

# Beer Colour Analysis



## Introduction

Beer is one of the most popular alcoholic beverages and has produced a large-scale industry worldwide. Beers have an expansive range of variety which resulted the requirement of quality control to ensure safety, authenticity, and distinct flavours as claimed by different manufacturers. Although sensory evaluation is an age old and essential technique in this regard, systematic analysis involving analytical instruments like UV-Vis spectrophotometer safeguards uniform quality across multiple batches of beers.

The standard international methods for sensory analysis of beer are the methods of the American Society of Brewing Chemists (ASBC) and the European Brewery Convention (EBC), and in Japan, the Brewery Convention of Japan (BCOJ), focussing on major beer producers, has established analytical methods for beer. This application note includes analysis of color of various beer samples as specified by ASBC and EBC methods by an OPTIZEN Alpha double beam spectrophotometer.

K LAB Co., Ltd., a leading company in the domestic analytical instrument industry, is the only specialized research and manufacturing enterprise in Korea that manages the entire process—from R&D to production—under one roof.

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## Materials and Method

### Samples and Reagents

- Representative beer samples

### Instrument and Accessories

1. Alpha double beam spectrophotometer
2. 10 mm standard cuvettes (disposable types can also be used)
3. Membrane filter ( $\leq 0.45 \mu\text{m}$ )
4. Ultrasonic bath
5. Erlenmeyer flask
6. Aluminium foil

## Measurement Procedure

### Sample Preparation

50 ml beer sample is taken in an Erlenmeyer flask, and covered with aluminium foil. It is then ultrasonicated for about 20 minutes for decarbonation. A 10 mm standard cuvette is filled with the decarbonated beer sample. The absorbance of the beer sample is measured at 430 nm and 700 nm wavelength.

### Measurement Parameters and Data Analysis

- If Absorbance at 430 nm  $A_{430}$  is greater than 0.8, then the sample has to be diluted at least three times of distilled water or more. The dilution factor will have to be calculated during the final calculation.
- The absorbance at 700 nm ( $A_{700}$ ) should be less than the value of  $0.039 \times A_{430}$ . If not, then the sample is considered to be too turbid and has to be filtered at least three times before measuring again at the same wavelength.

When the aforementioned conditions are fulfilled, then the final calculation can be carried out.

EBC Colour:  $25 \times A_{430} \times \text{dilution factor}$

Colour:  $12.7 \times A_{430} \times \text{dilution factor}$

## Result

Beer Sample	Parameter	Result
Sample 1	EBC Color	20.7
	ASBC Color	10.5
Sample 2	EBC Color	9.2
	ASBC Color	4.7
Sample 3	EBC Color	28.9
	ASBC Color	14.7

## Conclusion

The beer colour analysis was successfully conducted by the Alpha UV-Vis spectrophotometer.

## References

1. *EBC (European Brewery Convention) Method, vol. 73, 1967.*
2. *ASBC (American society of brewing Chemists) methods.*