

# Intelligent Lauter Tun Automation

(Introduction)

Huppmann's answer to the ever-increasing demand for simple and intelligent lauter tun automation is the "Multifunctional Lautering Management" (MLM).

This tool, which is already available in version 5 today, simplifies the control of the lautering process and makes it more reliable. The article describes the function and the results from practical application.

## Full of expert knowledge

In the lauter tun control the number of control variables is higher than the number of significantly available measured variables; therefore complex information processing is required. The existing expert knowledge is incorporated in this control system in so-called control modules. The practical implementation is realized in the MaxXControl software, an engineering tool which allows to build up the requested control procedure without extensive programming. The PC-based control system intervenes in the PLC via an OPC-server.

## Robust in practice

The technologist specifies his requirements with regard to turbidity, yield and lautering time in recipe forms. Detailed recipe parameters can be stored there for each beer type. These parameters can be changed at any time. Sparging can be adjusted from continuously to discontinuously. The intelligent control system now calculates the profile of the lautering volume flow. The course of spargings can be specified according to different methods (linear, progressive, degressive course). With this, the user does not only have the lautering time always under control.

The MLM version 5 (see Fig.1) controls all steps of the lautering process from cloudy wort pumping up to the final spargings. With the application of MLM, the time for commissioning and project planning can be reduced considerably. The user can easily keep the main process parameters like time, turbidity and yield under control. MLM is suitable for different process control systems and is not dependent on the system. Up to four lauter tuns can be controlled with one MLM. Occupancy times can be preset very precisely with variations of less than 60 seconds.

