease flavor stability
- May cause of filtration problem

Prevention of Yeast Autolysis

- Always keep beer and yeast cool
- Harvesting all of yeast from the beer after end of fermentation as much as possible.
- Minimize top pressure
- Cropping dead cell at the beginning of fermentation (normally after 24 hrs.)
- Cropping dead cell before end of fermentation
- Ensure to re-pitching with high viability yeast (dead cells should not be more than 15%)

Yeast Cleaning

Yeast infections in beer, which are often referred to wort bacteria, lactic acid bacteria and wild yeast infections, are caused off-flavor, hazy and short shelf life of the beer. So, pitching yeast must be always cleaned. These are three favorites technique for cleaning brewing yeast before re-pitching it into the wort.

1. Mechanical cleaning

- Screen cleaning; to remove cold break, collapsed foam, risk of contamination and loss of yeast.
- Wash with water; you may loss of yeast cell, osmotic chock and prolonged lag phase wherein bacteria adapt themselves to growth conditions. It is the period where the individual bacteria are maturing and not yet able to divide. During the lag phase of the bacterial growth cycle, synthesis of RNA, enzymes and other molecules occurs.”

2. Chemical cleaning

- Acid wash: Acid washing is one of yeast cleaning technique. Due to brewing yeast has more tolerant to low pH than bacteria, addition of acid to a pH range 2.1 – 2.5 enough to kill infected bacteria.
- Phosphoric and citric acids offer the advantage of being weak acids and the yeast pH is more easily controlled, whereas with strong acids, such as sulfuric acid, there are special handling procedures required for the operators and a slight overdose will yield excessively low pH values.

Recommended technique to be followed for acid washing of yeast:

- Use food grade phosphoric acid
- Wash the yeast as a beer or water slurry
- Chill both the yeast slurry and the acid to less than 5 °C
- Stir continuously and slowly while adding the acid to the yeast
- If possible, stir throughout the wash
- Never let the temperature exceed 5 °C during the wash
- Check the pH of the slurry
- Do not wash for more than 2 hours
- Pitch yeast immediately after washing
- Do not wash unhealthy yeast or yeast from the fermentations with greater than 8% ethanol present

Need to Evaluate Pitching Yeast

There are five reasons for the evaluation of pitching yeast, which are:

1. If you are correctly handled your yeast, they can produce high quality products in a cost-effective manner, despite the stresses that are clearly evident in modern brewery environments such as alcohol, CO₂ toxicity, nutrient limitation and cold shock.
2. It is benefits for brewer who needs to monitor not only yeast performance but all aspects of the production process that can influence this performance.
3. Because of it is imperative to measure and evaluate pitching yeast quality.
4. Because of we still do not know all details of yeast physiology, but we have a number of indicatives, analytical tools to measure pitching yeast quality.
5. To overcome deterioration of yeast performance.

Yeast Development Note

- Yeast harvest should be minimum 1.5 times pitching amount.
- Maximum yeast concentration 3-4 times the amount of pitching yeast.
- Too high yeast production - increased beer loss, lower yield of bitter substances, decreased ester formation.
- Risk of off-flavours (higher alcohols).
- Too low yeast production - slower fermentation and problem in yeast supply.

Yeast Viability and Yeast Vitality

Yeast Viability vs. Yeast Vitality

Yeast viability and yeast vitality are related, but they are not the same.

Yeast viability is a measure of the number of living cells which is a measure of yeast's ability to ferment – a property not possessed by dead cells.

Yeast vitality is a measure of yeast activity or fermentation performance. The vitality of yeast can also be expressed as a function of the total cell viability and the physiological state of the viable cell population.

Yeast Viability Testing

The reference analysis for viability is the plate count measurement. The most commonly used method to determine the viability of the pitching yeast is the slide culture technique by trained Microbiologist. A suitably diluted suspension of yeast is applied to a microscope slide covered with a thin layer of nutrient media. A sterile cover slip is positioned over the yeast and a slide is incubated for no longer than 18 hours at room temperature. The slides which give rise to micro colonies are viable. Single cells not giving rise to micro colonies are scored as dead. The percentage of viable cells is called the budding index.

Yeast Vitality Testing

The yeast vitality can be measured using the Acidification Power Test. The test measures the ability of the yeast to acidify a basal medium in the presence or absence of sugar and thus reportedly tests both the membrane functionality and the sugar catabolic rate of the culture. But this test is not rapid enough to allow its use on all pitching yeast samples on a routine basis.

Note:

Normally Brew Master only determine how many dead cells there are in the pitching yeast in the yeast storage tank ahead of the next use of the pitching yeast.

