

A method comparison study of Thermo Scientific Total Acids (Wine, pH 7) and OIV (International Organisation of Vine and Wine) wine Total Acidity method

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1 Introduction

In this technical note, we present a set of wine results measured with the new Thermo Scientific Total Acids system method and compare them to the results measured with the traditional titration method. In Europe, wine samples are often analyzed using the OIV Total Acidity method, which is titration with a bromothymol blue indicator most often performed using an automated titration. Intention of this new method was to improve automation of total acidity measurement in the wine laboratory by introducing an automated colorimetric version of the OIV method. This paper describes method comparison results between OIV Total Acidity Type 1 method (OIV-MA-AS313-01) and new automated Total Acids method.

2 Method principles

OIV Total Acidity method, see references for method details.

In Thermo Scientific Total Acids system method bromothymol blue indicator changes color from yellow to blue when pH changes from 6.0 to 7.6. Sample is added to buffer solution and measured together with the color reagent. Change in blue color is measured at wavelength 620 nm (with the side wavelength 700 or 750 nm). The results are calculated automatically by the analyzer using a calibration curve. The test has been developed to determine total acidity within a measuring range from 1.0 to 18.0 g/L expressed as tartaric acid and from 0.5 to 12 g/L expressed as sulphuric acid.

Details of Thermo Scientific Total Acids method are seen in the product application and insert documents.

2.1.1 Samples and sample pretreatment process

In this study, white wine, red wine, spiced white wine (mulled wine, glög), spiced red wine, cider and liqueur samples from concentrations between 2,65 to 8,82 g/L (calculated as tartaric acid) were analyzed. Samples were run without any pretreatment or predilution steps.

2.1.2 Instrument and reagent kit

Thermo Scientific™ Gallery™ analyzer was used for automated photometric determination.

Thermo Scientific Total Acids (Wine, pH 7) system kit, cat nro. 984632 was used for the colorimetric analysis of total acidity. Self made tartaric acid (e.g. Sigma/251380) solution can be used for calibration. Standards can be diluted automatically by the analyzer.

3 Results and Discussion

In the Table 1 can be seen results from the method correlation study. Same samples were analyzed with the two different methods. In the last column (Recovery), the results from automated Total Acids method was compared with the OIV method. Results show good recoveries from 91% to 112 %. With this set of samples, there was no trend seen based on the sample type (color or acidity). As a result, we can conclude that the automated colorimetric method can be used for all sample types tested in this experiment. In this study, the colorimetric method correlated very well with the titration method.

One major advantage of the automated Total acids method was the speed of the method. Time to analyze 26 samples below took only 18 minutes. Additional benefit is that method is independent of the user skills requiring no hands-on analysis time. Performing 5 point calibration with automated dilution took 2 min 30 seconds without any additional action from the user.

Colorimetric determination of Total acids provides a rapid, user-friendly way of analyzing Total acidity from alcoholic beverages like white wine, red wine, cider and liqueur. Together with Total acids method other colorimetric or enzymatic methods on the analyzer can be run simultaneously.

Our aim is to continue with a method correlation study where larger set of samples are analyzed with automated Thermo Scientific analyzer.

Table 1. Results of method correlation study between Thermo Scientific Total Acids (Wine, pH 7) and OIV wine Total Acidity methods

Sample	Result from automated Thermo Scientific Total Acids method (g/L)	Response	Average	Results from OIV reference method (g/L)	Bias	Recovery-%
White spiced wine	2,62	0,2435	2,65	2,65	-0,035	99 %
White spiced wine	2,66	0,2424		2,65	0,012	100 %
White spiced wine	2,67	0,2422		2,65	0,020	101 %
White wine 1	7,18	0,1457	7,18	7,86	-0,676	91 %
White wine 1	7,17	0,1460		7,86	-0,691	91 %
White wine 1	7,19	0,1457		7,86	-0,675	91 %
White wine 2	5,68	0,1778	5,67	5,44	0,240	104 %
White wine 2	5,69	0,1777		5,44	0,248	105 %
White wine 2	5,63	0,1789		5,44	0,187	103 %
White wine 3	5,53	0,1809	5,54	5,52	0,008	100 %
White wine 3	5,53	0,1809		5,52	0,012	100 %
White wine 3	5,56	0,1803		5,52	0,042	101 %
Cider 1	5,23	0,1869	5,24	4,91	0,324	107 %
Cider 1	5,24	0,1868		4,91	0,332	107 %
Cider 1	5,23	0,1870		4,91	0,319	106 %
Cider 2	6,00	0,1713	5,98	5,84	0,155	103 %
Cider 2	5,98	0,1717		5,84	0,138	102 %
Cider 2	5,97	0,1718		5,84	0,130	102 %
White wine 4	7,34	0,1423	7,35	7,31	0,033	100 %
White wine 4	7,34	0,1423		7,31	0,033	100 %
White wine 4	7,36	0,1419		7,31	0,051	101 %
Red spiced wine	5,94	0,1725	5,94	5,34	0,598	111 %
Red spiced wine	5,92	0,1730		5,34	0,576	111 %
Red spiced wine	5,97	0,1718		5,34	0,631	112 %
Liqueur	8,56	0,1166	8,52	8,82	-0,258	97 %
Liqueur	8,51	0,1175		8,82	-0,305	97 %
Liqueur	8,49	0,1180		8,82	-0,330	96 %

4 References

Compendium of international Methods of wine and must analysis (OIV, International Organisation of Vine and Wine), Edition 2013, Method OIV-MA-AS313-01

Thermo Scientific Total Acids (Wine, pH 7; ordering code 984632) system reagent insert and application.

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