

Technical Bulletin

Hydrogen Peroxide Analysis in the Presence of Peracetic Acid

Peracetic acid (PAA) causes a false positive interference (develops color) with colorimetric hydrogen peroxide test methods. CHEMetrics, Inc. has developed a procedure to prevent PAA interference with the ferric thiocyanate chemistry employed with our Hydrogen Peroxide Vacu-vials® Test Kit, Cat. No. K-5543, and our Hydrogen Peroxide CHEMets® Test Kit, Cat. No. K-5510.

CHEMetrics has determined experimentally that addition of a controlled amount of a potassium iodide solution (A-7900 Activator Solution) prevents the false positive interference from PAA with the ferric thiocyanate chemistry employed with the K-5543 and K-5510 test kits. PAA in the sample reacts with iodide and is converted to acetic acid. Unlike PAA, acetic acid does not develop color with this test method.

Test Procedure:

1. Add 5 drops of A-7900 Activator Solution* to the empty sample cup.
*A-7900 solution can be purchased separately in packages of 6 bottles.
2. Fill the sample cup to the 25-mL mark with the sample to be tested. Stir briefly to mix the contents of the cup.
3. Immediately perform the Test Procedure in the K-5543 or K-5510 Peroxide Test Kit instructions, starting with step 2.

Testing Protocol to Confirm Effectiveness of Modified Hydrogen Peroxide Test Procedure:

Samples containing known concentrations of hydrogen peroxide (H_2O_2) and varying levels of PAA were prepared and analyzed for H_2O_2 using both the standard and modified K-5543 test procedures. Test results were obtained with a spectrophotometer at 470 nm using CHEMetrics' published calibration curve for the K-5543 kit. Table 1 presents H_2O_2 test results and corresponding bias, expressed as % Error. Columns highlighted in green demonstrate that H_2O_2 test result accuracy is improved significantly in the presence of PAA under the conditions of the modified test procedure. Figure 1 demonstrates that addition of A-7900 Solution does not impact the reaction of hydrogen peroxide itself, in the absence of PAA, with the ferric thiocyanate reagent.

**Table 1: K-5543 Hydrogen Peroxide Test Results in the Presence of PAA
Obtained With and Without Addition of Potassium Iodide Solution**

H ₂ O ₂ Conc., ppm	PAA Conc., ppm	H ₂ O ₂ :PAA Ratio	K-5543 Lot No.	Standard K-5543 Procedure (No A-7900 Solution Added)			Modified K-5543 Procedure (A-7900 Solution Added)		
				H ₂ O ₂ Result, ppm	% Error	Average % Error	H ₂ O ₂ Result, ppm	% Error	Average % Error
4.07	0.40	10.18	84675	4.25	4.5	4.4	4.15	1.9	-0.1
			84706	4.24	4.2		4.05	-0.5	
			84971	4.25	4.4		4.00	-1.7	
4.43	2.50	1.77	84675	4.91	10.9	10.0	4.52	2.1	1.5
			84706	4.83	9.0		4.50	1.6	
			84971	4.87	10.0		4.46	0.7	
4.85	5.00	0.97	84675	5.74	18.4	16.6	4.91	1.3	1.3
			84706	5.62	15.8		4.90	1.0	
			84971	5.61	15.6		4.92	1.5	
0.27	0.40	0.68	84675	0.33	22.2	12.5	0.23	-15.2	-15.2
			84706	0.29	7.6		0.23	-15.2	
			84971	0.29	7.6		0.23	-15.2	
0.63	2.50	0.25	84675	0.97	54.1	54.3	0.62	-1.6	-1.6
			84706	0.93	47.8		0.62	-1.6	
			84971	1.01	61.1		0.62	-1.6	
1.05	5.00	0.21	84675	1.75	66.5	64.8	1.09	3.8	2.5
			84706	1.73	65.2		1.05	-0.4	
			84971	1.71	62.7		1.09	4.2	

**Figure 1: K-5543 Hydrogen Peroxide Test Results in the Absence of PAA
Obtained With and Without Addition of Potassium Iodide Solution**