Yeast Pitching Rate

Yeast pitching is decided by a number of factors, which are:

- Wort gravity
- Wort constituents
- Temperature
- Degree of wort aeration
- Previous history of the yeast

Ideally, it is desirable to have a minimum lag in order to obtain a rapid start to fermentation, which then results in a fast pH drop, and ultimately assists in the suppression of bacterial growth. Generally, 10 million cells/ml is considered an optimum level of pitching rate and results in lager yeast reproducing 4 to 5 times.

Yeast Growth & Final Beer Character

In case of higher yeast growth, will have a major influence on flavour and aroma compounds such as fusel alcohol, esters, and VDKs. The concentration of VDKs is related to yeast growth and accelerated fermentation may result in higher VDKs than traditional fermentation because of greater precursor production or slower conversion to diacetyl.

An increased pitching rate will increase the loss of bitter substances and polyphenols because of adsorption of these substances to the increased cell surface area due to the many new cells formed.

Yeast Storage

Ideally, yeast is stored in a room designed to be easily sanitized, containing sufficient supply of sterile water and a separate filtered air supply under positive pressure to prevent the entry of contaminants, and having a temperature of 0 °C. Alternatively, insulated tanks in a dehumidified room are employed. Removal of unnecessary equipment and tools from the room has proven beneficial.

Yeast is most commonly stored under 6 inches of beer or under a water or 2% potassium dihydrogen phosphate solution. Reduction of available oxygen is important during storage and minimum yeast surface areas exposed to air is desirable.

References

1. Handbook of Brewing, Edited by William A. Hardwick
2. Brewing – A Practical Approach, Bijay Bahadur, 2016
3. Handbook of Brewing, Edited by Fergus G. Priest & Graham G. Stewart
4. Handbook of Brewing, Edited by Hans Michael Eblinger

BELGIAN BEER STYLES



SURAJKUMAR

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BREWMASER URU BREWPARK BANGALORE



GOSE

HISTORY

Spontaneously fermented wild ale from the Brussels region. Originated from farmhouse brewing and blending traditions. Traditionally produced by blending, one, two and three-year-old lambics.

FLAVOUR PROFILE

A complex, pleasantly sour but balanced wild Belgian wheat beer that is highly carbonated and very refreshing. The spontaneous fermentation character can provide a very interesting complexity, with a wide range of wild barnyard, horse blanket, or leather characteristics intermingling with citrusy-fruity flavours and acidity.



FRUIT LAMBIC

HISTORY

Spontaneously fermented wild ale from the Brussels region. Originated from farmhouse brewing and blending traditions. Added fruit post-fermentation to sweeten and make more palatable to a wider audience. Fruit traditionally added to increase variety of beers available in local cafes.

FLAVOUR PROFILE

Pleasantly sour, wild wheat ale, showcasing the fruit contributions blended into the beer. Aroma should be dominated by the fruit used.



FLANDERS RED ALE

HISTORY

Distinctive to the West Flanders region of Belgium and symbolised by the Rodenbach brewery. Aged in Oak barrels, which contain bacteria required to sour the beer, for two years.

FLAVOUR PROFILE

Sour, fruity, red wine like ale with complex malt flavour to support and balance the fruitiness and sourness. Can have an acidic bite, and fruit flavors including plum, black cherry and red currant.



BELGIAN DUBBEL

HISTORY

First brewed by Trappist Abbey Westmalle in 1856. Brewed by most of the Trappist brewers in Belgium and the Netherlands. Name referred to the fact the beer was twice as strong as the standard beers brewed by the monastery.

FLAVOUR PROFILE

Rich, malty complex Trappist ale. Dried fruit esters, raisins flavour with a dry finish. Some alcohol and phenol notes with balance being towards the malt.



SAISON

HISTORY

Originated in Wallonia, the French speaking part of Belgium for consumption during the active farming season. Was a low strength beer so as not to debilitate farm workers, but tavernstrength versions also existed. Modern saison first produced by DuPont in the 1920's.

FLAVOUR PROFILE

Ability to ferment at extremely high temperatures, giving off loads of phenolic characters. Peppery and spicy aroma with high carbonation. Extremely dry as they are highly attenuated.



WITBIER

HISTORY

400-year-old Belgian style that died out in the 1950's. Revived by Pierre Celis at Hoegaarden. Becoming a popular fruity summer beer. Often spiced with freshly ground coriander and citrus peel and typically uses 50% unmalted wheat with the rest being pale barley malt and even a small amount of oats.

FLAVOUR PROFILE

Malty-sweet grain flavour with a dense white moussy head that lasts. Orange citrusy fruity flavour and sometimes a very light lactic sourness. Crisp with a dry, often tart finish.



BELGIAN GOLDEN STRONG ALE

HISTORY

Originally developed by the Moortgat brewery after WW1 to compete with the growing popularity of Pilsner style beers. Typically have references to the devil in the name of the beer.

