

# Craft beer production in Río Azul Brewing

Terrón Hernández D<sup>1,2</sup>, Del Río Pérez E<sup>1</sup>, Ibeas JI<sup>2</sup>.

<sup>1</sup>Río Azul Brewing. <sup>2</sup>Area de Genética Centro andaluz de Biología del Desarrollo (CABD), Universidad Pablo de Olavide

## The brewing process

Río Azul is a brewing Company in Seville which is producing craft beer since 2017 (Fig. 1). This company produces IPA, Stout and blonde beers. The brewing process in Río Azul starts with the reception and milling of the malts, making enzymes ( $\alpha$ -amilase and  $\beta$ -amilase) and sugars of the malt grain more accessible (Fig. 2A). Then, the malts are introduced into the mash tun and mixed with water around 68°C (B). Then temperature reach 65°C and about 60 minutes later mashing is completed, producing sugars fermentable by yeast. At this point pH and original gravity are measured. Further the wort is splitted from the malt grains by filtering in the lauter tank (C) and sent to the boiler tun where hop will be added to the wort and boiled around an hour (D). Finally turbs are removed by whirlpool (E) and clean wort is cooled down to 20°C (F) and transferred to sterile fermentation tanks (G) where the beer yeast is added. Finally it took 2 to 3 weeks to complete the fermentation and conditioning and then beer is bottled (H).

