HJ

HJ 1073-2019

Water quality—Determination of naphthol —High performance liquid chromatography

2019-12-31 2020-06-30

1- α-

2- β-

A B

2019 12 31

2020 6 30

1

1- α- 2- β-

10.0 ml 10.0 ml 10.0 μl 425 nm

1- 2- 2 μg/L 8 μg/L

360 nm 2- 0.2 μg/L 0.8 μg/L

50.0 ml 10.0 ml 10.0 μl 425 nm

1- 2- 0.3 μg/L 1.2 μg/L

360 nm 2- 0.06 μg/L 0.24 μg/L

2

GB 17378.3 3

HJ 91.1

HJ/T 91

HJ/T 164

3

pH 1 2 C_{18}

4

4.1 pH 1 2 C_{18}

4.2 2,4- 2,6- 2- 3- 4- 4- 2,4- 2,4,6- 1,3- 2,4- 4- 4,6- 2,4,6-

4.3

5

5.1 CH_3CN

5.2 CH_3OH

5.3 NaOH

5.4 $C_6H_8O_6$

5.5 1- *w* $C_{10}H_7OH$ ≥ 99.5%

5.6 2- *w* $C_{10}H_7OH$ ≥ 99.5%

5.7 *ρ* HCl =1.18 g/ml

5.8 1+1

5.9 *c* HCl =0.01 mol/L

1.8 ml 5.7 1000 ml

5.10 *c* NaOH =5 mol/L

20 g 5.3 100 ml

5.11 *w* CH_3OH =0.2%

2.0 ml 5.2 1000ml

5.12 *ρ* ≈ 1000 mg/L

0.10 g 0.0001 g 1- 5.5 2- 5.6 100 ml 100 mg 5.4 5.2 100 ml 5.2 6.4 4 3

5.13 *ρ*=100 mg/L

5.12 10 ml 5.2 6.4 4 3

5.14 *ρ*=10.0 mg/L

1.00 ml 5.13 10 ml 5.2 6.4 4 3

5.15 C_{18} 500 mg/6 ml

5.16 ≤ 0.45 μm

6

A

6.1

2

6.2 250 mm × 4.6 mm × 5 μm C_{18}

6.3 250 ml 500 ml

6.4 2 ml 10 ml 50 ml

6.5

6.6

7

7.1

HJ/T 91 HJ 91.1 HJ/T 164 GB 17378.3

6.3 0.5 g 5.4

5.8 5.10 pH 1 2 4

14 d

7.2

C_{18} 5.15 6.5 9 ml 5.2 9 ml

5.9 7.1

10.0 ml 50.0 ml 6.4 3 4 ml/min

5 ml 2

10.0 ml 5.2

10 ml 6.4

5 min 5.2 10.0 ml

5.16

1

10.0 ml 20.0 ml

20%

2 7.1 5.16

10.0 ml

7.3

7.2

8

8.1

A 5.1 B 5.11 A/ B=47/53

V/V 1.2 ml/min 10.0 µl 35
228 nm
1- 2- 425 nm 435 nm
2- 425 nm 2- 360 nm
350 nm
1

1

/ min	A/%	B/%
0.00	47	53
12.00	47	53
14.00	97	3
24.00	97	3
26.00	47	53
30.00	47	53

8.2

8.2.1

5.14 5.13 10 ml
5.2 5
2

2

		1	2	3	4	5	6
	µl	0.50[a]	2.00	10.0	100	250	500
	µg/L	0.50[a]	2.00	10.0	100	250	500
	µl	50.0	100	200	300	500	1000[b]
	µg/L	500	1000	2000	3000	5000	10000[b]
[a] 360 nm 2-							
[b] 360 nm 2-							

