

Shine's Solution for Determination of Sugar in Food

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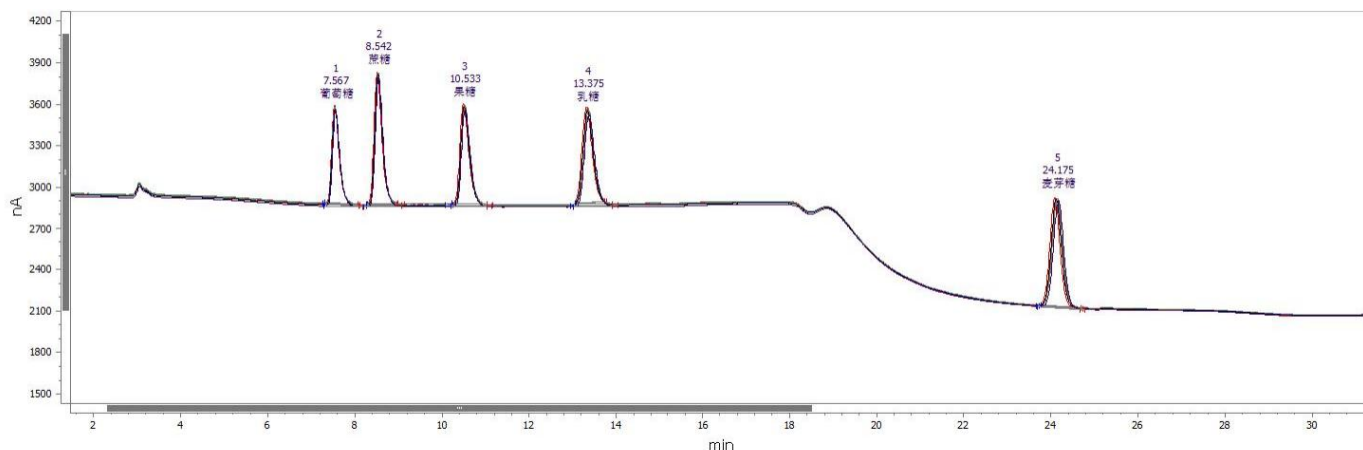
Sugar is a fundamental substance that provides energy. Long-term high sugar intake can increase the risk of dental caries and obesity. In recent years, the issue of overweight and obesity has become prominent among residents in China, with the rate of overweight and obesity among children and adolescents continuing to rise. To implement the "three reductions" healthy lifestyle—reducing salt, oil, and sugar—and the "Protection of Minors Law," China's GB 28050-2025 "National Food Safety Standard for Nutritional Labeling of Prepackaged Foods" stipulates that sugar is a "mandatory labeling item" on the nutritional labels of prepackaged foods. The standard also clarifies that "sugar specifically used for nutritional labeling refers to the sum of fructose, glucose, sucrose, maltose, and lactose in food." In other words, these five types of sugar are mandatory inspection items for food. GB 5009.8-2023 "National Food Safety Standard for Determination of Fructose, Glucose, Sucrose, Maltose, and Lactose in Food" specifies the testing procedures, with the second method being ion chromatography, which is applicable to the determination of fructose, glucose, sucrose, maltose, and lactose in food, making it the most widely applicable.

Shine is committed to the high-end development of China instruments, continuously refining its expertise in scientific instrument R&D and production. Focusing on the R&D, production, sales, and technical services of ion chromatography and its core components, it is a high-tech international enterprise with unique China characteristics. Guided by the principle of "protecting the human living environment and promoting the benign development of ecology," Shine provides the SH-CIC-D200E dedicated sugar detector for food sugar detection, offering multiple optional solutions with three different chromatograph columns to choose from. Practical cases have proven the excellence of Shine's products.

Instrument

<p>CIC-D200E</p>	<p>SH-CAC-1 (4.6*250mm)</p>	<p>SH-CAC-20 (4.0*200mm)</p>	<p>SH-CAC-200 (4.0*200mm)</p>

