CALCULATIONS AND FACTORS YOU SHOULD KNOW ABOUT A SUGAR WASH

CALCULATION 1: RATIO OF YEAST TO SUGAR

Ratio Of Sugar To Alcohol In Fermentation

1. Need 17g of sugar to make 1% of alcohol (Theory) use 18g
2. Aim for 13% (ABV) alcohol
3. Wash size 25L

Calculate how much sugar you need

Based on Bakers dried yeast: 10 > 13% alcohol

To get to the 13% ABV in the sugar wash depends on the amount of sugar used.	
Theory 1 - Calculation	**Theory 1 - Example 1**
18g x 13% (ABV) x 25L	18 x 13 x 25
	5850grams
	= 5.85kg of sugar needed.
Theory 2 - Calculation	**Theory 2 - Example 2**
17g x 13% (ABV) x 25L	17 X 13 X 25
	5525grams
	= 5.5kg of sugar needed.

REAL WORLD EXAMPLE

18g of sugar x 13 (%ABV) x 25L (wash size)
= sugar needed

CALCULATION

Example 1: 18 x 13 x 25
= 5.85kg

Example 2: 17 x 13 x 25
= 5.85kg

CALCULATION 2: CONVERSION RATE OF SUGAR TO ETHANOL

In theory you should get 51% but in real life the conversion rate depends on a factors like temperature, cuts, fermentation etc.

The actual conversion rate can be between **42% > 48%** depending on the yeast strain used.

For every gram of sugar converted during fermentation **48% (after losses) 480ml alcohol is made.**

Simple based on 48% conversion	
Theory - Calculation	**Theory - Example**
480ml x 5.6Kgs (sugar)	= 2.6L Pure ethanol

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CALCULATION 3: YEAST CALCULATIONS AND TIPS

Calculate how much yeast is needed per 25 litres of wash.

Yeast needed for Fermentation of 25L batch	
Description	**Calculation**
Ratio of yeast to liters alcohol	= 1.5
Wash size	=25L
Constant temp Celsius	= 28 Celsius
Yeast needed for 25 L	= 25 x 1.5
	= 38g of yeast

REAL WORLD EXAMPLE

Wash size x Ratio of yeast to liters alcohol
= Yeast needed for 25 L

CALCULATION

Example: 25 x 1.5
= 38g of yeast

Tip 1: Yeast test to see if healthy (active)

- Fill half cup with hot tap water
- Dissolve 1 teaspoon in the half cup of hot tap water
- Add roughly 1 teaspoon of yeast into the cup with hot water & sugar
- Stir after 5 minutes, what should happen is the yeast will feed on the sugar and rise. What does this tell you? If the yeast rises within 10 minutes then the yeast is active. If slight or no rise then the yeast is inactive. Do not use.

Tip 2:Yeast role in ABV process

- The first factor in ABV production s how much fermentable sugars are there to convert to alcohol during fermentation. The selected yeast has a Alcohol yeast tolerance that determines how much alcohol it can make in ratio to yeast to sugar to water. Baker's yeast Alcohol tolerance level 10 > 13%
- First calculate how much sugar is needed with 13% ABV, 25l wash and sugar needed taking into losses.
- 18g sugar x 25L wash x 13% ABV wanted
- 18 x 25 x 13 = 5.8kgs of sugar needed.

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CALCULATION 4: TEMPERATURE CORRECTION FOR ALCOHOL HYDROMETER

- A Proof alcohol spirit Hydrometer is calibrated at 20°C, to measure only the pure ABV spirit %.
- Should the actual temperature of the pure spirit measured be higher (spirit less dense) or lower (more dense) than the set 20°C on the meter you will read the wrong reading.
- This is no problem as you can use the temperature calibration figures supplies with the meter and adjust to get more accurate reading ABV reading and make adjustments if necessary.
- When diluting the alcohol to 38 > 41 % ABV the reading here will be more accurate, easier to handle. Remember to check the abv before adding any essence.
- Take a sample ABV at 40% and measure it at 10°C, 20°C and 30°C and you will see a difference in readings. This is for yourself to do.
- Dilute the alcohol to the ABV you want as any other additives such as glucose, flavourings etc. will affect the spirit density reading. What these additives do is affect the density of the spirit, making it lighter.