8.2.2

8.1 8.2.1

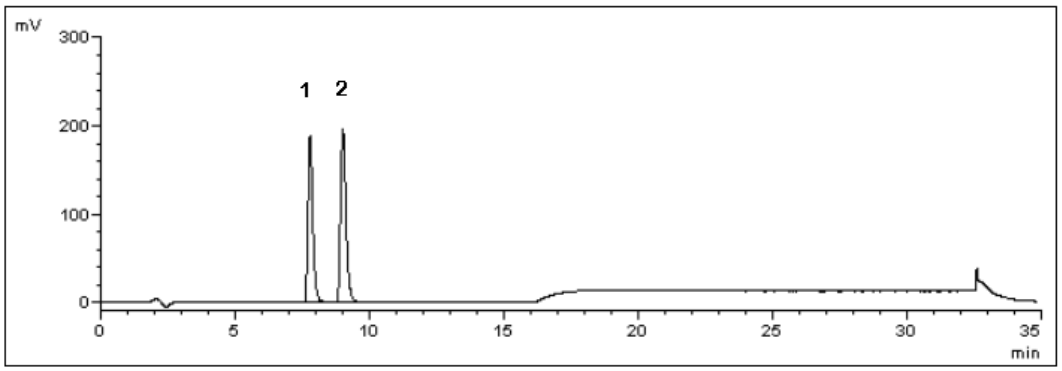
μg/L

8.2.3

1 8.1 1- 2- 500 μg/L

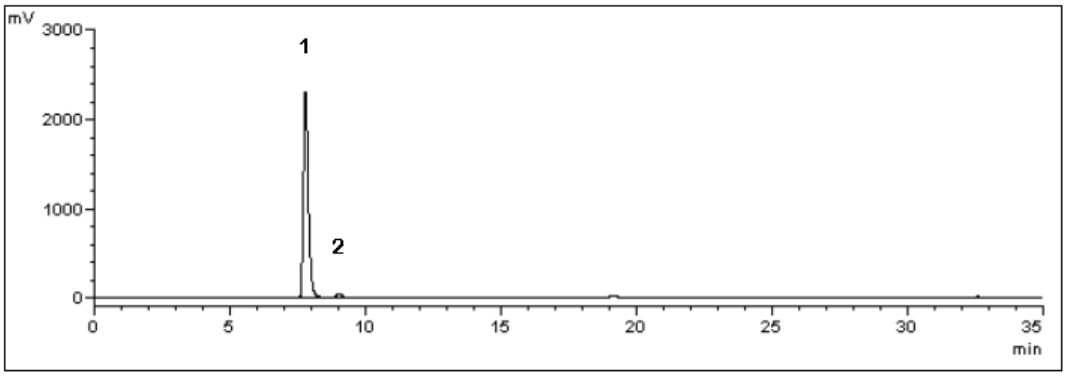
425 nm 2 8.1 2- 1.00 mg/L

360 nm



1—2- 2—1-

1 425 nm



1—2- 2—1-

2 360 nm

8.3

8.2.2 7.2

8.4

8.3 7.3

9

9.1

≤ 5%

9.2

μg/L 1

$$\rho_i = \frac{\rho_{si} \times V_2}{V_1} \times D \qquad 1$$

ρ_i—— i μg/L

ρ_{si}—— i μg/L

V_1—— ml

V_2—— ml

D ——

1 10 mg/L

7.2

2 1- 2-

9.3

10

10.1

1- 2- 2.00 μg/L 100 μg/L 1.00 mg/L

6 1- 1.6%

5.9% 0.7% 7.0% 0.7% 6.2% 9.2% 9.2% 3.2%

0.2 μg/L 8.9 μg/L 0.089 mg/L 0.6 μg/L 28 μg/L

0.13 mg/L 2- 1.9% 4.1% 0.7% 8.5%

0.8% 6.1% 5.1% 7.6% 5.5% 0.18 μg/L

10 μg/L 0.088 mg/L 0.33 μg/L 23 μg/L 0.18 mg/L

1- 2- 10.0 μg/L 500 μg/L 9.00 mg/L

6 1- 0.7%
9.4% 0.5% 8.9% 0.6% 3.4% 10% 5.3% 6.9%
2 µg/L 54 µg/L 0.41 mg/L 3 µg/L 89 µg/L 1.7 mg/L
2- 1.4% 15% 0.4% 7.1% 0.5% 5.1%
8.5% 3.1% 7.4% 2 µg/L 43 µg/L
0.52 mg/L 3 µg/L 60 µg/L 1.8 mg/L
1- 2.00 µg/L 10.0 µg/L 100 µg/L 500 µg/L