FLAVOUR PROFILE

Highly attenuated and features fruity and hoppy notes compared over phenolics. Lots of fruity esters in the aroma, very high carbonation and extremely effervescent.



BELGIAN BLONDE ALE

HISTORY

Relatively recent development to further appeal to European Pils drinkers, becoming more popular as it is heavily marketed and widely distributed. Just think Leffe Blond.

FLAVOUR PROFILE

A moderate-strength golden ale that has a subtle fruity-spicy Belgian yeast complexity, slightly malty sweet flavor, and dry finish. Often described as having a "grainy sweet" malt flavour.



BELGIAN TRIPEL

HISTORY

Also popularized by the Westmalle Trappist Monastery. Brewed by most of the Trappist brewers in Belgium and the Netherlands. Name referred to the fact the beer was three times as strong as the standard beers brewed by the monastery.

FLAVOUR PROFILE

Pale in colour unlike Dubbel, spicy, dry and strong Trappist ale. Very aromatic and drinkable for high alcohol levels. Fruity esters, spicy, peppery and clove like phenols. Grainy sweet or honey like light malt character.



ECOLOGICAL SUSTAINABILITY AND DILIGENCE OF ENZYMES IN PURSUIT OF BREWING: A SYNERGISTIC APPROACH



Dr. Nidhee Chaudhary

Background

The history of Brewing with excellent diligence goes back according to the Bavarian Purity Law of 1516, by Scientist Berg, producing Austrian beer that guaranteed the highest drinking pleasure. The family-run private brewery in Frankenmarkt, Upper Austria, places great value on quality and customer service under the motto "small but excellent". The raw materials being indigenous, and processing done manually using the high-quality mineral water, produce the multi-award-winning beer. As matter of course is an excellent example of "Ecological sustainability and diligence" giving a unique unparallel brand.

Enzymes and Brewing: Synergy

The great discovery and coining name of "Enzyme" by scientist Buchner in 1897 has been revolutionary. Zymase surely turned into the first determined yeast prepared from yeast extract, further observing alcohol formation (with sugar) in the extract. Zymase virtually facilitates the fermentation of sugar into ethanol and carbon dioxide. The sugar in the juice acts as a substrate for the enzyme in the yeast cellular in a commonly huge way. This type of fermentation, known as genuinely alcoholic fermentation, for all intents and functions shows that zymase became first located in yeast for the most component extract by using Buchner in 1897, which is especially in all fairness widespread. It is anaerobic respiration.

Enzymes utilized in the brewing industry are diverse in their action and properties and the main enzymes used in the beer brewing industry can be divided into four main processes which are germination, mashing, fermentation, and clarification. The four most common enzymes used in brewing are beta-glucanase, protease, alpha-amylase, and beta-amylase (endogenous or external).

Commercial enzymes can be used for extra quality attributes such as clarification, color, texture, or flavour and sometimes it is mandatory to use the enzymes from an external source when the barley mashing is not producing enough enzymes to breakdown and hydrolyse the starch which can lead to low-quality beer and less yield.

During malting β -glucan, fibres and proteins are broken down by the action of proteases, glucanases, and xylanase. After the gelatinization of starch by the hot water, the amylase enzymes start to act on the wort-producing sugars through the liquefaction and scarification processes, yielding sugars to be fermented. Later, the fermentation process takes place where α -amylase and β -glucanase can be reused again to improve the fermentation yield and filtration. Usually, other enzymes can be used for extra quality such as alpha acetolactate decarboxylase (ALDC) which improves fermentation by reducing the fermentation time, and other commercial types of proteases that keeps the beer clear during cooling and chilling of beer.

Beer Enzymes: Enzymes in Brewing

Craft beers are what brewers' endeavours for with unique flavours; done smartly by brewers using enzymes. Beer enzymes are being used more frequently in the brewing process in recent years as they have been creating successful brews, satisfying the current desires for craft beer.

Enzymes are special proteins that speed up chemical reactions by decreasing the activation energy required for a chemical reaction but are not consumed themselves in the process. They are used for all kinds of necessary reactions in the human body, but they also have many interesting applications in the food and beverage industry. There are many types of enzymes intrinsic to the grains used in brewing, but brewers can manipulate two major classes of beer enzymes: proteases, also known as protein-cleaving enzymes, and diastases, also known as starch-cleaving enzymes.



Ms. Meenakshi Kanojia

Role of Proteases as Beer Enzymes

Proteases break down large proteins into smaller ones and are important in brewing as brewers are concerned with the nitrogen content of beer. Yeasts, which are necessary for brewing beer, use nitrogen as a primary nutrient. Nitrogen is found in all proteins, but yeasts prefer free nitrogen. Proteases are critical for cleaving proteins and providing that free nitrogen to yeast. Using commercially available protease allows brewers to control the amount and quality of foam or head on a brew. Also, little foam can make the beer seem flat or stale.

