

Effect of the Temperature on the Clarification of the Wort in the Beer Making Process

Application
Food

Objective
Study the effect of temperature on the clarification of wort for beers

Device
TURBISCAN® Classic

INTRODUCTION
The Wort is a sweet liquid which comes from Malt. The clarification of the wort is an important stage in the beer making process, and comes prior to the fermentation. The clarification occurs as the different impurities (residues of gluten, malt ...) are coagulated by the action of heat on the wort. More precisely, the tannic acid from the hops precipitates the different materials in suspension, and makes the wort transparent.
This stage has to be controlled to a high degree of accuracy in order to get a good quality of the final product.

In these experiments, the rate of wort clarification has been compared over the same time, after heating the wort to different temperatures, following the process with the Turbiscan Classic.

METHOD
Two different dispersions were analysed (after coming back to room temperature):

- a wort heated at 45°C
- the same wort heated at 90°C.

Sample number	2
Analyses volume	6 ml
Analysis temperature	20°C
Analyses time	10 minutes

The first curve obtained was selected as a reference. The traces show the evolution of back scattered light intensity (%, Y-axis) on the tube height (mm, X-axis) as a function of time (last curve in red).

RESULTS
The results show different kinds of transmission variation :

- a transmission increase in the middle of both samples (Figure 1 and 2), which is characteristic of the precipitation of particles. This corresponds to a clarification of the dispersion.
- a transmission decrease at the bottom of both samples (Figure 1 and 2), which is characteristic of the precipitated particles sedimenting and forming a layer.

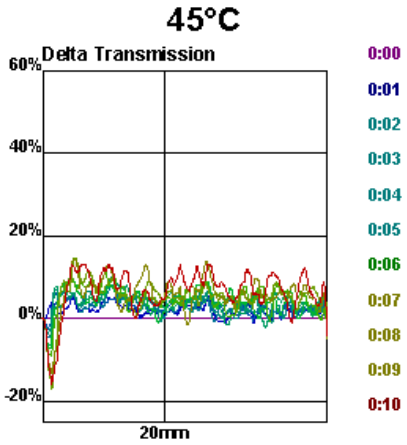


Figure 1

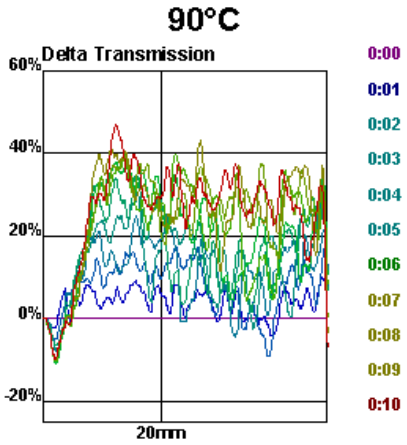


Figure 2

By plotting the variation of the transmission in the middle of both samples as a function of time (Figure 3) we get a quantitative comparison of the rate of flocculation.

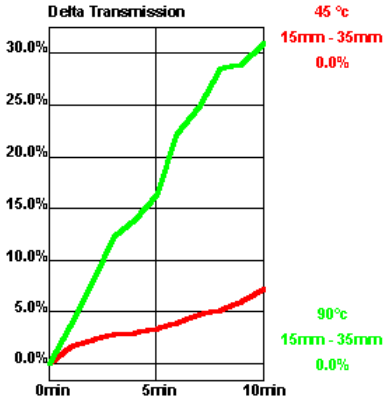


Figure 3

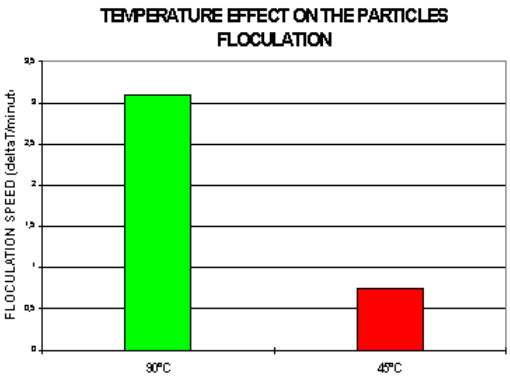


Figure 4

Calculation of the slope of the graph over 10 minutes allows the determination of the sediment formation speed as a function of the maximum temperature of the wort (Figure 4).

The precipitation of the particles in the suspension by the tannic acid is 4 times faster if the wort is heated to 90°C compared to heating to 45°C; in fact, the clarification gets quicker when the wort temperature is increased.

SUMMARY

The Turbiscan Classic detects destabilisation phenomena in few minutes, and allows a quantitative comparison of the results to be made. It is a useful tool to follow the process of beer making.