



Application Note AN-I-029

Dissolved oxygen in wine

Fast determination of dissolved oxygen in various wines

Dissolved oxygen is generally considered detrimental to wine quality, especially if introduced after fermentation, storage, or bottling. The presence of oxygen after primary fermentation and during the later stages of winemaking can enhance browning reactions, chemical and microbiological instability, and the formation of off-flavors such as acetaldehyde. Sulfur dioxide (SO₂) is added as a scavenger to the wine to prevent these oxidation reactions. Knowing

the oxygen content in wine is important through the entire wine production process. Oxidation is a common fault in bottled wines. In the past, oxidation has accounted for up to 7% of the errors/exclusions at wine exhibitions and competitions.

With the 913 pH/DO meter and the 914 pH/DO/Conductometer, the oxygen content of wine can be determined quickly and easily directly on site.

SAMPLE AND SAMPLE PREPARATION

Red wine and rosé wine are used as examples in this Application Note. The closed sample is shaken well

before analysis. No further sample preparation is required.

EXPERIMENTAL

This analysis is carried out on a 914 pH/DO/Conductometer equipped with an O₂-Lumitrode, which is calibrated with 100% and 0% air saturation.

The prepared sample is carefully opened and the O₂-Lumitrode is placed into the solution. The measurement is started and the DO content is measured until the value is stable. During the measurement, the sensor is gently moved in the solution to reach equilibrium faster. Do not stir vigorously, as oxygen from the environment can be introduced into the sample. Afterwards, the sensor is removed and rinsed well with deionized water.



Figure 1. 914 pH/DO/Conductometer equipped with an O₂-Lumitrode and conductivity sensor for the determination of dissolved oxygen in wine samples.

RESULTS

For the analyses in this study, stable results were obtained within approximately 20 seconds. The

obtained absolute standard deviation is smaller than 0.1 mg/L.

Table 1. Content of dissolved oxygen in mg/L in red wine and rosé wine.

| | DO content in mg/L, red wine (n = 6) | DO content in mg/L, rosé wine (n = 4) |
|-------------|--------------------------------------|---------------------------------------|
| Mean | 0.69 | 0.98 |
| SD(abs) | 0.027 | 0.02 |
| SD(rel) / % | 3.83 | 1.86 |

CONCLUSION

The dissolved oxygen content in wine can be assessed quickly by using a 914 pH/DO/Conductometer and the optical sensor O₂-Lumitrode. Other dissolved gases such as CO₂ show no influence on the measured value, as long as no air bubbles adhere to

the O₂-Lumitrode. An accurate measurement takes less than 30 seconds and the sensor is completely maintenance-free. No need to worry about the quality of your sensor: if the O₂ cap needs to be replaced, the instrument will inform you.

CONTACT

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CONFIGURATION



914 pH/DO/Conductometer Laborvariante

Tragbares Zweikanal-pH/DO/Leitfähigkeitsmessgerät mit intelligentem Messeingang zur Messung von gelösten Sauerstoff/pH/mV/ und analogem Messeingang für Leitfähigkeit/TDS/Salinität und Temperatur.

Mit diesem batteriebetriebenen Messgerät mit Stativkonsole sind Sie für Messungen im Feld und im Labor bestens gerüstet.

- Digitaler Messeingang für die O₂-Lumitrode oder die intelligenten pH-Elektroden
- Analoger Leitfähigkeitsmesseingang für die 4-Leiter-Leitfähigkeitsmesszellen
- Labor-pH/DO und Leitfähigkeitsmessgerät mit eingebautem Batteriepack
- Parallele Messung von pH-Wert und Leitfähigkeit
- Parallele Messung von Sauerstoff und Leitfähigkeit
- Robustes, wasser- und staubdichtes Gehäuse (IP67) für den harten Außen- und Laboreinsatz
- LCD-Farbdisplay mit Hintergrundbeleuchtung für einfache Ablesbarkeit der Ergebnisse
- USB-Schnittstelle für einfachen Datenexport auf PC oder Drucker
- Großer interner Speicher (10'000 Datensätze)
- Pin-geschützter Benutzer- und Expertenmodus, verhindert ungewollte Parameteränderungen
- GLP-konformer Ausdruck und Datenexport mit User-ID und Zeitstempel



O₂-Lumitrode

Der optische Sensor für die Messung von gelöstem Sauerstoff (DO) kann mit einem 913 pH/DO Meter oder 914 pH/DO Konduktometer verwendet werden. Das Messprinzip des Sensors beruht auf der Lumineszenzlöschung. Der platzsparende und wartungsfreie Sensor ist z.B. geeignet für die DO Messung in der:

- Qualitätskontrolle von Wasser
- Abwasserindustrie
- Getränkeherstellung
- Fischzucht

Der Sensor wird mit einem Kalibrierköcher und 3 x 30 mL Sauerstoffstandard 0% ausgeliefert.

Die Messkappe (O₂-Kappe), welche das sauerstoffsensitive Luminophor enthält, kann bei Bedarf einfach ausgetauscht werden.