Protease works in conjunction with another protein-cleaving enzyme, peptidase, to produce free nitrogen for the brewers' precious yeast. After protease completes a preliminary protein breakdown, peptidase cuts these shortened chains into even tinier molecules. Peptidase breaks down those molecules from the outside in, essentially, while protease cleaves down the middle. Because of the structure of proteins, this means that peptidase's cleaving action ultimately frees up nitrogen for yeast.

Preventing Haze with Beer Enzymes

Protease also prevents haze from forming in beer which can be a sign of too many proteins and polyphenols hanging around in your brew, or it can be a much more urgent symptom of bacterial infection. The enzyme protease can mitigate precipitating proteins and polyphenols by breaking them down, enhancing the clarity of a brew. Bacterial contamination is another issue that can alter the flavour of your beer in undesirable ways.

While proteases generally enhance the head or foam of a beer, misusing them will over-dilute it. This can create an undesirable, watered-down brew. The choice of papain type because it appears to be specific for proteins involved in haze formation and the enzyme can be controlled under manufacturing conditions. Chill-proof beer is sold as a 20% papain extract solution. Beer, whiskey, and sometimes vodka is produced by fermentation of grain starches that have been converted to sugar by the enzyme amylase, which is present in grain kernels that have been malted (germinated).

Beer Enzymes Affecting Beer Mouth-feel

The other major category of beer enzymes in brewing is diastatic enzymes which are related to the feel of beer feels in the mouth and the body of the beer. The grains used in brewing are comprised of bran and endosperm, the endosperm is made of starch, and diastatic enzymes can break down that starch resulting into dextrans and sugars. The most important diastatic enzymes in brewing are amylases, specifically alpha- and beta-amylase. To produce a thick, rich beer, use more alpha-amylase. Liquefaction is this diastatic enzyme's specialty. This process involves cleaving starch into smaller carbohydrate bits. Dextrans are further responsible for how the beer feels in mouth.

Beta-amylase, another diastatic enzyme continues the starch breakdown process by converting the non-fermentable dextrins into fermentable carbohydrates-maltose and glucose. For brewing, carbohydrates are required to ferment and for balance of alpha- and beta-amylase thereby creating perfect beer. A lot of beta-amylase happen to make the beer dry due to higher alcohol content. Excessive breakdown of starch into fermentable carbohydrates can result in other adverse effects, too. Too many sugars for the yeast to digest can cause more fermentation than desired and ultimately creates too much carbonation with bubbles (undesirable).

Enzymes Optimization in Brewing Process

With so many beer enzymes to consider and an emphasis on balancing them all perfectly, the brewer needs to know how to manage them correctly. Each enzyme has an optimal functioning temperature and pH. Optimizing the temperature and pH of brew, therefore, allows to activate and deactivate these enzymes; the process being highly important.

Brewing-Beer Production

Brewing, the process of production of malt beverages-the main being Beers, ale, and lagers is a complex fermentation process. It differs from other industrial fermentation because flavour, aroma, clarity, colour, foam production, foam stability, and percentage of alcohol are the factors associated with the finished product. Beer production involves malting, milling, mashing, extract separation, hop addition and boiling, removal of hops and precipitates, cooling and aeration, fermentation, separation of yeast from young beer, aging, maturing, and packaging.

From the above points, it seems to be emphasized that the diligence of enzymes and brewery is of immense importance for the maintenance of ecological sustainability. A holistic synergistic approach towards all the components including enzymes is required for excellency in the brewery sector with overall efficiency.

Beer For Health? Hop Compounds May Offer Protection Against Alzheimer's



AKSHAT JAIN

Business Development Manager-Craft Brewing

KEY POINTS

- Researchers looked at four hops varieties
- Compounds in hops inhibited protein clumping linked to Alzheimer's disease
- Results show hop's potential as a nutraceutical for the disease

Beer isn't exactly the first thing that comes to mind when people think of foods and drinks that may be beneficial for health. But a team of researchers has now found that a compound in beer hops may offer protection against Alzheimer's disease (AD).

In their work, published in the American Chemical Society's ACS Chemical Neuroscience, researchers had a closer look at the "chemical variability" of four common hop varieties: Cascade, Saaz, Tettnang and Summit.

One of the factors that make AD so difficult to treat is the "time lag" of several years that's between the biological processes of the disease and the onset of symptoms, ACS explained in a news release. By the time the person realizes they may have the disease, "irreversible damage" may have already occurred.

"In this scenario, the prevention of AD rather than treatment can represent an important strategy," the researchers wrote. "Among the preventive interventions, diet is one of the most promising ones because the intake of foods or nutraceuticals containing natural molecules can interfere with key biochemical events underlying aging in both physiological and pathological conditions."