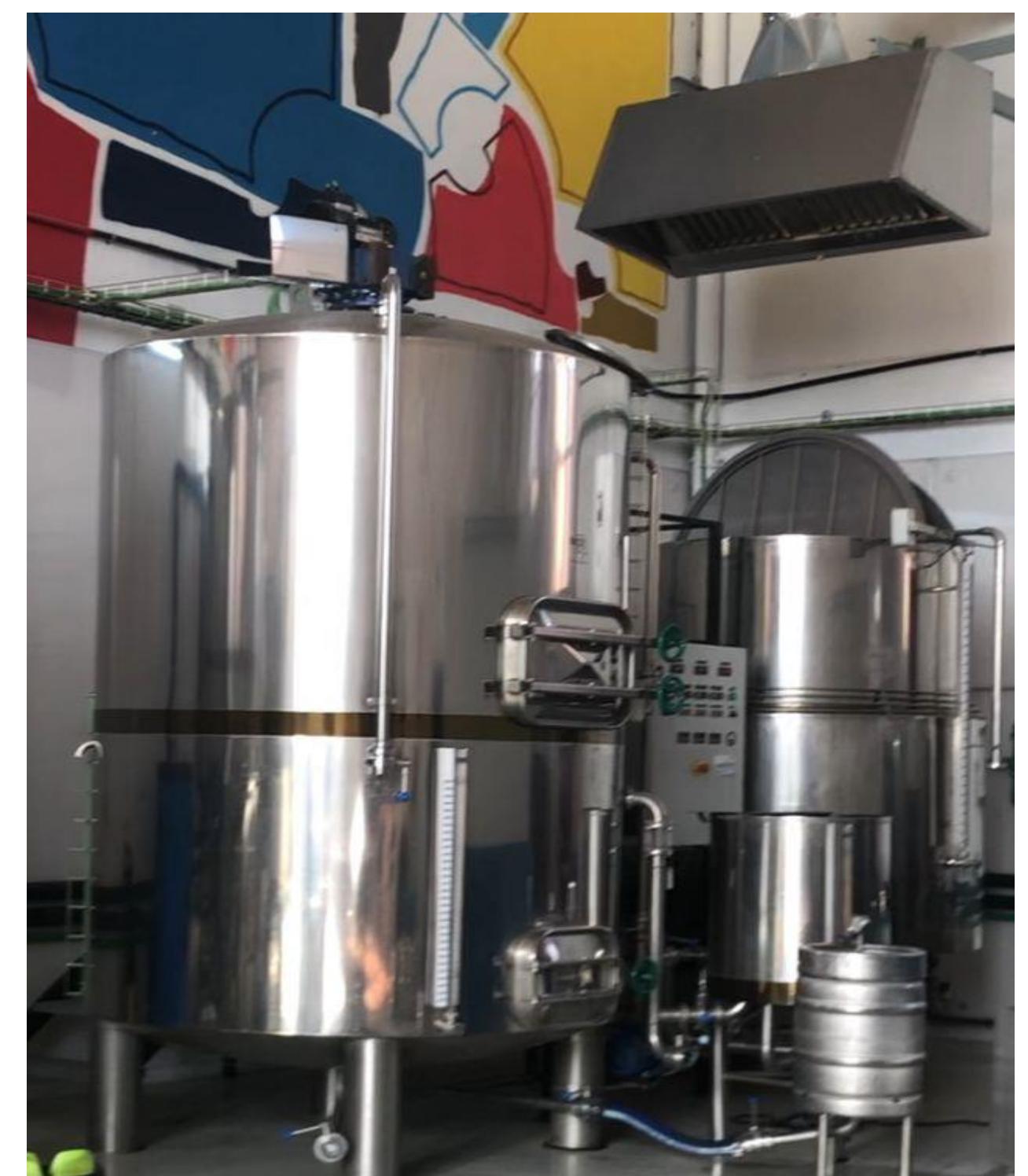


Figure 1. Mashing and boiling tuns in Río Azul



Figure 2. Brewing process

## Beer production control

In order to get consistency during beer production some parameters have to be monitored. During my work in Río Azul I have been collaborating in every step for beer production and controlling the wort pH and gravity during mashing and fermentation.

## Results and conclusions

After the analysis of pH and gravity for wort and beer in different beer stiles we have observed that these values shows small differences among different lots which indicate that the methodology is not easily reproducible. Nonetheless, these values are among valid ones and the final parameters are correct to make a high quality beer. Remarkably we have observed that:

- In three different IPA beer production studied, IPA I present noticeable differences in the original gravity compared to IPA II & IPA III, what will produce longer fermentation as well as a higher alcohol content in the final beer. Thus, a better control of the mash process in raw materials, time and temperature is required to ensure consistency (Fig. 3 & 4)

When three different stile production were analysed we found that:

- The Stout beer has a lower pH and a higher original gravity that the other styles. This is because the use of torrefact malts and more quantity of malts used to craft it. It produces a beer that shows a perfect balance in flavours with more than 10% alcohol. (Fig. 5)

- The Blonde beer is the fastest one to be fermented (~1 week) as it has the lower difference between original and final gravity, followed by IPA (~2 weeks) and Stout (~3 weeks) although for these last two, most of the sugars is fermented in one week. (Fig. 6)

- The maximum yeast fermentation capacity starts at the 3<sup>rd</sup> day after the inoculation for all beers and ends one week after it. It takes about 3 days to reach the maximum yeast growth, sugar intake and alcohol production (Fig. 6). Thus probably a better conditioning for yeast before inoculation is required to speed up the fermentation