Product performance



Analysis of five kinds of sugar by six injections and chromatogram overlay

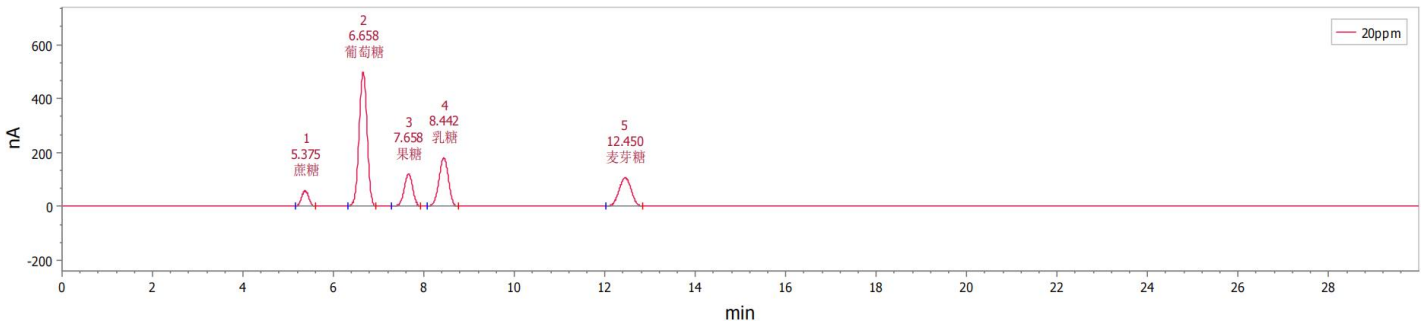
Target	Qualitative repeatability (retention time, min)							Quantitative repeatability (peak area [(nA) * min])						
	1	2	3	4	5	6	RSD (%)	1	2	3	4	5	6	RSD (%)
Glucose	7.54	7.55	7.55	7.55	7.56	7.55	0.126	142.2	141.2	139.0	138.8	137.1	139.7	1.457
	2		8	0	7	3		48	83	93	37	57	24	
Sucrose	8.51	8.54	8.54	8.53	8.54	8.53	0.127	200.8	198.6	198.3	196.1	196.9	198.1	0.914
	7	2	2	3	2	5		62	31	98	64	07	92	
Fructose	10.5	10.5	10.5	10.5	10.5	10.5	0.142	172.3	170.7	169.7	170.3	165.7	169.7	1.433
	00	17	33	08	3	18		27	48	47	72	89	97	
Lactose	13.3	13.3	13.3	13.3	13.3	13.3	0.171	192.5	187.4	181.2	192.6	187.9	188.3	2.482
	17	42	67	50	75	50		72	35	48	18	70	69	
Maltose	24.0	24.1	24.1	24.1	24.1	24.1	0.128	222.6	219.6	220.3	221.1	220.0	220.7	0.531
	92	25	42	17	75	30		07	33	12	68	88	62	

The CIC-D200E was used to analyze 5 sugar standard solutions (2mg/L) with 6 consecutive injections. The relative standard deviation (RSD) of retention time was between 0.126% and 0.171%, much lower than 1.5%, and the RSD of peak area was between 0.531% and 2.482%, all below 3%. These data indicate that the CIC-D200E has excellent overall performance.

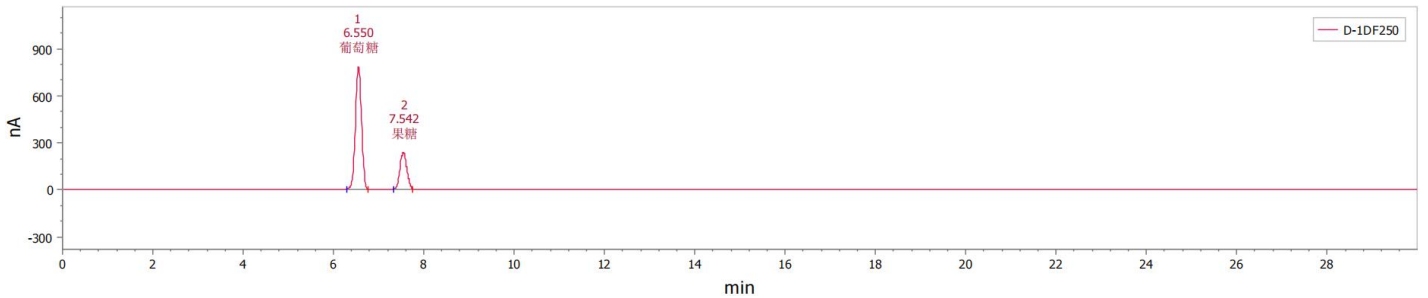
Typical application cases

(1) Determination of sugar in honey (SH-CAC-1)