6 2.5% 11% 1.1% 11%
0.96% 2.2% 0.94% 9.3% 8.8% 5.9% 8.6% 4.9%
0.38 µg/L 1.5 µg/L 4.5 µg/L 50 µg/L 0.61 µg/L
2.1 µg/L 24 µg/L 81 µg/L
2- 0.10 µg/L 0.40 µg/L 2.00 µg/L 10.0 µg/L 100 µg/L
500 µg/L 6 2.1%
14% 1.7% 10% 1.1% 5.0% 0.82% 8.3% 0.72% 2.6% 0.64% 2.7%
12% 4.0% 11% 6.4% 8.9% 2.5% 0.021 µg/L
0.069 µg/L 0.20 µg/L 1.3 µg/L 5.3 µg/L 24 µg/L 0.037 µg/L 0.076 µg/L
0.66 µg/L 2.1 µg/L 26 µg/L 42 µg/L
1- 48.4 µg/L 45.7 µg/L 0.541 mg/L
6 1.8% 11% 1.5%
5.5% 1.2% 4.3% 22% 19% 11%
2- 0.950 mg/L 2.62 mg/L 153 µg/L
6 0.6% 2.4% 0.9%
5.6% 0.7% 8.1% 8.0% 10% 15%
1- 10.0 µg/L 400 µg/L 1000 µg/L
6 2.6% 1.6% 0.3%
2- 0.50 µg/L 10.0 µg/L 400 µg/L 1000 µg/L
6 4.0% 2.9% 1.6% 0.3%
1- 10.0 µg/L 400 µg/L 1000 µg/L
6 3.0% 2.9% 6.7%
2- 0.50 µg/L 10.0 µg/L 400 µg/L 1000 µg/L
6 7.0% 3.5% 1.9% 6.7%

A

10.2

1- 2- 10.0 µg/L 500 µg/L 9.00 mg/L
6 1- -14% 11%
-12% 2.0% -17% 0.1% -5.5% ± 19% -4.9% ± 10%
-6.5% ± 13% 2- -12% 6.0% -8.6% -1.0%