"Nutraceuticals" are foods or parts of food that have medical or health benefits. And hop, one of the main ingredients of beer, can interrupt the collection of amyloid beta proteins linked with AD. Further, previous studies showed that consuming bitter hop acids can improve "cognitive function, attention, and mood in older adults."

Researchers have now found the hop extracts actually had antioxidant properties and may prevent the clumping of amyloid beta proteins in human nerve cells, with the "most successful" variety being Tettnang.

"We fractionated the extracts to identify a pool of molecular components mainly responsible for their neuroprotective action," the researchers wrote. "According to our data, they are feruloyl and p-coumaroylquinic acids, flavan-3-ol glycosides, and procyanidins."

The hop extracts also prevented cell death due to oxidative stress, the researchers noted. And when they tested the Tettnang extract activity on a *C. elegans* worm model, it actually protected the creatures from "AD-related paralysis," although the effect was "not very pronounced." While this doesn't mean people have an excuse to drink a lot of their favorite hoppy beer, it shows hop's potential as a nutraceutical for AD.

"Our results show that hop is a source of bioactive molecules with synergistic and multitarget activity against the early events underlying AD development," the researchers added. "We can therefore think of its use for the preparation of nutraceuticals useful for the prevention of this pathology."

Enzymatic transformation of starch into Sugars



Sachin Mogal
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Introduction

Starch is the second most abundant carbohydrate in the plant world after cellulose. It is the principal plant storage polysaccharide. Both starch and cellulose are glucose-based polymers that differ in the orientation of the linkages between the glucose subunits in the respective macromolecules. *Saccharomyces cerevisiae* is the primary microorganism involved in the transformation of starch to ethyl alcohol, and corn starch remains the major raw material for industrial alcohol fermentation although potato starch also has limited use, particularly in Europe. For example, in the 1999 US crop year, 526 million bushels of corn (14.7 million tons at 15% moisture) were used in the fuel ethanol industry

Starch, however, cannot be fermented directly by *S. cerevisiae*, because the organism lacks the requisite starch-degrading or amylolytic enzymes to liberate glucose from this storage polysaccharide. Whether the starch is derived from corn, potatoes, sorghum (milo), barley or other cereal grains, the bonds between the glucose subunits in the starch chain must first be hydrolyzed to liberate free glucose molecules which yeast can utilize.

Gelatinization

The α -linkage of starch allows the molecule to be more flexible, taking on a helical configuration in the solution which is stabilized by hydrogen bonding. Furthermore, the bottlebrush-like structure of amylopectin lends itself to less densely packed associations between adjacent starch molecules and further enhances water solubility and access by starch-degrading enzymes. The ratio of amylose to amylopectin is a characteristic of each starch source and has an impact on its gelatinization properties

When an aqueous suspension of starch is heated, the hydrogen bonds rupture, water is absorbed and the starch granules swell. This process is termed gelatinization because the resulting solution has a highly viscous, gelatinous consistency

The exact temperature required for gelatinization to occur depends on a variety of factors, including granule size and structure and the aforementioned amylose to amylopectin ratio. For example, tapioca starch has a lower gelatinization temperature than rice starch, although both have similar amylose contents. This is because tapioca starch granules are much larger than rice starch granules and, as a result, swell more easily.

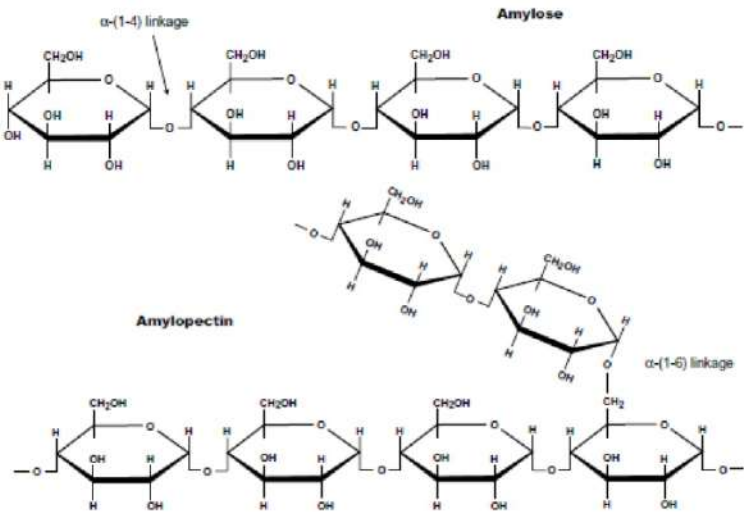


Figure 1. Structure of amylose and amylopectin; the polysaccharides that comprise starch.

Table 1. Ratio of amylose to amylopectin (percent of total starch) in various starch sources.