Correction Alcohol Meter, Based On Actual Distilate Temp.

**Rule of thumb is for every for every 1°C (33.8°F) over 20°C (68°F) 0.33% off the initial ABV reading.*

Actual spirit meter reading	
Description	**Value**
Example Initial ABV	= 94%
Spirit temp at parrot	= 30°C
Factor	= 0.33%
Difference in temp x Factor	= 30°C - 20°C
	= 10 °C x .33% (factor)
	= 3.33
ABV calculation	= 94 – 3.33
ABV	= 90.67 %

REAL WORLD EXAMPLE

Initial ABV = 94
Spirit temp at parrot = 30 Celsius
Difference in temp = 20 Celsius
Factor = 0.33%

CALCULATION

Initial ABV - [(Difference in temp) x Factor] = Final ABV
94 - [(30°C - 20°C) x 0.33%]
94 - [10°C x 0.33%]
94 - 3.33
FINAL ABV = 90.67%

CALCULATION 5: CALCULATE CONTENT OF ALCOHOL

REAL WORLD EXAMPLE

Open gravity (OG) - Final gravity (FG) x 131.25 / 10 = Potential alcohol

CALCULATION

(1.095 - .096) X 131.25 / 10
= 13.1% Total Potential alcohol

CALCULATIONS AND FACTORS YOU SHOULD KNOW ABOUT A SUGAR WASH

CALCULATION 6: BASICS FOR DILUTING ALCOHOL FOR DIY HOME DISTILLING SPIRITS

Dilute 6 Liters of alcohol ABV @ 90% to 40%	
Total volume of alcohol expected	**= (Start alcohol % / desired alcohol %) X start volume (pure alcohol)**
	= (90% / 40%) X 6L
	= 13.50L of alcohol at 40%
How much water should be added	= 13.5L total vol – 6L start volume (pure alcohol)
FINAL: Amount water added to 6lt	**= 7.5L**

Great tip for dilution for your spirit

To play it safe add 7 litres of water to the start volume, mix then check the alcohol strength using an alcoholmeter and test tube. Once satisfied add the balance of water to bring it down to the 40% mark.

REAL WORLD EXAMPLE

Sum 1:
(Start alcohol % / desired alcohol %) X start volume (pure alcohol) **= Total volume of alcohol expected**

Sum 2:
Total volume of alcohol expected - start volume (pure alcohol) **= amount of water**

CALCULATION

Sum 1: (90% / 40%) X 6L = 13.5L of total volume

Sum 2: 13.5L - 6L

= 7.5 L of water to be added

CALCULATIONS AND FACTORS YOU SHOULD KNOW ABOUT A SUGAR WASH

CALCULATION 7: ALCOHOL CUTS - SUGAR WASH / MASH

The amount of Foreshots / heads and tails on a mash is far greater than a sugar wash due to Purity and ingredients used.

- The low purity 40 % ABV from a pot still
- The high purity of 95% ABV on a reflux column

Please note this is not a hard and fast rule as with a sugar wash DIY you lump the Foreshots and tails as one unit. You can collect 50 > 100ml on a sugar wash

When distilling the cuts are as follows

• Foreshots	(Bad)	= 2 > 5%	Dump
• Heads	(Bad)	= 30%	Dump / rework
• Hearts	(Good)	= 30%	Good Stuff
• Tails	(Bad Feint)	= 35%	Dump / rework small part > hearts

The trick here is do not get tails into your hearts, but hearts into tails which can be separated using jars that only hold 30% in each one.

Here you must also be very careful as in the tails section it is best to split by taste. When you split you will see what I mean.

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