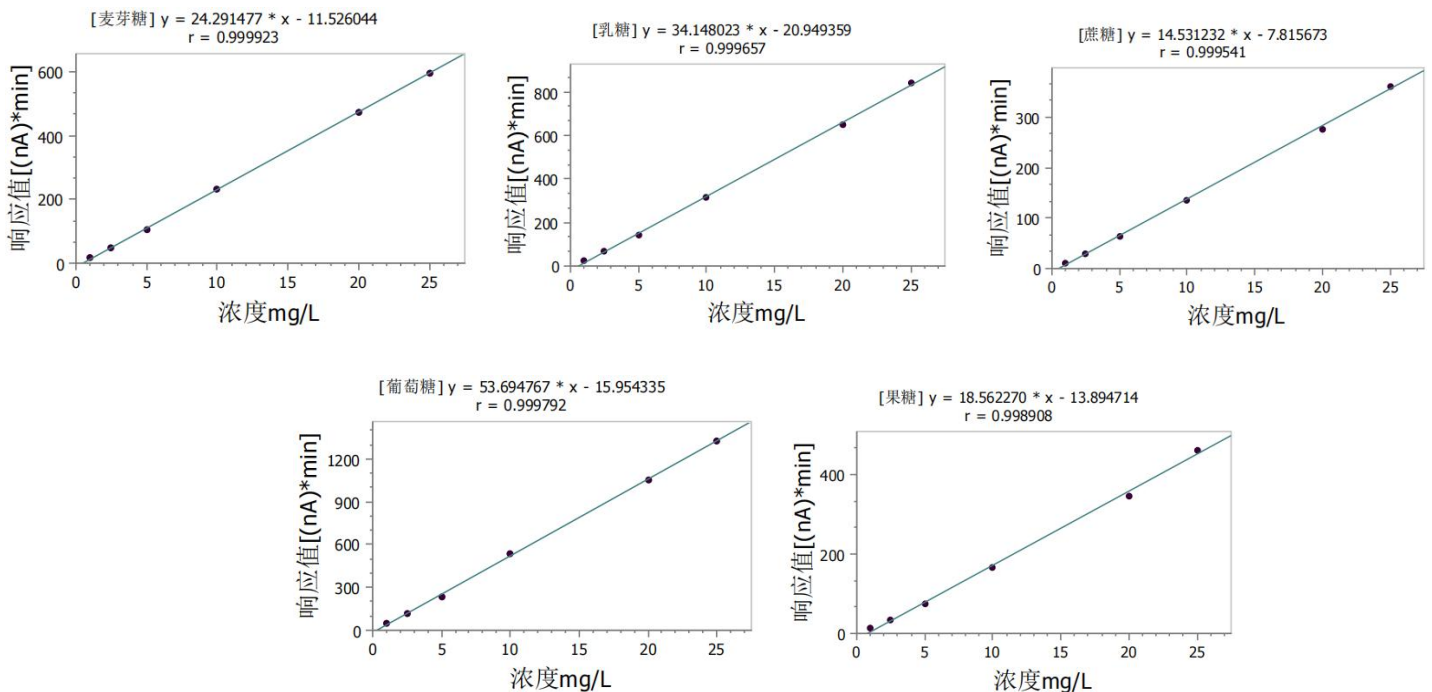
Column	SH-CAC-1 (250 mm*4.0 mm)	Potential waveform	E1-E5 : 0.10V/-2.00V/0.60V/-0.10V/0.10V t1-t5: 0.40s/0.02s/0.01s/0.01s/0.06s ts: 100ms
Eluent	Pure water; 200 mM NaOH	Loop	25 μ L
Flow rate	0.8 mL/min	Working electrode	Gold electrode
Column temperature	35 $^{\circ}$ C	Detection mode	Pulse mode



Standard sample chromatogram (20mg/L)