Starch source	Amylose (%)	Amylopectin (%)
Common corn	25	75
Waxy maize	1	99
High amylose corn	50-75	25-50
Potato	20	80
Rice	20	80
Waxy rice	2	98
Tapioca/cassava/manioc	17	83
Wheat	25	75
Sorghum	25	75
Waxy sorghum	<1	>99
Heterowaxy sorghum	<20	>80

Table 2. Typical temperature ranges for the gelatinization of various cereal starches.

Cereal starch source	Gelatinization range (°C)
Barley	52-59
Wheat	58-64
Rye	57-70
Corn (maize)	62-72
High amylose corn	67->80
Rice	68-77
Sorghum	68-77

Kelsall and Lyons, 1999

Enzymes

The enzyme used for the initial dextrinization or liquefaction of starch is α -amylase. The more scientifically correct or systematic name for this type of enzyme is 1,4- α -D-glucan glucanohydrolase. They are endo-acting enzymes, meaning that they attack the starch polymer from within the chain of linked glucose residues rather than from the ends. They randomly cleave internal $\alpha(1\rightarrow4)$ bonds to yield shorter, water-soluble, oligosaccharide chains called dextrins, which are also liberated in the α -configuration.

Finally, α -amylases cannot cleave $\alpha(1\rightarrow6)$ bonds and bypass the branch points in amylopectin. When this occurs, the residual products are called α -limit dextrins. Commercial sources of α -amylase are produced mainly by *Bacillus* species, for example, *Bacillus amyloliquefaciens* and *B. licheniformis*. The choice of α -amylase is based principally on tolerance to high temperatures and this varies quite widely among enzyme sources. One common approach is to cook the starch at approximately 105 DegC in the presence of a thermostable α -amylase, followed by a continued liquefaction stage at 90–95 DegC.

The maximum extent of hydrolysis, or dextrose equivalence (DE), obtainable using bacterial α -amylases is around 40, but care should be exercised not to overdose or prolong treatment since this can lead to the formation of maltulose (4- α -D-glucopyranosyl-D-fructose), which is resistant to hydrolysis by α -amylases and glucoamylases.

The next stage is termed the true saccharification phase, which under most practical circumstances is effected by a class of amylases called glucoamylases. The mode of action of *pullulanases* (α -dextrin 6-glucanohydrolase; EC No. 3.2.1.41), which belong to a category of starch-degrading enzymes known as debranching enzymes. The action of pullulanases concerns the hydrolysis of 1,6- α -D-glucosidic linkages in amylopectin, glycogen and their nascent limit dextrins, generated by α -amylase activity.

In the beverage alcohol industry, β -amylase (1,4- α -D-glucan maltohydrolase; 3.2.1.2) is another enzyme encountered in the starch conversion process. Like α -amylase, this enzyme cleaves $\alpha(1\rightarrow4)$ linkages but attacks starch in an 'exo' rather than an 'endo' fashion. The enzyme cleaves maltose (a disaccharide of glucose) in a stepwise manner from the nonreducing end of the starch polymer. The enzyme cannot bypass $\alpha(1\rightarrow6)$ branch points to attack linear 1 $\rightarrow$ 4 bonds on the other side and generates β -limit dextrins as a result. Hence, the enzyme is **most effective when used in conjunction with a debranching enzyme**. β -amylases are also utilized in the syrup industry for the production of high-maltose syrups from starch (McCleary, 1986).

