

The Sugars of Tripel



How different brewing sugars effect your beers flavor profile.

Presented by Ted Hausotter

Special thanks to the following tasting panel:

Gordon Strong, Grand Master 5

Phil Farrell, Grand Master 1

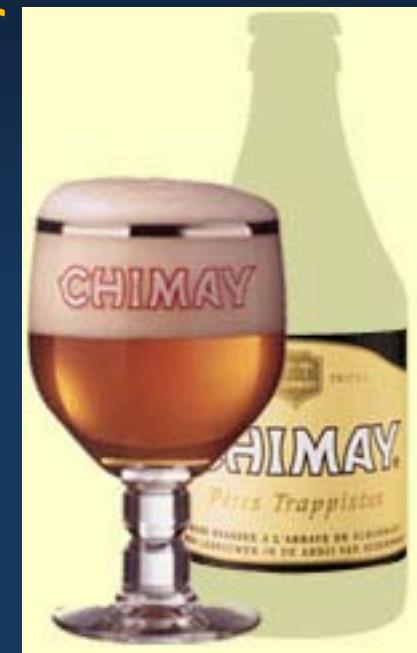
Mark Emiley, Master

Greg Doss, Wyeast Laboratories



Class Outline

1. What is a Tripel
2. Why use Sugar
3. Common Brewing Sugars
4. Tasting 5 Tripels with different sugar
5. Vote on the best



What is a Tripel?

Tripels are a higher alcohol, golden Belgian ale.

- Color is gold, 4.5-7° L
- Spicy and fruity esters
- Phenols, usually pepper
- Light malt flavor and aroma
- Low to moderate spicy hop character
- Bitterness is a combination of phenols and hop bitterness
- OG 1.075 to 1.085, FG 1.008 to 1.014
- Sugar is the key to raise alcohol and keep the body light

Does Sugar make a Difference?

- Why is one batch better than the next? Ever make a perfect Tripel and the next is not as good?
- Is it yeast strain? To eliminate that possibility, I made 5 Tripels and fermented them on 5 different yeasts, still not the perfect Tripel.
- Is it sugar? Yes, each sugar will give different flavors, and it is not the same for each yeast strain. We will try 5 Tripels, each brewed with a different sugar.

Common Sugars in Brewing



Glucose

Fructose

Sucrose

Maltose

Raw Sugar

Invert Sugar

Honey

Glucose

- Monosaccharide
- Corn Sugar
- Also called Dextrose
- Fermentable by Yeast as is
- Relative Sweetness Level 74.3
- Energy source for most organisms
- $C_6H_2O_6$

Fructose

- Monosaccharide
- Common fruit sugar
- Fermentable by Yeast as is
- Sweetest natural sugar
- Relative Sweetness Level 173
- $C_6H_{12}O_6$ Same as Glucose!
- Found in Honey, Invert Sugar and High Fructose Corn Sugar

Sucrose

- Disaccharide: Glucose bonded to Fructose
- Common Table Sugar
- From Beets and Sugar Cane
- Yeast can ferment using enzyme invertase
- Relative Sweetness Level 100
- Main sugar in Pineapple and Apricot
- Private labels are beet sugar



Maltose

- Disaccharide: Glucose bonded to Glucose
- Malt Sugar
- Fermentable by yeast using Maltase
- 2 Glucose molecules joined make Maltose
- 3 Glucose molecules joined make Maltotriose
- 4 Glucose molecules joined make Dextrin
- Many Glucose molecules joined make Starch
- Relative Sweetness 32.5

A close-up photograph of a pile of raw sugar crystals. The sugar is light-colored with some darker, molasses-like specks. It is scattered across a dark, textured surface, likely a kitchen counter.

Raw Sugar

- Turbinado: the sugar is only partially processed, leaving some molasses. It is blonde colored.
- Demerara: similar to Turbinado sugar but darker and has more molasses flavor. It is tan colored.
- Muscovado: a British specialty brown sugar with a strong molasses flavor. Color is dark brown

Brown Sugar

- Sucrose sugar with molasses
- Molasses can be added after refining or can be partial processed or raw.
- Light Brown sugar has 3.5% Molasses
- Dark Brown sugar has 6.5% Molasses
- Private label brown sugar is usually beet sugar!
- If you can wash off the brown color, molasses is added to refined sugar.