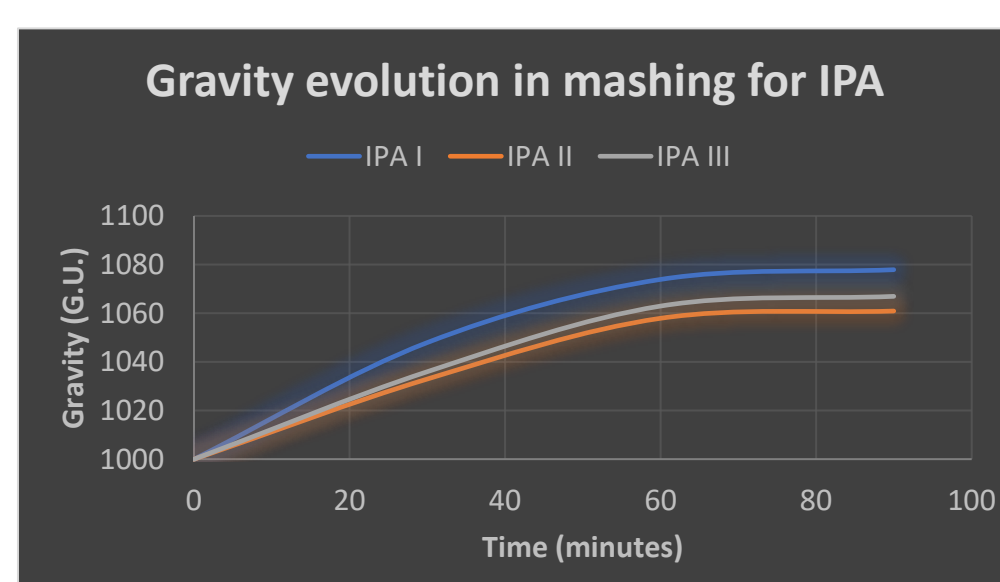


Figure 3. Gravity evolution during mashing for three different IPA brew processes

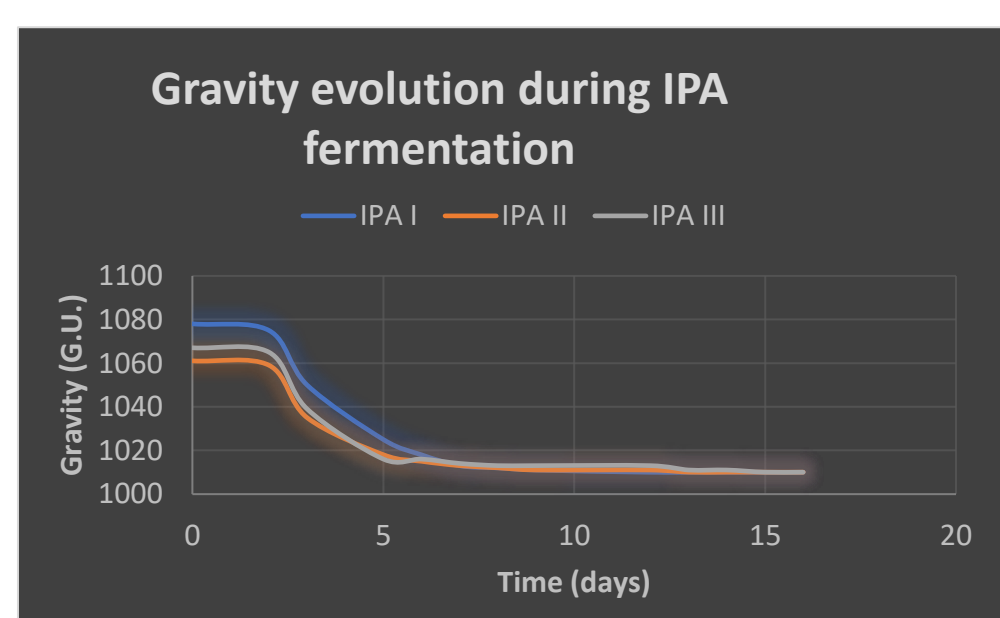


Figure 4. Gravity evolution during fermentation for three different IPA processes

