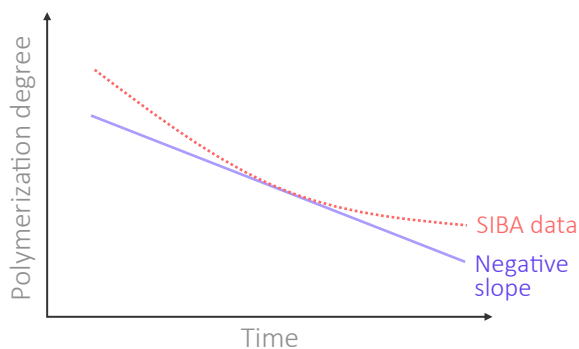


Reduce Mashing Time by Enzyme Activity Digitalization with SIBA

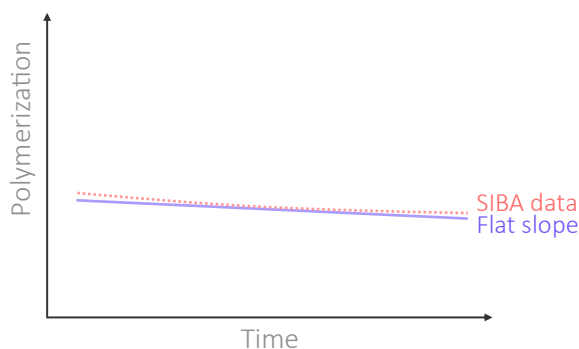
Enzyme activity is crucial during the mashing process in order to produce fermentable sugars in the wort. To date lengthy trials are used to optimize starch hydrolysis, involving extensive amounts of labor intense laboratory work. SIBA can not only compute this conversion automatically in-line and live, but is also able to track enzyme activity by analyzing trends on the average polymerization degree of the wort during mashing.

The SIBA technology is crucial to boost enzyme performance in the mash tun and reduce periods in which enzyme activity is low or zero. The degree of polymerization tracked by SIBA will show the average number of monomeric units of the carbohydrates in solution, giving an indirect reading of the saccharification process. This will allow the brewer to eliminate bottleneck problems in the mash tun, while maintaining the highest quality of the wort.



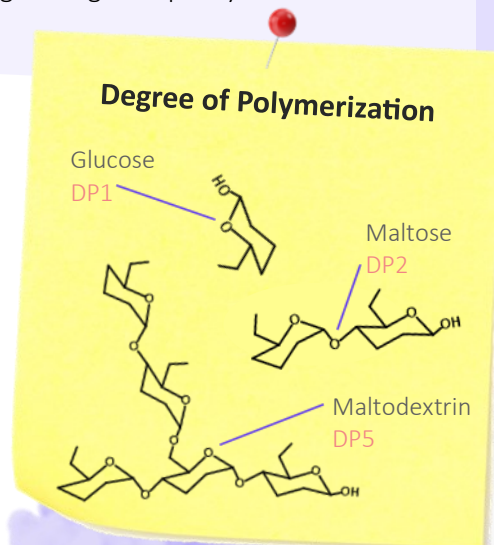
Active saccharification

- Substrate being hydrolyzed
- Active amylase



In-existent saccharification

- No conversion
- Amylase not working
- Enzyme inactivated or process completed



Optimize

Together with Specshell, brewers can optimize their processes by cutting down the mashing process were the enzyme activity is low or zero. Typically, a mashing time reduction of 10-25% can be achieved without compromising the wort fermentability and quality, on those breweries were this objective was in focus.

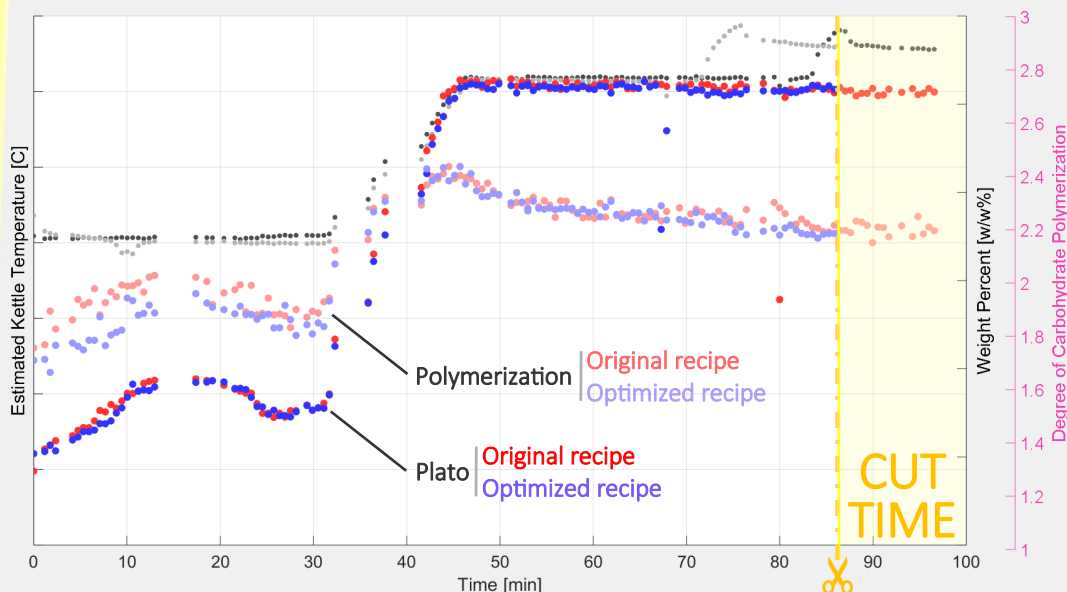


Figure 1A — Real case SIBA plots showing base recipe - red representing extract development and pink showing polymerization - and improved recipe - purple representing extract development and lila showing polymerization - (rest of SIBA data not shown). Mashing time was reduced 15min from original recipe without compromising rest of parameters.