-18% 2.0% -4.3% ± 16% -4.1% ± 6.0% -5.3% ± 14%

1- 2- 2.00 µg/L 100 µg/L 1.00 mg/L

6 1- -13% 11%

-3.0% 21% -2.9% 4.0% -3.4% ± 18% 2.0% ± 19%

1.6% ± 6.6% 2- -7.0% 7.0% -20% 0.8% -7.5%

8.0% -2.2% ± 10% -5.8% ± 15% 1.9% ± 11%

1- 10.0 µg/L 500 µg/L 6

88% 99% 89% 103%

94% ± 11% 97% ± 9%

2- 0.40 µg/L 10.0 µg/L 500 µg/L 6

91% 100% 85% 101% 96% 103%

95% ± 7% 94% ± 12% 100% ± 5%

1- 2.00 µg/L 100 µg/L 6

91% 116% 92% 117%

101% ± 17% 100% ± 17%

2- 0.10 µg/L 2.00 µg/L 100 µg/L

6 84% 114% 86% 121% 95% 119%

96% ± 22% 100% ± 23% 101% ± 18%

1- 48.4 µg/L 45.7 µg/L 540 µg/L

50.0 µg/L 50.0 µg/L 400 µg/L 6

80% 101% 82% 116% 90% 109% 91%

± 18% 99% ± 23% 99% ± 14%

2- 0.950 mg/L 2.62 mg/L 153 µg/L

1.00 mg/L 5.00 mg/L 200 µg/L 6

76% 102% 82% 109% 94% 122% 93%

± 18% 103% ± 29% 105% ± 20%

1- 10.0 µg/L 400 µg/L 1000 µg/L

6 87% 91% 84%

2- 0.50 µg/L 10.0 µg/L 400 µg/L 1000 µg/L

6 91% 89% 93% 87%

1- 10.0 µg/L 400 µg/L 1000 µg/L 6

82% 92% 84%

2- 0.50 µg/L 10.0 µg/L 400 µg/L 1000 µg/L

6 80% 94% 93% 87%

B

11

11.1 20 ≤ 20 / 1

11.2 5 ≥ 0.995

20 ≤ 20 /

± 10%

11.3 20 ≤ 20 / 1

≤ 25%

11.4 20 ≤ 20 / 1

70% 130%

12

A

A.1 50.0 ml

				%	%	*r*	*R*	nm
1-	µg/L	2.00	1.9	1.6 5.9	9.2	0.2	0.6	425
	µg/L	100	102	0.7 7.0	9.2	8.9	28	
	mg/L	1.00	1.02	0.7 6.2	3.2	0.089	0.13	
2-	µg/L	2.00	2.0	1.9 4.1	5.1	0.18	0.33	425
	µg/L	100	94.2	0.7 8.5	7.6	10	23	
	mg/L	1.00	1.02	0.8 6.1	5.5	0.088	0.18	

A.2 10.0 ml

				%	%	*r*	*R*	nm
1-	µg/L	10.0	9.4	0.7 9.4	10	2	3	425
	µg/L	500	475	0.5 8.9	5.3	54	89	
	mg/L	9.00	8.42	0.6 3.4	6.9	0.41	1.7	
2-	µg/L	10.0	9.6	1.4 15	8.5	2	3	425
	µg/L	500	480	0.4 7.1	3.1	43	60	
	mg/L	9.00	8.52	0.5 5.1	7.4	0.52	1.8	

A.3 50.0 ml

				%	%	*r*	*R*	nm
1-	µg/L	2.00	2.02	2.5 11	8.8	0.38	0.61	425
	µg/L	100	100	0.96 2.2	8.6	4.5	24	
2-	µg/L	0.10	0.10	2.1 14	12	0.021	0.037	360
	µg/L	2.00	2.00	1.1 5.0	11	0.20	0.66	425
	µg/L	100	101	0.72 2.6	8.9	5.3	26	

A.4 10.0 ml

				%	%	*r*	*R*	nm
1-	μg/L	10.0	9.4	1.1 11	5.9	1.5	2.1	425
	μg/L	500	488	0.94 9.3	4.9	50	81	
2-	μg/L	0.40	0.38	1.7 10	4.0	0.069	0.076	360
	μg/L	10.0	9.41	0.82 8.3	6.4	1.3	2.1	425
	μg/L	500	499	0.64 2.7	2.5	24	42	

A.5

	ml				%	%	nm
1#	50.0	1-	μg/L	48.4	1.8 11	22	425
		2-	mg/L	0.950	0.6 2.4	8.0	360
2#	10.0	1-	μg/L	45.7	1.5 5.5	19	425
		2-	mg/L	2.52	0.9 5.6	10	360
3#	50.0	1-	mg/L	0.541	1.2 4.3	11	425
		2-	μg/L	153	0.7 8.1	15	360

A.6 10.0 ml

	μg/L		μg/L	μg/L	%	nm
1#	0.50	2-	0.455	0.018	4.0	360
2#	10.0	1-	8.94	0.23	2.6	425
		2-	8.70	0.25	2.9	
3#	400	1-	370	7.2	1.9	425
		2-	363	5.7	1.6	
4#	1000	1-	868	2.7	0.3	425
		2-	842	2.4	0.3	
1#	0.50	2-	0.40	0.028	7.0	360
2#	10.0	1-	9.35	0.28	3.0	425
		2-	8.22	0.29	3.5	
3#	400	1-	373	11	2.9	425
		2-	367	6.8	1.9	
4#	1000	1-	868	58	6.7	425
		2-	836	56	6.7	