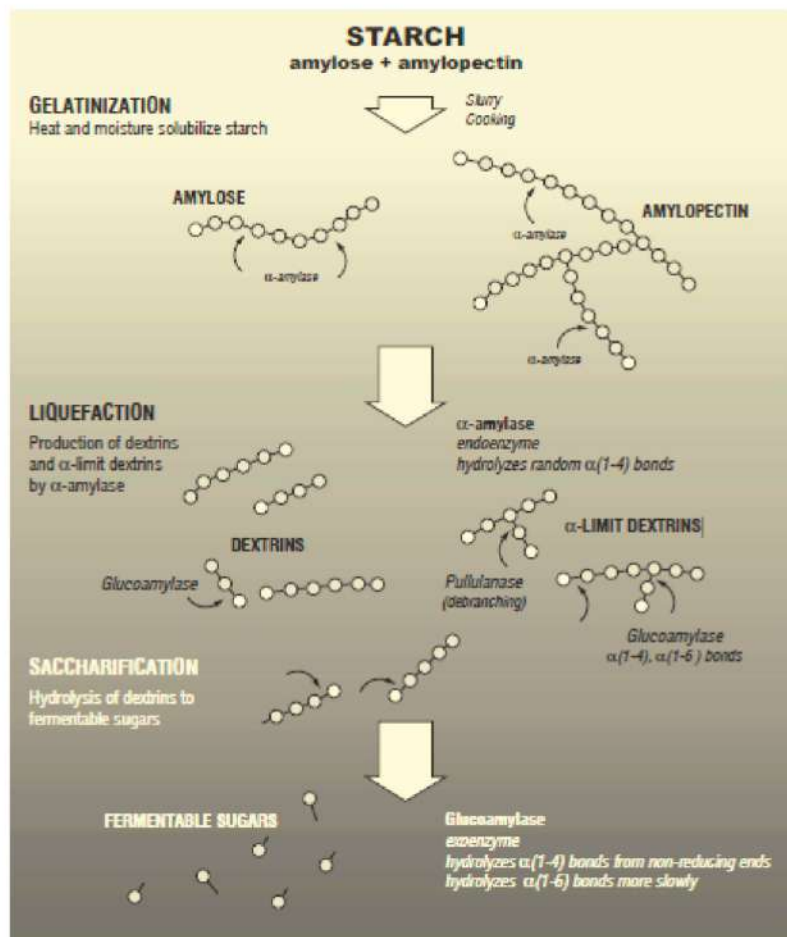


Figure 2. Schematic representation of the action of amylases on starch.

As mentioned, the true saccharification or conversion of dextrins to glucose is conducted, in the vast majority of cases, by glucoamylase. Glucoamylase is also known as amyloglucosidase (glucan 1,4 - α -glucosidase; EC No. 3.2.1.3) and its main activity is the hydrolysis of terminal 1,4-linked α -D-glucose residues successively from the non-reducing end of dextrins causing the release of β -D-glucose. Reference has also been made to the fact that glucoamylases can hydrolyze $\alpha(1\rightarrow6)$ bonds to a certain extent. However, these branches are cleaved at a rate approximately 20 to 30 times slower than the cleavage of $\alpha(1\rightarrow4)$ bonds by the enzyme. Extra glucoamylase can be added to compensate for this slower rate but this can cause undesirable side reactions to take place, whereby glucose molecules repolymerise in a reaction termed reversion, forming isomaltose and causing a decrease in glucose yield.

Glucoamylases are isolated from fungal sources such as *Aspergillus niger* and *Rhizopus* sp. Fungal enzymes, by nature, are less thermotolerant than their bacterial counterparts and therefore the temperature maxima for glucoamylases tend to be in the region of 60 Deg C while their pH optima normally lie between pH 4.0 and 4.5.

BECPL EXHIBITING AT ALCOTECH EXPO 2022, LUCKNOW



MICROBIAL PRODUCTION OF ENZYME AND THEIR APPLICATION



RAGHAVENDRA SHARAN SINGH

**Sales & Technical Manager
(Alcohol Industry)**



Microbial fermentation is well known traditional process for decades. Over the past few years, the fermentation process has been used to produce many value-added products including enzymes, organic acids, alcohols, polymers. Due to widespread application of enzymes in different industries (food, textile, and agriculture, pharmaceutical, leather, and detergent) increased the interest of biotechnologists to establish the economically feasible process.

As evident from previous studies, enzyme production using the fermentation route is eco-friendly. Microbial production of enzymes over plants or animal sources has many fundamental advantages. The main advantages are (i) it can be produced on large scale in limited space and time (ii) extraction and purification of an enzyme using microbial route is easier (iii) enzyme yield can be increased using genetic modifications. Enzymes can be produced intracellular or extracellular by a microbe. Most commonly produced enzymes on large scale such as amylase, proteases, catalase from bacteria, yeast, and fungi respectively are still used in different industries.

S.No.	Enzyme	Source	Used in different industry
1	α -Amylase	Bacteria, fungus	Starch industry, textile industry, food industry, brewing industry
2	Cellulases	Fungus	Food industry, bakery industry, biofuel industry,
3	Invertases	Yeast	Food industry
4	Lipases	Yeast, fungus	Food dairy, polymer industry, detergent processing industry
5	Proteases	Fungus, bacteria	Cosmetic industry

Table1: Industrially important enzymes obtained from different microbes.

Different techniques involved in the enzyme production selection of microbes, strain improvement to enhance the enzyme activity high and downstream to purify the quality product. Microbial production of enzymes has the potential to provide a viable solution to many industries. As an attractive and emerging technology, this area still needs to explore for successful application for the large scale.

References:

Fermentative Production of Microbial Enzymes and their Applications: Present status and future prospects. Journal of Applied Biology & Biotechnology 2015 (90-094). Microbial enzymes produced by fermentation and their applications in the food industry -A review. International Journal of Agriculture Innovations and Research 2019 (2319-1473)



BECPL TEAM AT VINEXPO INDIA 2022





MAMTA BHARDWAJ

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Founder and Researcher
Applied B.Sc.in Wine Technology, B.Sc. Microbiology
WSET Level 1

Crystal Vs Glass

There are two types of stemware, crystal, and glass.

