Nephelometric titration of macromolecular beer complexes using Turbidimeter

Saturated ammonium sulphate precipitation limit (SASPL) test using model TurbiLab

(IOB methods of analysis – method 9.39 „Saturated ammonium sulphate precipitation limit (SASPL) of beer")

Principle:

This rapid analytical method gives information about the hydrophilic character of the colloidal constituents of beer. The addition of ammonium sulphate to beer induces a haze formation. The ammonium sulphate initially dissolves protein complexes and then precipitates the highest molecular weight proteins followed by those of lower molecular weight.

The method gives empirical values relating to the levels of proteins in beer. Although there is no simple relationship between the precipitation limit and the shelf life (since it depends not only on the proteins but also on other factors e.g. tannin and oxygen content) it may indicate colloidal stability. The greater the amounts necessary to achieve a given haze value the higher the chances of stability.

IOB methods of analysis - method 9.39 - Saturated ammonium sulphate precipitation limit (SASPL) of beer - The limit of precipitation is expressed as the volume of saturated ammonium sulphate solution (SASS) per 10ml of beer which induces the beginning of the haze formation.

Field of application

The method can be used to monitor the effectiveness of beer stabilization treatment and results gives an indication of the probable shelf life of the beer.

Apparatus:

Turbidimeter, PC with controlling software MZN Control, dosing syringe pump pipette
(for 6 ml volume)

Reagents:

Saturated Ammonium Sulphate solution (SASS)

Procedure:

Connect the Turbidimeter to PC, connect the pump to supply and to PC.

Switch all instruments on and start the software MZN-Control at your PC. Select the type of measurement in the program: *Titration – Measurement – Sulphate test* and check (or fill in) the table for individual parameters of measurement:

Sample container: cuvette
Number of measurements: 100 (increase when higher SASPL is expected)
Measuring interval: 00 : 00 : 20;
Starting dose: 0;
Dosage: 3.1 ml / hour (according to pump calibration);
Sample volume: 6 ml

Infuse the syringe with saturated ammonium sulphate (SASS) solution, connect to the hose of dosing assembly, gently press the piston to eject solution into the whole hose. Prepare the dosing pump according to manual (differs for different type of dosing pump). Place the dosing assembly tip to the separate test tube for the drain. Pipette 6 ml of degassed beer into the measuring test tube, put the appropriate magnetic bar in, insert the test tube into the Turbidimeter measuring chamber and let approx. 10 minutes to mix and stabilize temperature.

Gently wipe the dosing assembly tip and place it into the test tube containing the sample. Start the measurement procedure from the PC software.

When the measuring process starts the sample haze value is automatically measured in dependence on time with simultaneous SASS dosing into the sample. The curve of haze changes in dependence of SASS added volume is drawn on the display. (Measurement may be stopped at any time from the PC keyboard.)

Result evaluation:

Automatic evaluation:
Switch *"Automatic results"* on (window - *"Measurement – Sulphate test"*). Test results will be automatically recalculated and stored in the data file just after the measurement ends.

Automatic evalution (viewing mode)
Start the viewing mode in MZN-Control, open required file which includes measured data (the measured data are drawn on display). Select *"Functions – SASPL - result"* item. The resulting value is displayed and can be stored directly into the file results

*!!! **Attention !!! – If "Automatic evaluation" fails use manual SASPL evaluation***

Manual evaluation:
Start the viewing mode in MZN-Control, open required file which includes measured data (the measured data are drawn on display). Select *scan* and determine the turning point when the haze begins to steeply rise. (The resulting value can be stored directly into the file using *"results"* item)

Results of the SASPL are expressed in ml of saturated ammonium sulphate per 10ml of the sample to 1 place of decimals.

SASPL example: SASPL = 1.14 ml/10ml

Chemtronic Waltemode GmbH, Sales & Service Partner for your   MONITEK Products

40789 Monheim   Niederstr. 14   Phone: +49-(0)2173-57007   Fax: +49-(0)2173-56007   E-mail: info@chemtronic-gmbh.de   Internet: www.chemtronic-gmbh.de