



EUPHORICS™

Bench Trial Usage Guide


The best way to gain familiarity with Euphorics™ is by performing bench trials. With this type of assay, the beverage developer will learn how to handle the liquid flavor ingredient, analyze the interaction that it has with the other components of the formulation, and experiment with single or combined additions of different Euphorics™ flavors to determine the ideal dose rate.

AN INITIAL EVALUATION CAN BE CARRIED OUT BY FOLLOWING THIS PROTOCOL

1. Prepare the following materials:
 - Euphorics™ samples
 - 10-100 µL micropipette with multiple fresh tips
 - one or more 32-fl oz pitchers or 16-fl oz glasses
 - enough clean glassware for tasting
 - an empty cup for disposing of used micropipette tips
 - marker and labels for identifying samples
2. Select a beverage for testing based on the expected outcome for the experiment. Focusing on beer as an example, a light lager or a blonde ale will provide a relatively neutral background for evaluating each of the Euphorics™ offerings at a low dose and profiling their flavor attributes. On the other hand, dosing Euphorics™ into a dry-hopped IPA will show how its flavor synergizes with a strong hop presence.
3. Define the Euphorics™ dose rate and the volume of beverage to be used for the trial. An initial set of parameters is provided on Table 1. Sticking to the examples cited above, a dose of 0.003% v/v could be a good place to start for a baseline evaluation on a blonde ale, while an IPA might call for a higher dose (0.006% v/v) to appreciate the integration of Euphorics with the hops. A dosing calculator is available at johnihaas.com/euphorics-dosing/ to assist with the execution of the trials.

Table 1. Recommended dose rates for bench trials

Matrix	Euphorics™ Dose Rate (% v/v)	Bench trials: dose for 32 fl oz (0.95 L) of beverage
Beer & NA Beer	0.003 – 0.010	28.39 µL – 94.64 µL
Waters & Teas	0.001 – 0.006	9.46 µL – 56.78 µL
Hard Seltzers & FMB	0.001 – 0.010	9.46 µL – 94.64 µL



Based on the values from Table 1, it can be inferred that rounding the volume of Euphorics™ is necessary when using a micropipette. Consider that the minimum volume of test beverage required for a 0.001% v/v dose and using a 10-100µL micropipette (rounding up to 10 µL) is 32 fl oz. However, for higher dose rates, for example, 0.006% v/v, a 16-fl oz glass would hold enough beverage volume for the experiment.

4. Fill a clean pitcher with one third of your target beverage volume, pouring gently to minimize foam formation.
5. Attach a fresh tip and load the micropipette with the required volume of Euphorics™, leaving behind any liquid adhered to the exterior of the tip. Dose Euphorics™ into the beverage, discharging the micropipette below the liquid line. Flush the pipette tip by aspirating and dispensing the dosed beverage multiple times. Discard the used tip.
6. Gently swirl the pitcher to fully disperse the Euphorics™ addition. Fill with the remaining two thirds of beverage.
7. Pour the dosed beverage into the tasting glasses and enjoy! Repeat these steps for different dosing rates, flavor combinations, or base beverages.
8. Be sure to record your experiences e.g. changes in intensity and flavor profile and aroma/flavor intensities. These will aid in scaling up your trial for commercial purposes.

Euphorics™ is at its most potent when directly dispensed into the beverages from your bench trial. What this means is that you may experience a milder impact when Euphorics™ is applied in your standard process. We recommend that you validate your dosage rate using a growler trial.

GROWLER TRIAL

1. Prepare three growlers:
 - A Control (your base beer without Euphorics™)
 - The base beer dosed using the rate determined by your bench trial.
 - The base beer dosed at a rate 20% v/v higher than your bench trial (e.g. 12 µL instead of 10 µL).
2. Dose the beers using the methodology outlined in the previous section.
3. Seal growlers and allow them to rest several hours or overnight – It is during this period that Euphorics™ will fully equilibrate into the beverage.
4. Evaluate the three beers using the same methodology as your bench trial, comparing and contrasting the samples against your recorded sensory results.
5. Should your desired outcome fall somewhere between two of the three samples, blend the two beers using a graduated cylinder, recording the ratios. These ratios can be used to scale up or down the dosage rate as needed.



