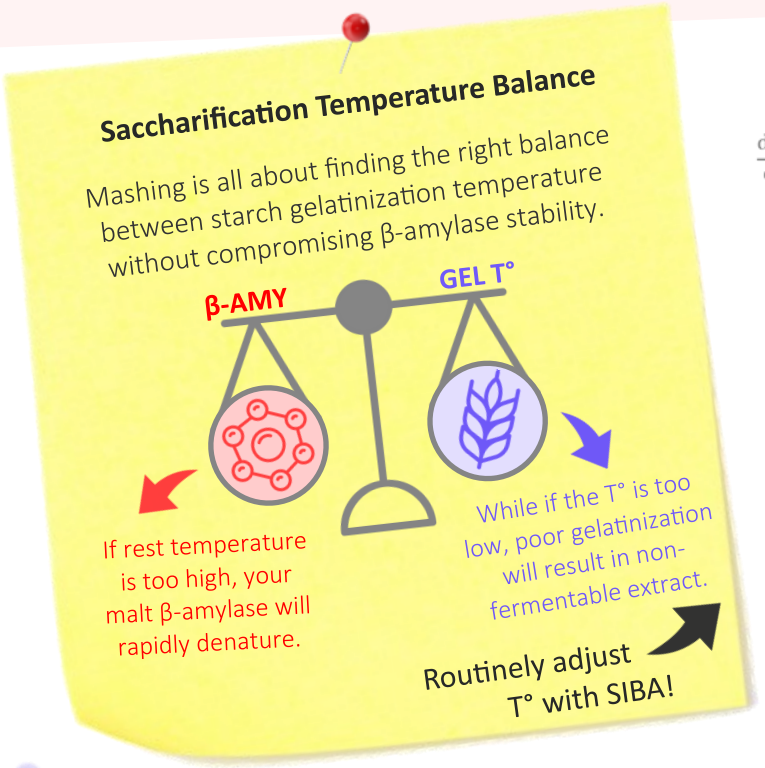
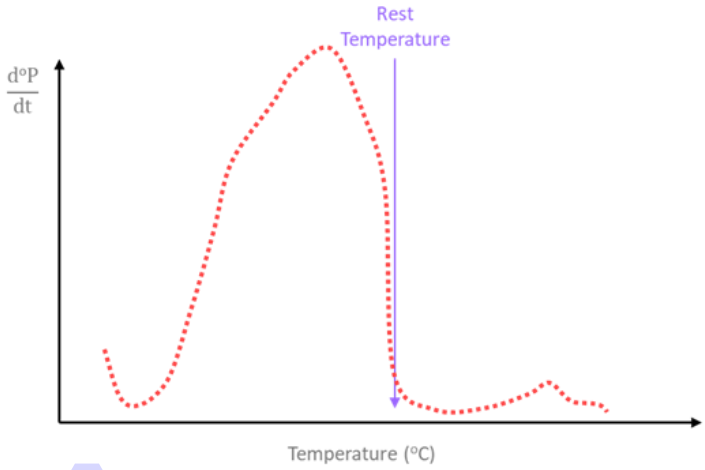
Increased RDF by Adjusting Mashing to Gelatinization Properties with SIBA

Malt gelatinization highly varies depending on the type, quality, seasonal fluctuations and even batch heterogeneity, causing changes in final wort parameters. Routinely use of the SIBA technology in several industrial breweries has shown huge potential in adjusting the mashing temperature scheme to meet malt gelatinization properties. The SIBA technology can track this property by the gelatinization plots, tracking the extract formation rates for the different degrees during the mashing process. By slightly adjusting the saccharification rest a few temperatures to meet malt gelatinization properties, one can benefit from significant fermentable quality extract increases and brewhouse performance.



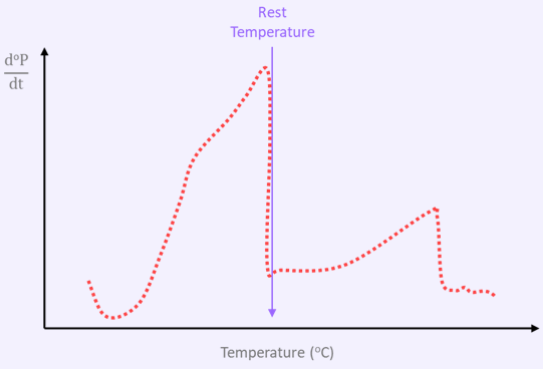


Optimal temperature

- Good temperature balance
- Required action: maintain performance

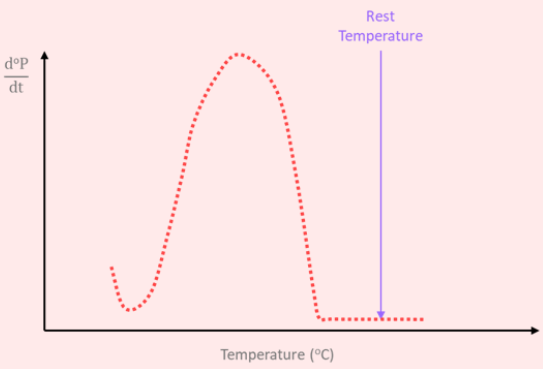
Too **cold** temperature

- Late extract formation
- Fermentability compromised
- Required action: increase rest T°



Too **hot** temperature

- β-amylase activity compromised
- Required action: decrease rest T°



Increased RDF by Adjusting Mashing to Gelatinization Properties

SIBA technology has helped several breweries around the world their processes to meet variable malt quality properties on a daily basis. Together with the Specshell consulting team, the baseline recipe is analyzed to evaluate saccharification and gelatinization temperature balance, and if required the process temperature is adjusted to meet malt gelatinization requirements. The small temperature adjustments can bring big improvements on extra fermentable extract formed during the process, optimizing the brewery performance. The brewery is then entitled to savings by increasing adjunct ratio, reduce enzyme dosage,...