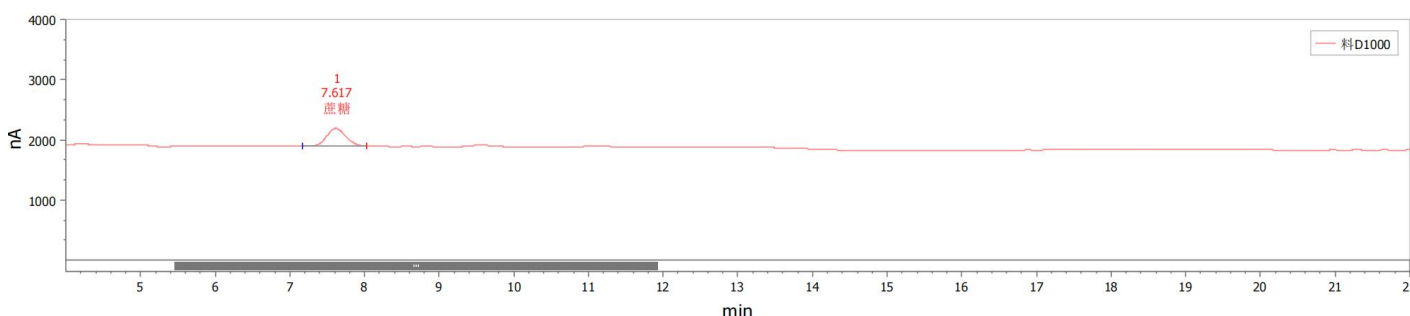
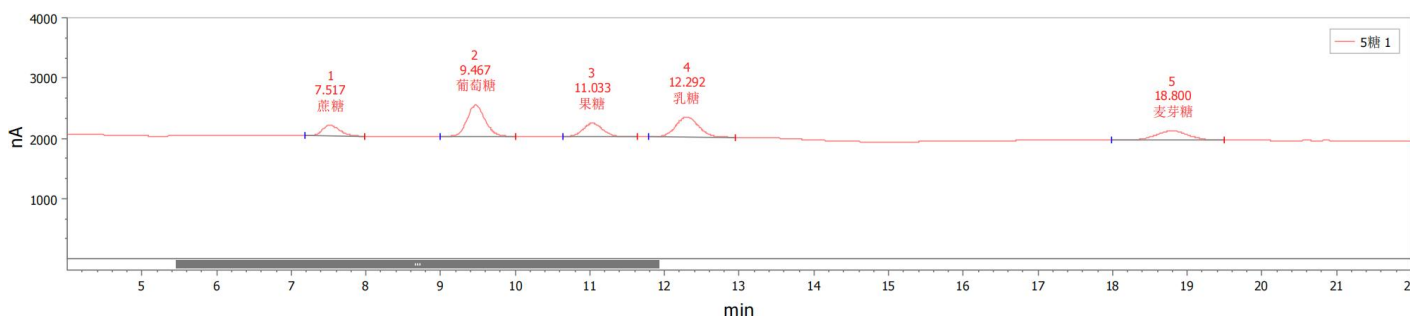
Honey sample chromatogram



Calibration curves for glucose, sucrose, fructose, lactose, and maltose (1, 2, 5, 10,20,25 mg/L)

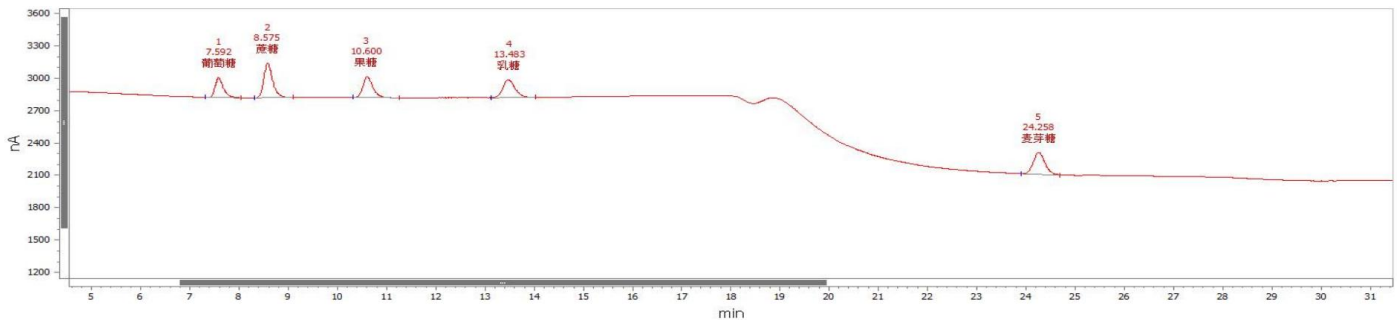
(2) Determination of Sugar in Hot Pot Broth (SH-CAC-1)

Column	SH-CAC-1 (250 mm*4.0 mm)	Potential waveform	E1-E5 : 0.10V/-2.00V/0.60V/-0.10V/- 0.10V t1-t5: 0.40s/0.02s/0.01s/0.01s/0.06s ts: 100ms
Eluent	Pure water; 200 mM NaOH	Loop	25 μ L
Flow rate	0.6 mL/min	Working electrode	Gold electrode
Column temperature	30 $^{\circ}$ C	Detection mode	Pulse mode