Molasses

- By product of the manufacture of sugar
- Contains all the vitamins and minerals left behind in the processing of the sugar
- Cane sugar Molasses is what is offered in stores.
- Beet sugar Molasses is usually used for livestock feed.
- Produced by boiling the raw sugar to crystallize it, then removed, leaving the light colored molasses behind.
- Second boil leaves behind a darker molasses.
- Third boil leaves behind the darkest, black strap molasses. The least sweet of all molasses.
- Used in Rum



Invert Sugar

- Made from Sucrose
- Breaks down the bond between Glucose and Fructose
- Sweeter than Sucrose due to Fructose
- Golden Syrup is 56% invert sugar and 44% sucrose
- Lemon juice added to water and Sucrose heated to a boil and held will make invert sugar
- Similar to High Fructose Corn Sugar, usually 55% Fructose 45% Glucose

Invert Sugar Syrup Recipe

1# Table Sugar

1 qt water

One of the following acids: $\frac{1}{4}$ tea cream of tarter,
 $\frac{1}{4}$ tea citrus acid, 1 tea lemon juice

Boil sugar, water and acid for 20 minutes. Taste it prior to boiling and compare sweetness. You may want to boil longer. As the sweetness increases, so does the amount of inverting. For candy, drop the water down to a minimum, just enough to dissolve the sugar. 300° is hard crack candy temperature. The length of time the solution boils getting to temperature gives the color to the candy. Water can be added to the solution to keep it cool for color development. Recipe will add 8 gravity points to your beer.



Belgian Candy Sugar

- Available in hard or liquid form
- Light, medium and dark
- Made from inverting Sucrose
- Not fully inverted!
- Blend of Sucrose, Fructose and Glucose
- Darker colors have some caramelization

Honey



- Made from bees collecting nectar from flowers
- Each type of flower nectar tastes different
- 38% Fructose
- 30% Glucose
- 7% Maltose
- 1% Sucrose
- 3.5% Higher sugars
- 17% Water
- 3.5% other
- Relative Sweetness 97



Brewing Process



- 15 gallon Belgian Pale Ale starter
- Tripel brew date 4/3/10
- 25 gallon recipe
- 52# Malt
- 5# Sugar
- (2) 15 gallon mash tuns
- (2) 15 gallon boil pots
- Added 2.5 gallons into each carboy from each boil pot.
- Fermented in (5) 6 gallon carboys
- Sugar added after full fermentation
- Original Gravity 1.075 prior to sugar addition
- Finish Gravity 1.009 prior to sugar addition
- Finish Gravity 1.0075 after sugar addition



Tripel Recipe

25 Gallons, 90% BHY, 31 IBU

47# Continental Pilsner Malt

5# Imported Vienna Malt

5# Sugar

1.9 oz Columbus hops 15% A 60 min boil

3.3 oz East Kent Goldings 5% A 30 min boil

3.3 oz East Kent Goldings 5% A 5 min boil

1 yeast slurry Wyeast 3787

Mash 18.15 gallons water at 147° till conversion, no mash out. Boil, adding first addition hops when protein start to coagulate. Chill to 70° and pitch yeast, past slurry is best. Ferment at 70°. Add sugar in 1 qt water, boil to sanitize, chill to 70° and add to fermenters when fermentation has slowed.



Preference Ranking of Tripels

based on 9/07 batch with Wyeast 3944 yeast

	1 Month	4 Months	5 Months
Base, no sugar	4	4	4
Belgian Candy	1	1	1
Corn sugar	2	2	5
Cane sugar	3	3	3
Brown Sugar	5	5	2

Tasted and ranked independently by 2007 Advanced Judge Training Class (1 month), Good Libations homebrew club (4, 5 months). Strange Brew home brew club (4 months)

Lessons Learned

- All sugars are different in flavor and aroma.
- Sugar flavor contributions are yeast strain dependant.
- If it is not great, let it sit a few more months or even a year.
- You can not invert Corn Sugar!
- Pick a yeast and start working out your recipe.
- Cider flavors are part of Sucrose's profile but are yeast strain dependant!
- Cider flavors fade over time.

Special Thanks to the following
Wyeast Labs
Brewcraft USA
Hop Heaven



Sources:
BJCP Style Guide
The Sugar Association
National Honey Board
Wikipedia