B

B.1 10.0 ml

				$\overline{RE}$ %	$S_{\overline{RE}}$ %	%	%	nm
1-	μg/L	10.0	9.4	-5.5	9.3	-14 11	-5.5 ± 19	425
	μg/L	500	475	-4.9	5.0	-12 2.0	-4.9 ± 10	
	mg/L	9.00	8.42	-6.5	6.5	-17 0. 1	-6.5 ± 13	
2-	μg/L	10.0	9.6	-4.3	8.0	-12 6.0	-4.3 ± 16	425
	μg/L	500	480	-4.1	3.0	-8.6 -1.0	-4.1 ± 6.0	
	mg/L	9.00	8.52	-5.3	7.0	-18 2.0	-5.3 ± 14	

B.2 50.0 ml

				$\overline{RE}$ %	$S_{\overline{RE}}$ %	%	%	nm
1-	μg/L	2.00	1.9	-3.4	8.8	-13 11	-3.4 ± 18	425
	μg/L	100	102	2.0	9.3	-3.0 21	2.0 ± 19	
	mg/L	1.00	1.02	1.6	3.3	-2.9 4.0	1.6 ± 6.6	
2-	μg/L	2.00	1.96	-2.2	5.0	-7.0 7.0	-2.2 ± 10	425
	μg/L	100	94.2	-5.8	7.2	-20 0.8	-5.8 ± 15	
	mg/L	1.00	1.02	1.9	5.6	-7.5 8.0	1.9 ± 11	

B.3 10.0 ml

	μg/L	μg/L	μg/L	%	$\overline{P}$ %	$S_{\overline{P}}$ %	%	nm
1-	ND	10.0	9.4	88 99	93.6	5.5	94 ± 11	425
	ND	500	488	89 103	97.5	4.7	97 ± 9	425
2-	ND	0.40	0.38	91 100	95.0	3.7	95 ± 7	360
	ND	10.0	9.4	85 101	94.1	6.0	94 ± 12	425
	ND	500	499	96 103	99.8	2.5	100 ± 5	425
ND								

B.4 50.0 ml

	μg/L	μg/L	μg/L	%	$\overline{P}$ %	$S_{\overline{P}}$ %	%	nm
1-	ND	2.00	2.0	91 116	101	8.7	101 ± 17	425
	ND	100	100	92 117	100	8.6	100 ± 17	425
2-	ND	0.10	0.10	84 114	96	11.2	96 ± 22	360
	ND	2.00	2.0	86 121	100	11.4	100 ± 23	425
	ND	100	101	95 119	101	9.0	101 ± 18	425
ND								

B.5

						%	$\overline{P}$ %	$S_{\overline{P}}$ %	%	nm
1# 50.0 ml	1-	μg/L	48.4	50.0	94.1	80 101	91	8.9	91 ± 18	425
	2-	mg/L	0.950	1.00	1.88	76 102	93	9.1	93 ± 18	360
2# 10.0 ml	1-	μg/L	45.7	50.0	95.1	82 116	99	11.6	99 ± 23	425
	2-	mg/L	2.62	5.00	7.79	82 109	103	14.7	103 ± 29	360
3# 50.0 ml	1-	μg/L	540	400	935	90 109	99	6.8	99 ± 14	425
	2-	μg/L	153	200	363	94 122	105	10.1	105 ± 20	360

B.6 10.0 ml

		μg/L	μg/L	μg/L	%	%	nm
1#	2-	ND	0.50	0.40	73 87	80	360
2#	1-	ND	10.0	8.2	78 85	82	425
	2-	ND	10.0	9.4	91 98	94	
3#	1-	ND	400	367	91 95	92	425
	2-	ND	400	373	89 97	93	
4#	1-	ND	1000	836	72 86	84	425
	2-	ND	1000	868	75 90	87	
1#	2-	ND	0.50	0.455	88 96	91	360
2#	1-	ND	10.0	8.70	83 91	87	425
	2-	ND	10.0	8.94	87 93	89	
3#	1-	ND	400	363	90 93	91	425
	2-	ND	400	370	90 95	93	
4#	1-	ND	1000	842	84 85	84	425
	2-	ND	1000	868	87 87	87	
ND							