All crystal is glass but not all glass is crystal.

Crystal contains minerals, typically lead monoxide. The lead percentage varies from 1 to 30 percent.

In the European community glass with 4 to 10 percent lead monoxide is called glass. Glass with lead content 8 to 10 percent is called lead glass. Glass with 10 to 30 percent lead is called a crystal. Glass with more than 30 percent lead monoxide is called as lead or leaded crystal. While in the United States 1 percent lead monoxide is sufficient to call it crystal. So the meaning of crystal versus glass changes according to country.

Some countries use zinc and magnesium oxide instead of lead which also causes refraction. These are called lead-free crystals. They have a similar refractive index as lead but they are lighter.

Crystal is porous. Mineral strengthens the material and makes it thin but durable. Also, it increases the weight of glass and causes light refraction. In crystal rim is very thin but still strong.

There is one theory that explains that crystal is rougher than glass so roughness creates turbulence in wine which, in turn, causes more aeration of the wine, and therefore more aromatic compounds are released.

The problem with leaded crystal is, lead can leach out of the glass, especially the glasses that are often used. Exposure to lead can increase the risk of heart attack and stroke and can cause memory loss.

Although the highest quality crystal glasses provide a better wine-tasting experience but they are too expensive.

Glass is nonporous and thick. Thicker glass can create distortions. It does not refract light. It is more durable and affordable than crystal. Borosilicate is one type of glass that has high durability and heat and scratch resistance.

It is affordable.

There is a difference between crystal and glass stemware but it is up to you how much you want to spend.

For more detailed information in a visual format, you can always visit www.winesutra.in

Cheers!!!

WINE REPORT



KANCHAN SINGH

**Chapter Head - South Delhi, India
Apex Wine Club India
1 November 2022, Tuesday**

The Leela Bhartiya City Bengaluru has announced the launch of their own signature label, Falak.

Falak Wine is complex and well balanced with pronounced aromas of red berries and cherries perfumed with floral notes of violets and potpourri roses. Falak Wine comes in a Bordeaux style bottling and this differentiates it from other labels.

The label of the Falak Wine is a hand-sketched caricature which was well researched and thought through. The young Chardonnay and the Cabernet Shiraz have been aged in oak wood barrels for over a year to give them a perfect structure and well-balanced tasting notes.





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Aabkari Times is a first Hindi monthly news magazine on alcohol, sugar and prohibition being published from Allahabad since 2009. The editorial team has retired excise and sugar dept. official. This magazine covers different articles and news on govt. policies related to sugar, alcohol, ethanol.

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CERTIFICATIONS : A TOOL TO QUALITY ASSURANCE



DR. JYOTI VOHRA JOHAR

Msc (Microbiology) PhD

Quality is at the core of what we do and Certifications are keymakers in instilling Quality and best approaches to customer satisfaction.

Every business has three basic challenges that threaten their success:

1. Comply with customer requirements and government regulations and standards.
2. Protect the organisation through embedding quality and instituting best practices.
3. Grow the organisation, extending the customer reach and satisfaction, thereby increasing revenue.

Management systems allow organisations to meet these challenges by standardizing best practices and validating through certifications, that they are properly established in the company. Internationally recognised standards, reap substantial benefits.

By having a quality system in place, a manufacturer can reliably provide a quality product to their customers. Using objectives, standardized methods and metrics, employees are engaged throughout the entire process to, ensure a final quality product shipped to the customer. Overall the purpose of certification is to “demonstrate that specified requirements are met”.

MALTO DEXTRINE (MDP)



RUPAK KUMAR CHATTERJEE

Yamuna Nagar (Haryana)

Raw Materials

1. Maize
2. Rice

Here is the process from “Maize starch slurry” after refined process.

Process

1. Jet Cooking
2. Dextrinization
3. Analytical testing
4. Filtration (Separation of Gluten)
5. Bleaching, Filtration
6. Ionexchange (Purification, removal of impurities)
7. Bleaching filtration
8. Evaporation:
 - Here evaporating from initial solid 22%-23% to 55% to 58%
9. Dryer:
 - Here feed solid 55%-58% to dry powder by maintaining bulk density and moisture content.
 - Generally bulk density: 0.55 to 0.58g/cc and moisture 3-4% (as per requirement)

Packing

1. In HDPE bags with inside liner
2. Paper Bags
 - As per customer requirements and depends upon the product
 - Weight: 25kgs

Malto Dextrine easily digestible carbohydrates which are completely soluble in water, fruit juice, milk and other liquid foods

Applications

- Dairy Industry
- Bakery Industry
- Sauces, soups & gravies
- Flavour foods
- Baby foods
- Fruit Drinks
- Etc



BrewTimesTM



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