



Style:
HAZY IPA (19L/5GAL)

Source:
Biotransformation Series

Fermented with:
LalBrew Pomona™

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Beer name and/or description: **The Rejoin IPA**

IBU: **30** | Color (SRM): **4.6** | % ABV: **5.6**

In this recipe, LalBrew Pomona™ promotes terpene biotransformation and boosts hop-derived esters. The soft floral and citrus notes from terpenes are complemented by fruity esters that are released by yeast biotransforming precursors from hops. European hop varieties are layered over flavorful British malts. [Read more](#)

Water

Mash Water	Temp.	76	°C	169	°F
		17.5	L	4.6	gal
Sparge Water	Temp.	78	°C	172	°F
		15	L	2.6	gal

Malt

Malt/adjuncts	Weight		%
	Kg	Lbs	
Golden Promise	2.9	6.5	65
Oat Malt	0.9	2.0	15
Flaked Wheat	0.5	1.1	10
Flaked Oats	0.5	1.1	10
Total	4.8	10.7	100

Mash & Sparge

	Temperature		Time (min)
	°C	°F	
Mash Step 1	69	156	
Mash Step 2			
Mash Step 3			
Mash Step 4			

NOTES

Other ingredients	Quantity	Units (L, g, etc)	Addition Point
Aromazyme	1	g	With day 1 DH
(optional)			

Boil

Wort	SG	L	gal	pH
Pre-boil	1.049	26.3	6.9	
Post-boil	1.055	23.2	6.1	
Total Boil Time	60	minutes		

Hops

Hop Variety	%AA	Weight		Kettle addition Boil Time (min)	Dry hopping Fermentation day
		g	oz		
Saaz	3.5	200	7.1	5	
Bravo	15.5	50	1.8	WP	
Simcoe	12.7	50	1.8	WP	
Idaho 7	14.1	50	1.8	WP	
Mandarina Bavaria	8.5	115	4.1		1
Jester	8.0	115	4.1		At FG
Mandarina Bavaria	8.5	115	4.1		At FG
Total	70.8	695	24.8		

Fermentation

Yeast Strain	LalBrew Pomona™			
Pitch Rate	0.58	g/L	1x 11g sachet	
Temperature	18.5	°C	65.3	°F
		SG	Plato	
OG	1.055		13.5	
FG	1.012		3.0	
Attenuation	78	%		

Whirlpool additions for 30 min at 82°C.





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LalBrew Pomona™ Biotransformation Recipe Series

Lallemmand/Escarpments Labs Collab 2: The Rejoin IPA

In this recipe, we explore the ability of Pomona to biotransform terpenes into the highly aromatic citronellol and possibly further contribute to aroma through interaction with hop-derived esters. The intention is to complement the soft floral, citrusy notes that can be gained from terpenes with fruity esters produced through transesterification of hop derived precursors such as 2-methylbutyl isobutyrate (2MIB), layering this with complementing aromas from European hops on top of flavorful British malts.

We will achieve this by a combination of methods:

- › **Use hop varieties known to have high quantities of free and bound terpene geraniol** (Motueka, Bravo) for late kettle and whirlpool additions. Free geraniol will be transformed by LalBrew Pomona™ into citronellol. By adding these hops to the kettle and whirlpool, the yeast can convert geraniol into citronellol during active fermentation.
- › **Use hop varieties high in bound terpenes** (Amarillo) for early dry hopping to allow yeast-derived beta-glucosidase enzymes to release free-aromatic terpenes and provide more free geraniol substrate for biotransformation. Optionally, a purified beta-glucosidase enzyme such as ABV Aromazyme can be used to boost the release of free terpenes.
- › **Late dry hop with varieties known for high free terpenes** (Motueka) and hop esters for added complexity.

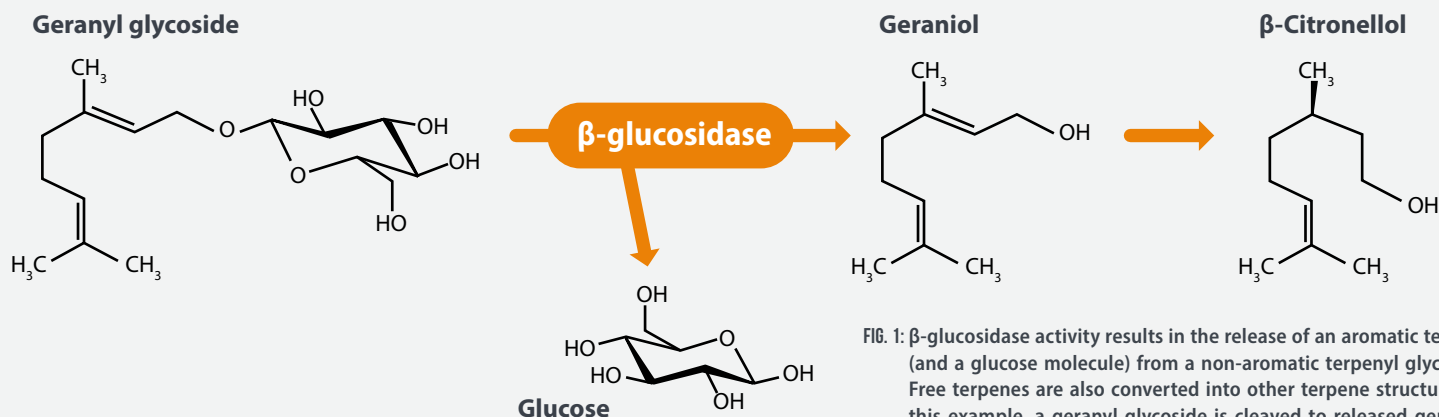


FIG. 1: β -glucosidase activity results in the release of an aromatic terpene (and a glucose molecule) from a non-aromatic terpenyl glycoside. Free terpenes are also converted into other terpene structures. In this example, a geranyl glycoside is cleaved to released geraniol, which is then converted into β -citronellol.

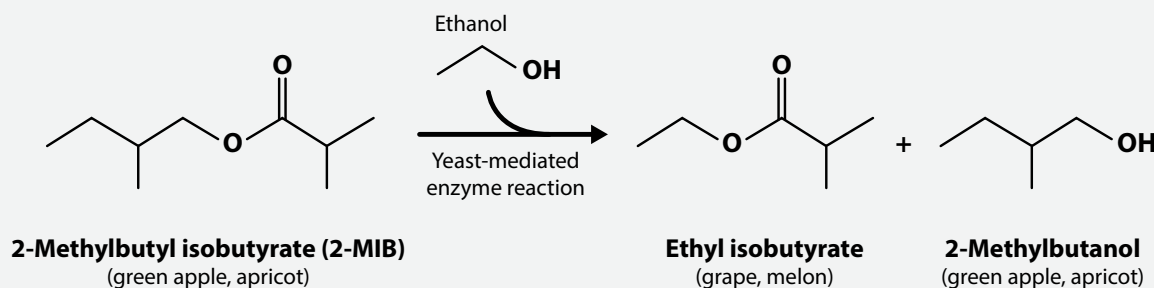


FIG. 2: Transesterification of hop-derived esters such as 2-MIB through yeast-mediated enzyme reactions can increase concentrations of ethyl esters such as ethyl isobutyrate.