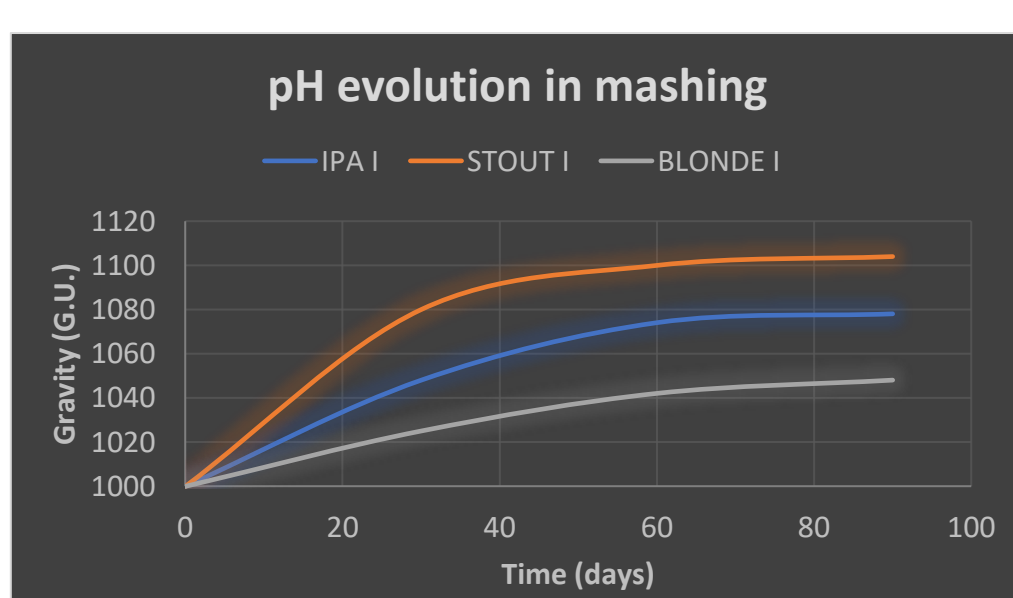


Figure 5. Gravity evolution during mashing for three different style of beers

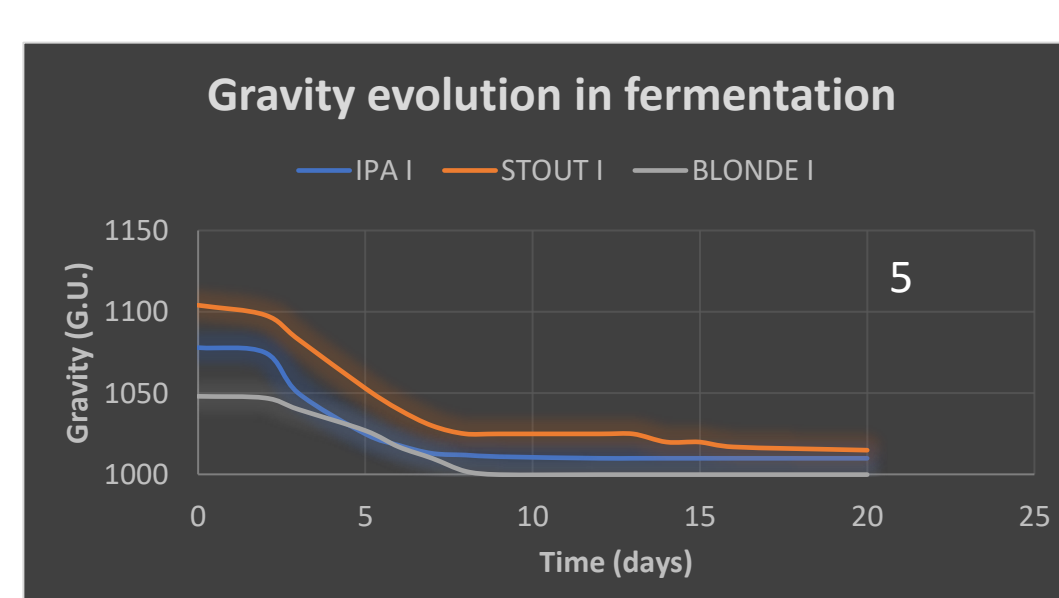


Figure 6. Gravity evolution during fermentation for three different style of beers

## References

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- C. White, J. Zainasheff (2010). Yeast: The practical guide to beer fermentation, 30-35;70-72.