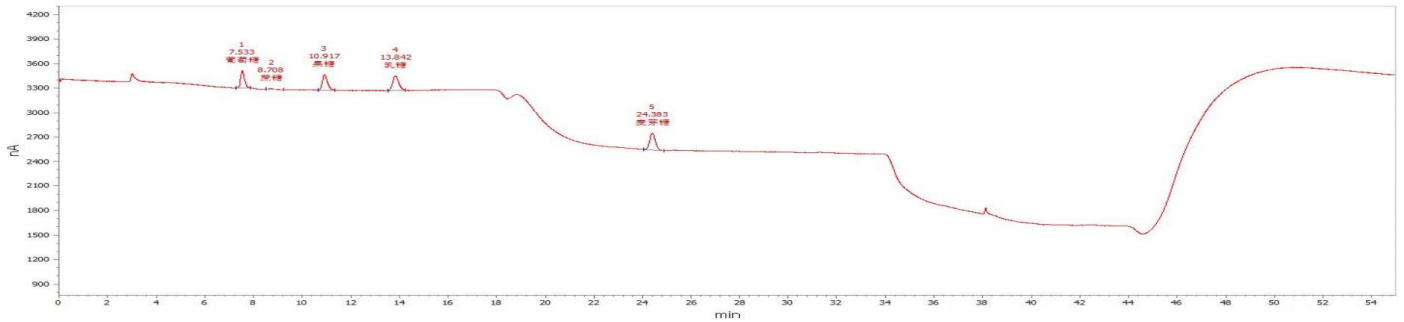


(3) Determination of 5 kinds of sugars in GB 5009.8-2023 food (SH-CAC-20)

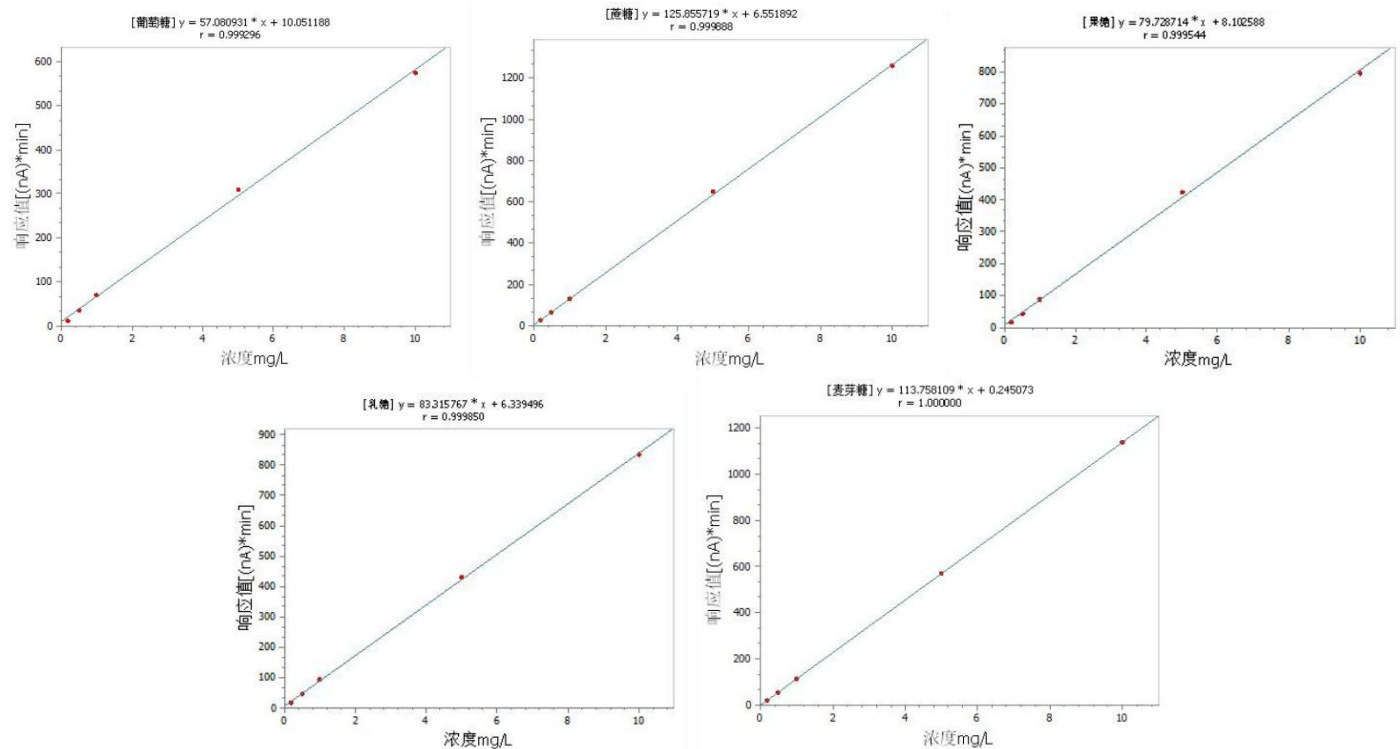
Column	SH-CAC-20 (200 mm*4.0mm) SH-GP-20 (50*4.0mm)	Potential waveform	E1-E5 : 0.10V/0.1V/0.1V/-2V/-2V t1-t5 : 0.00s/0.2s/0.4s/0.41s/0.42s ts: 100ms
Eluent	A: Pure water B: 500mM NaOH +100mM NaAC	Loop	25 μ L
Flow rate	0.4mL/min	Working electrode	Gold electrode
Column temperature	30 $^{\circ}$ C	Detection mode	Pulse mode



