2014 ASBC Annual Meeting

RELY ON DIFFERENTIATED TPO MEASUREMENT

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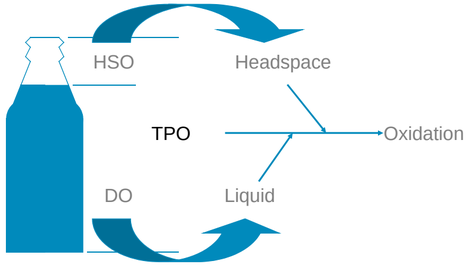
Introduction

Preventing oxygen (O_2) pick-up during the production and packaging of beer and soft drinks is paramount for preserving product quality (freshness) and taste stability, and increasing shelf life. As a result, beer and beverages are produced and packaged with increasingly narrow targets for O_2 content.

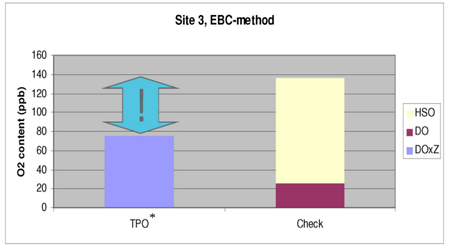
How differentiated TPO measurement works

The differentiated Total Package Oxygen (TPO) measurement is achieved by measuring the Headspace Oxygen (HSO) followed by Dissolved Oxygen (DO) in a package. This gives immediate insight into the performance of the filling and sealing processes, that are very critical in regard to O_2 in the filled package.



Differentiated versus traditional TPO measurement

Traditional TPO measurement, which is based on DO measurement and calculated by DO x Z, is influenced by anti-oxidants that are naturally present in or added to the beer. These anti-oxidants cause fast O_2 consumption and reduction of the DO quantity during the sample preparation, thus disturbing the O_2 equilibrium that is required for proper DO x Z measurement. This results in incorrect TPO information and unpredictable effects of O_2 on the flavor stability in bottle conditioned beers (see graph).



** TPO results of bottled beer based on DO x Z using the sample preparation according to EBC (5 minutes shaking and 3-5 minutes pause)*

The gap between the TPO result, based on DO x Z, and the "check" TPO result, based on HSO + DO, proves that the bottle was not in equilibrium. The differentiated TPO measurement gives the result "What you see is what it truly is".

Proper filler operation

The differentiated TPO measurement provides accurate information so that the proper action can be taken to optimize the filling process.

- The filler operator receives precise information on where the O_2 in the package is located – liquid or headspace – and can adjust where necessary
- The process manager can optimize the filling process, schedule maintenance and prevent potential future major failures

Several examples of filling process optimization as the result of differentiated TPO measurement at various brewery locations include:

- A good balance was found between the TPO value of cans and the speed of the filler. At maximum speed the headspace air retention was no longer effective, which caused high HSO levels.
- Timing from high pressure system for headspace air retention was improved to reduce HSO.
- An increasing difference between DO measured in the filler inlet line and the DO of the packaged beer helped the filling manager schedule automatic cleanings of the filling head valves and preventive maintenance of the fillers.
- Insufficient evacuation of the package caused an increase in DO because the vacuum pump was malfunctioning and required repaired.

Conclusion

To improve the beer's flavor stability and shelf life, breweries strive for lower TPO values. Compared to traditional TPO measurement the differentiated TPO measurement provides the real TPO value, which often is higher. An increasing number of breweries are, or in the process of, standardizing on differentiated TPO measurement.

With the Inpack TPO/CO_2 Meter, type c-TPO and the recently launched Haffmans Automator, Pentair Haffmans offers two solutions for differentiated TPO measurement using optical O_2 measurement technology.

Haffmans Inpack TPO/CO_2 Meter, type c-TPO

Haffmans Automator

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