

## INTRODUCTION

Light scattering depends on the shape and concentration of particles and used wavelength. Haze meters for the brewing industry use light with the wavelength of 650 nm according to the MEBAK definition. Typical haze meters used in the brewing industry correlate very well for lager beers. However, they differ substantially for dark beers.



The reason for this effect is the fluorescence of the sample. Selected dark beers and malts have been excited by a laser at 645 nm and the emission spectra have been measured between 650 nm and 780 nm. The fluorescence spectra of dark beers are similar to the spectrum of caramel malt. The fluorescence spectra of Color Malt and Coca Cola are different.

## 2014 ASBC Annual Meeting INFLUENCE OF FLUORESCENCE OF DARK BEERS ON HAZE MEAUSREMENT

R. Beneš, P. Brugger, Anton Paar GmbH, Austria



Turbidimeters from Haffmans, Sigrist, Anton Paar and Hach were compared with fluorescence dyes dissolved in water. The samples were microfiltered before the measurement to guarantee no additional haze. The turbidity of the samples was checked at 880 nm, i.e. in the spectral region where no fluorescence occurs. Depending on the optical design and evaluation algorithm of the turbidimeters the fluorescence apparently increases the haze.

Apparent turbidity caused by fluorescence of samples



Oxazin				Rhodamin700			
Turb 3Angles [EBC]	Abs 650nm	Turb at 90° [EBC]	Turb at 25° [EBC]	Turb 3Angles [EBC]	Abs 650nm	Turb at 90° [EBC]	Turb at 25° [EBC]
1.5	0.27	1.5	0.9	1.5	0.10	1.4	0.5
29.9				3.9			
		5.3	0.5			4.1	0.6
		2.9	0.3			1.4	0.6
0.0	0.00	0.0	0.0	0.0	0.00	0.0	0.0

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## CONCLUSION

Darkbeersexhibitfluorescencewhenexcitedat650 nm.Thefluorescenceiscausedbycaramelizedpolysaccharidescomingfrom malt.total

For a correct measurement of the turbidity of beers, the fluorescence of the sample must be considered by producers of turbidimeters.

TurbidimetersfromSigristandAntonPaararevirtuallyinsensitivetothefluorescence.