Standard sample chromatogram (0.5 mg/L)



Chromatogram of the juice sample

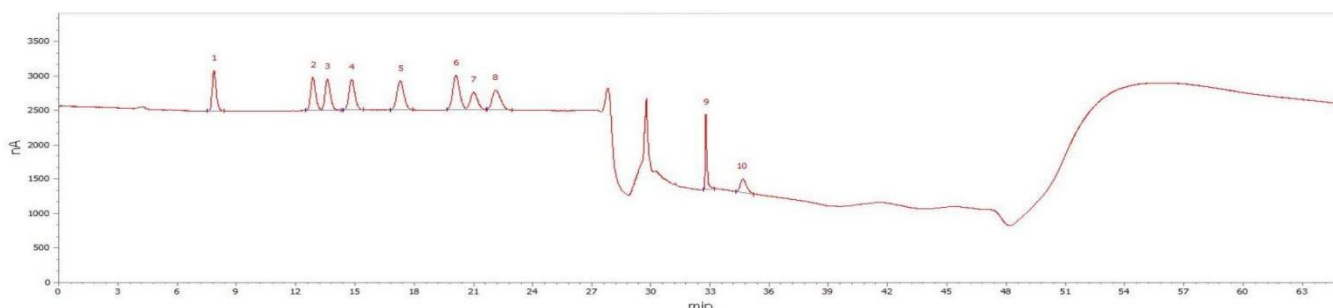


Calibration curves for glucose, sucrose, fructose, lactose, and maltose (0.1, 0.5, 1, 5, 10 mg/L)

(4) Determination of 10 monosaccharides in longan polysaccharide extract (SH-CAC-20)

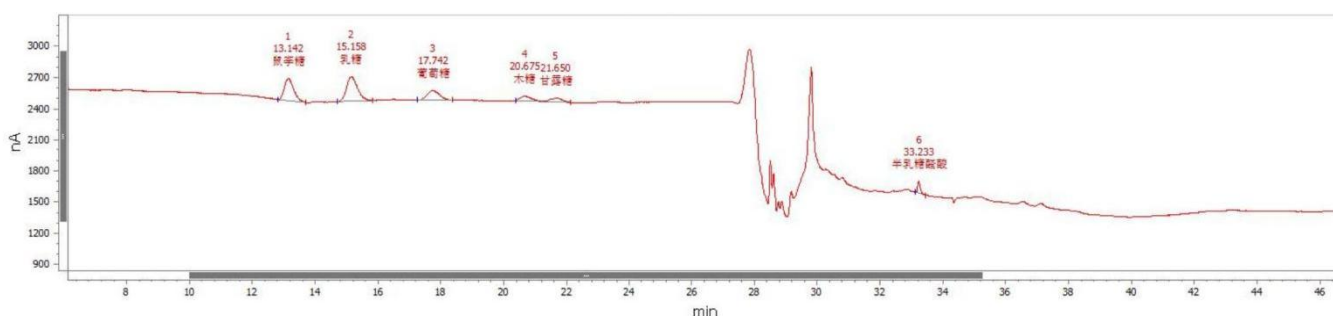
Column	SH-CAC-20 (200 mm*4.0 mm) SH-GP-20 (50*4.0mm)	Potential waveform	E1-E5 : 0.10V/0.1V/0.1V/-2V/-2V t1-t5 : 0.00s/0.2s/0.4s/0.41s/0.42s ts: 100ms
Eluent	A: Pure water B: 200mM NaOH	Loop	25 μ L