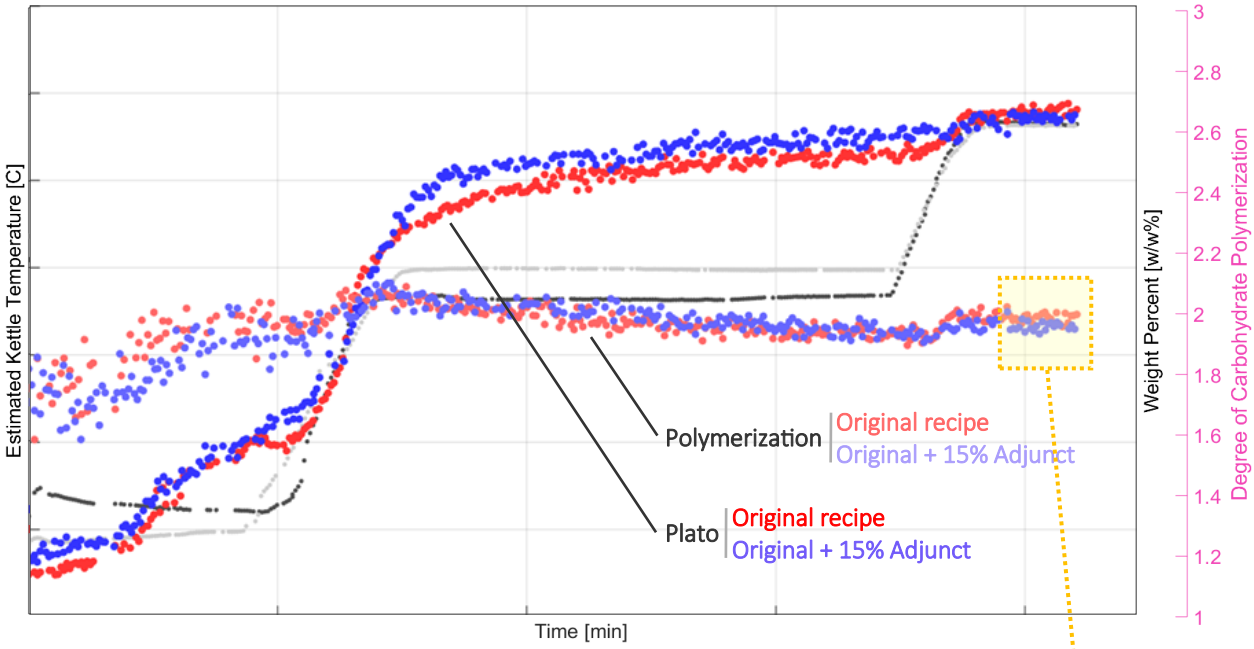


Figure 2B.I — Real case SIBA plots showing base recipe - red representing extract development and pink showing polymerization - and improved recipe with 15% more adjunct - purple representing extract development and lila showing polymerization - (rest of SIBA data not shown).

3 Stage Rocket Optimization

1. Observe Baseline Recipe
2. Adjust temperature to optimize enzyme and gelatinization balance
3. Optimize process and benefit from savings

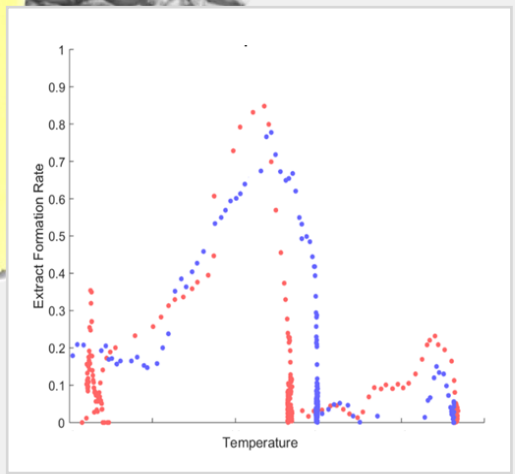


Figure 2B.II — SIBA gelatinization plots showing base recipe - red - and improved recipe with 15% more adjunct - purple - representing a more suitable rest temperature for this particular malt.

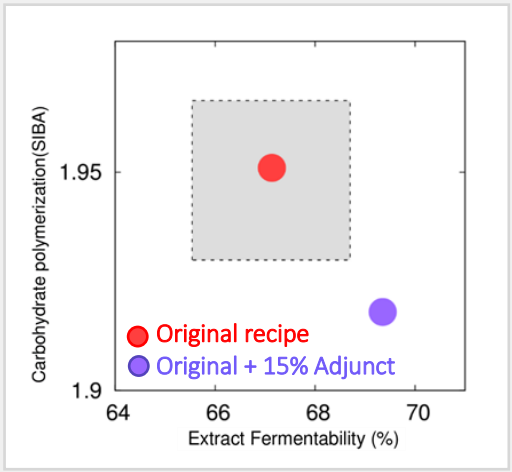


Figure 2B.III — SIBA fermentability plots showing base recipe - red - and improved recipe with 15% more adjunct - purple. SIBA data - wort carbohydrate polymerization - has been directly related to extract fermentability values in order to predict wort RDF. As a quality control tool, the grey box is limiting the RDF specifications for this particular recipe, showing how the base recipe falls into them, while the improved recipe has higher fermentability and room for recipe optimization.

3% points increased RDF on the described case