SCALING UP YOUR RESULTS

Once a dosing rate has been established through bench trials, there are several ways to add Euphorics™ to a production-scale batch. While every beverage production process is unique, here is an example of how the procedure might look:

- Beer style: Hazy IPA.
 - Batch size: 20 bbl (23.4 hL).
 - The beer is fermented, dry hopped, conditioned, and packaged from a CCT (Unitank).
 - Bench trials with the base beer indicate that the ideal dosing rate is 0.005% v/v Euphorics™ Cosmic Guava.
 - There are 3 x 50 mL bottles of Euphorics™ Cosmic Guava at the brewery.
1. Plan addition time: for the best results, it is recommended to dose Euphorics™ in late stages of the production cycle. Brew, ferment, dry hop, clear VDKs, crash, cold-condition and carbonate the beer as you normally would. Then, add Euphorics™ one or two days prior to packaging.
 2. On the day of dosing, clean, sanitize and purge with CO₂ a brink or a Cornelius keg and a transfer hose.
 3. Determine the volume of Euphorics™ needed: for this example, the online calculator (johnihaas.com/euphorics-dosing), gives a result of 117 mL for a 0.005% v/v addition of Euphorics™ into a 20-bbl (23.4 hL) batch. In this case, the brewer would be using 2 x 50 mL full bottles and would need to sample 17 mL from the third bottle with a small, graduated cylinder or a 1-10 mL micropipette. Flush the headspace of the partial Euphorics™ bottle with nitrogen and store in the fridge.
 4. Depressurize and open the brink/Cornelius keg. Pour Euphorics™ in and close the brink. Purge the vessel with CO₂ one more time.
 5. Using standard procedures to minimize oxygen pickup, transfer beer from the CCT into the vessel with Euphorics to predisperse it. Then, push the beer/ Euphorics™ mix back into the CCT with CO₂. Repeat two or three times.
 6. Continue with the rest of the conditioning/packaging process as usual.

Other alternatives for dosing include pouring Euphorics™ directly into the CCT from a port at the top, followed by a recirculation or a CO₂ blast to homogenize the beer, or the use of a dedicated dosing skid for flavor additions.

RECIPES FOR INSPIRATION

Nug Jug Hazy IPA

Varietal Beer Co., Sunnyside, WA.

Original Gravity: 15.5°P

Final Gravity: 2.9°P

Calculated ABV: 6.8%

Calculated BU: 25

Grain Bill:

- 92.6% Buzz Pils
- 6.2% Flaked Oats
- 1.2% Acidulated Barley Malt

Mash Schedule:

- 154°F (67.8°C) – 60 min total, including dough in and vorlauf

Hot-side Hop Additions:

- 1 lb/bbl (385 g/hL) El Dorado® T90 – Whirlpool at 170°F (76.7°C)
- 0.5 lb/bbl (190 g/hL) Cashmere® LUPOMAX® – Whirlpool at 170°F (76.7°C)

Cold-side Additions:

- Dry hopping at day 6 of fermentation:
 - 1 lb/bbl (385 g/hL) El Dorado® T90
 - 1 lb/bbl (385 g/hL) HBC 586 LUPOMAX®
 - 1 lb/bbl (385 g/hL) Cashmere® LUPOMAX®
- Euphorics™ addition after dry hopping, during cold conditioning, 24 hours before packaging:
 - 0.007%v/v (8.2 mL/bbl or 7.0 mL/hL) Cosmic Guava
 - 0.004%v/v (4.7 mL/bbl or 4.0 mL/hL) Pineapple Paradise

We are pleased to offer support for the many uses and applications of Euphorics and can be contacted at brewing.solutions@johnihaas.com.

Peachification IPA

HAAS' Research Brewery

Original Gravity: 14°P

Final Gravity: 1.9°P

Calculated ABV: 6.5%

Calculated BU: 35

Grain Bill:

- 50% 2-row
- 50% High Color Pale Ale

Mash Schedule:

- 122°F (50°C) – 20 min
- 144°F (62°C) – 20 min
- 162°F (72°C) – 20 min
- Mash out at 172°F (78°C)

Hot-side Hop Additions:

- Columbus LUPOMAX® to a 10 BU target – 60 min. left
- Eclipse® T90 to a 5 BU target – 15 min. left
- HBC 1019 LUPOMAX® to a 5 BU target – 15 min. left
- Eclipse® T90 to a 7.5 BU target – Whirlpool
- HBC 1019 LUPOMAX® to a 7.5 BU target – Whirlpool

Cold-side Additions:

- Dry hopping at the end of primary fermentation:
 - 1 lb/bbl (385 g/hL) HBC 1019 LUPOMAX®
 - 1 lb/bbl (385 g/hL) Eclipse® T90
- Euphorics™ addition after dry hopping, during cold conditioning:
 - 0.005%v/v (5.9 mL/bbl or 5.0 mL/hL) Peachy Keen