	C:500mM NaOH+100mM NaAC		
Flow rate	0.3mL/min	Working electrode	Gold electrode
Column temperature	16°C	Detection mode	Pulse mode



Standard solution (1.5 mg/L)

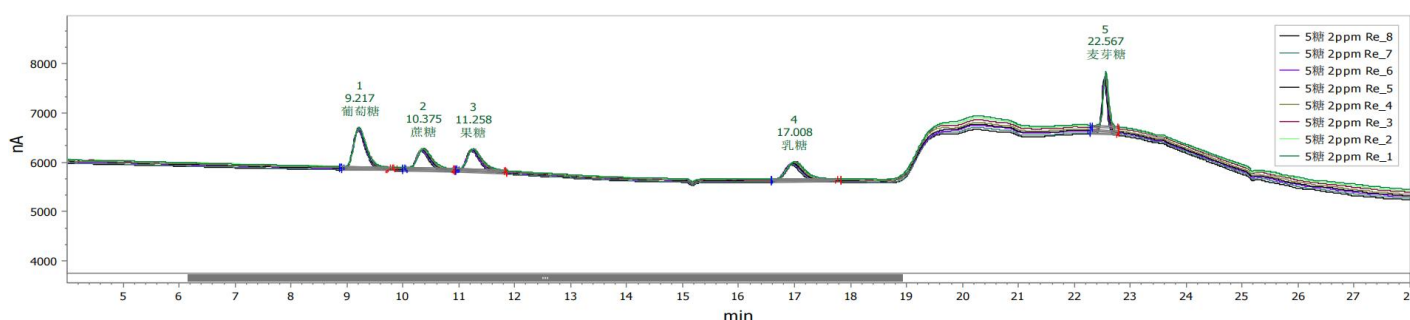
1-fucoside; 2-rhamnose; 3-arabinose; 4-lactose; 5-glucose; 6-xylanose; 7-mannose; 8-fructose; 9-galacturonic acid; 10-glucuronic acid.



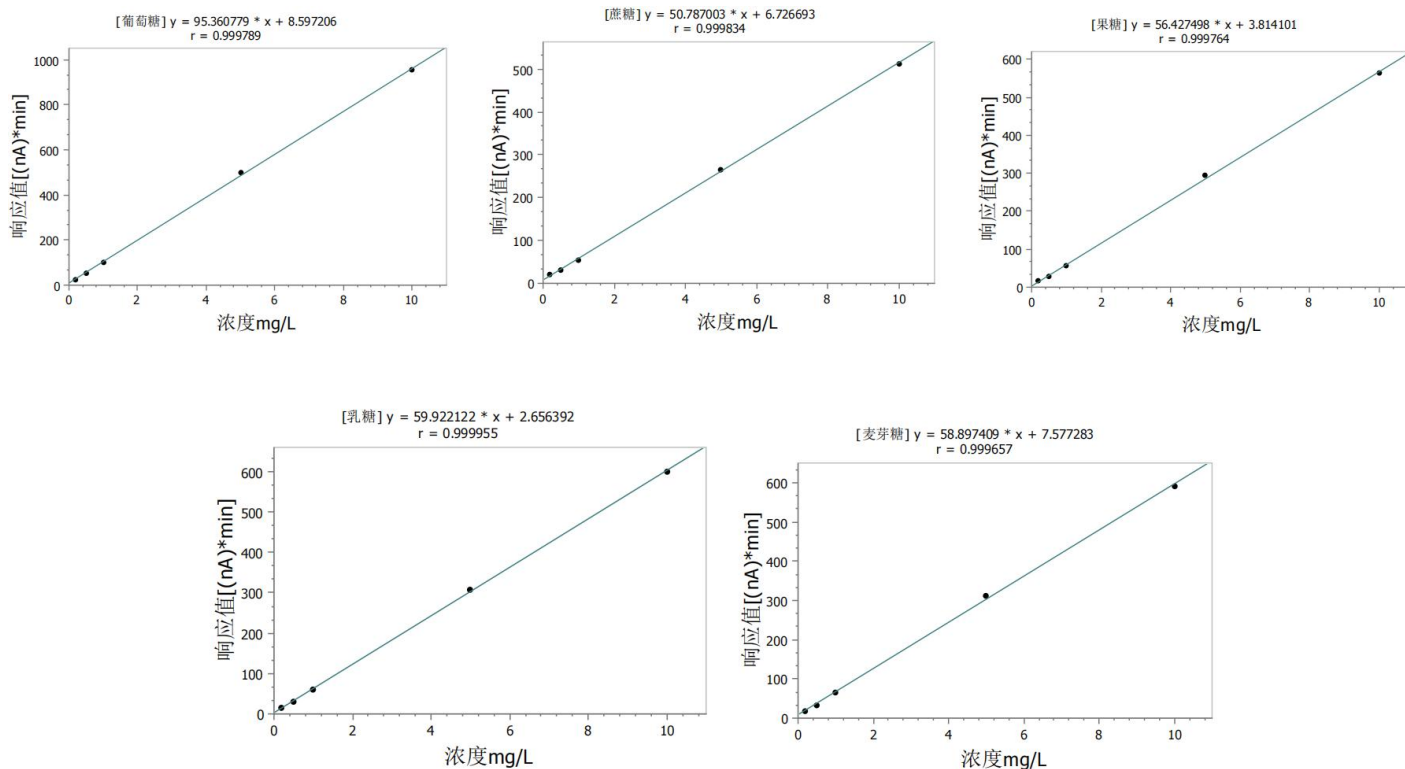
Sample chromatogram of longan polysaccharide extract