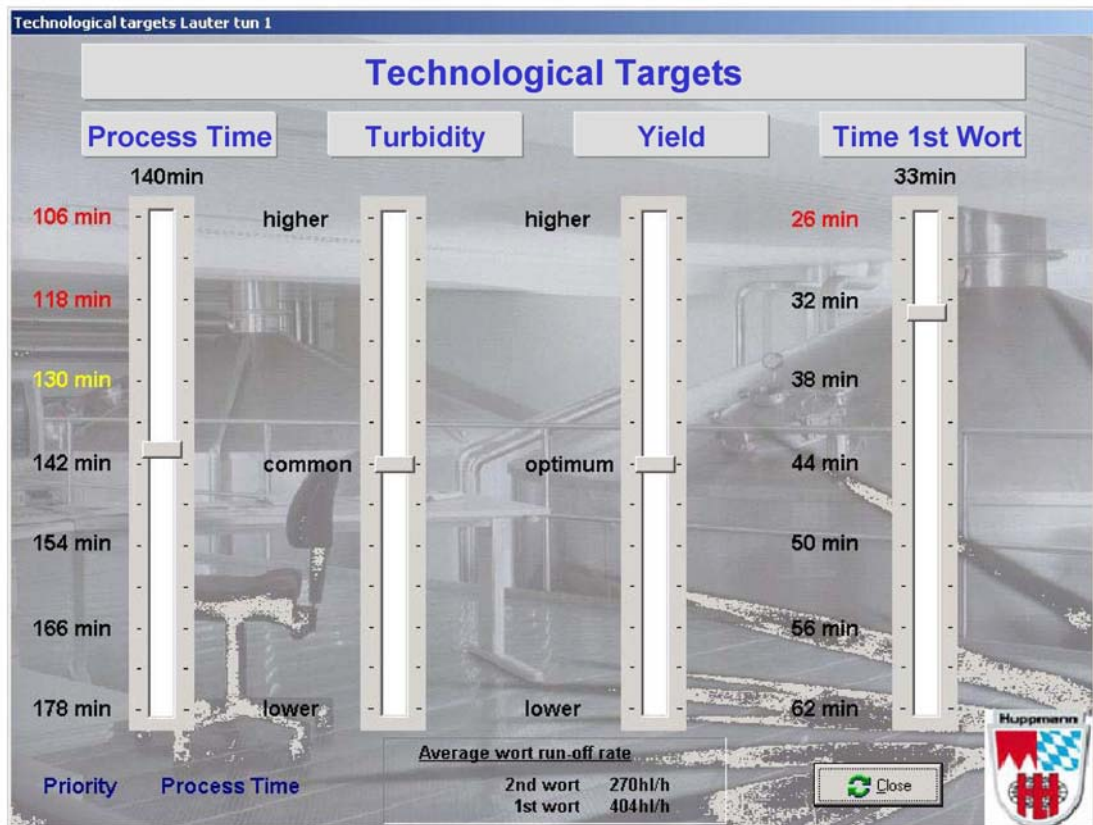


Fig 1: All relevant technological targets under control. The operator interface of the MLM.

## Technological features

### Process time

MLM allows constant process times for each brew. MLM ensures minimum process times under changing conditions. The process time is regulated via the lautering speed during first wort lautering and sparging with the advantage of yield maximization, if sufficient time is available. In addition, process-dependent adjustment of the first wort time is possible. Fact is: Optimum utilization of time (e.g. in dependence on mashing) allows minimum turbidity with maximum yield!

### Turbidity

MLM allows to simply influence turbidity by means of variable setpoint input for the raking machine control. Fact is: The better the given process time reserves are utilized, the lower the turbidity values (nonlinear)!

### Yield

MLM makes it possible to directly influence the yield by means of variable setpoint input for the raking machine control. With MLM, the best possible yield is always achieved, if this is compatible with the preset lautering time. Fact is: If the highest possible yield has top priority, the overall turbidity value can increase depending on the malt quality.

### Economically most interesting

In practice, MLM has already shown an excellent performance in numerous applications in very different configurations. It reduces the "operator drift", the frequently experienced

gradual deterioration of the mostly optimum performance values achieved at the time of the acceptance test.

The example of a large American brewery shows which improvements can be achieved even with older lauter tuns if MLM is retrofitted. 13 brews with four different beer types were examined and on average the yield could be increased by more than 2.5 % (see Fig.2). In all trials, the lautering time was less than 90 minutes. Detailed results regarding increase in yield are shown in diagram 1. In the specific application (annual malt requirement 57 000 t) this means savings of raw materials costs of about 0.4 million Euros per year.

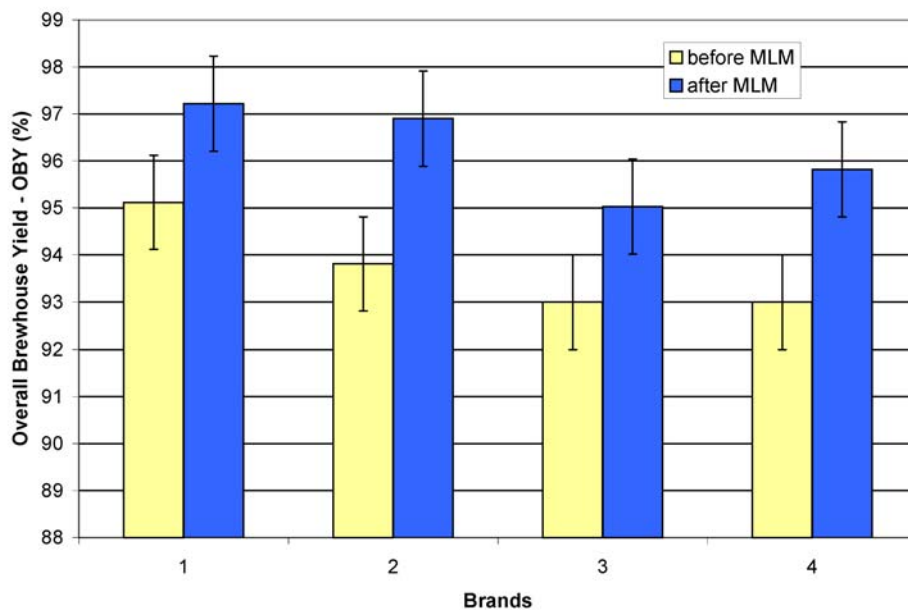


Fig 2: OBY increased over all brands by approx. 2.5%

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