(5) Determination of 5 kinds of sugars in GB 5009.8-2023 food (SH-CAC-200)

Column	SH-CAC-200 (250 mm*4.0mm) SH-GP-20 (50*4.0mm)	Potential waveform	E1-E5 : 0.10V/0.1V/0.1V/-2V/-2V t1-t5 : 0.00s/0.2s/0.4s/0.41s/0.42s ts: 100ms
Eluent	A: Pure water B: 200mM NaOH	Loop	25 μL
Flow rate	0.4mL/min	Working electrode	Gold electrode
Column temperature	30°C	Detection mode	Pulse mode



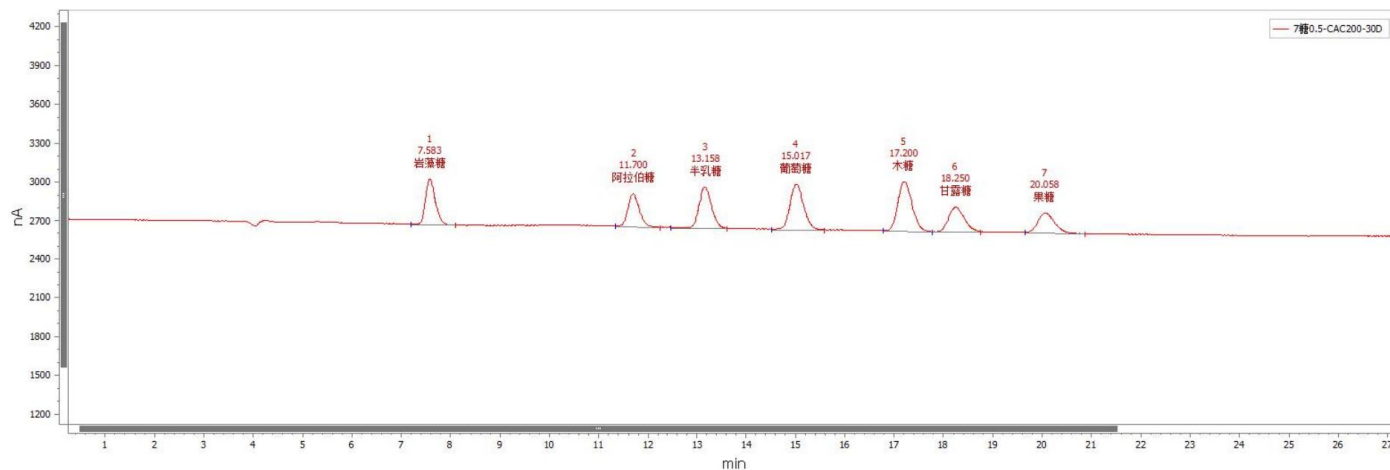
The chromatogram of 8 consecutive injections of standard solutions of glucose, sucrose, fructose, lactose, and maltose (2 mg/L)



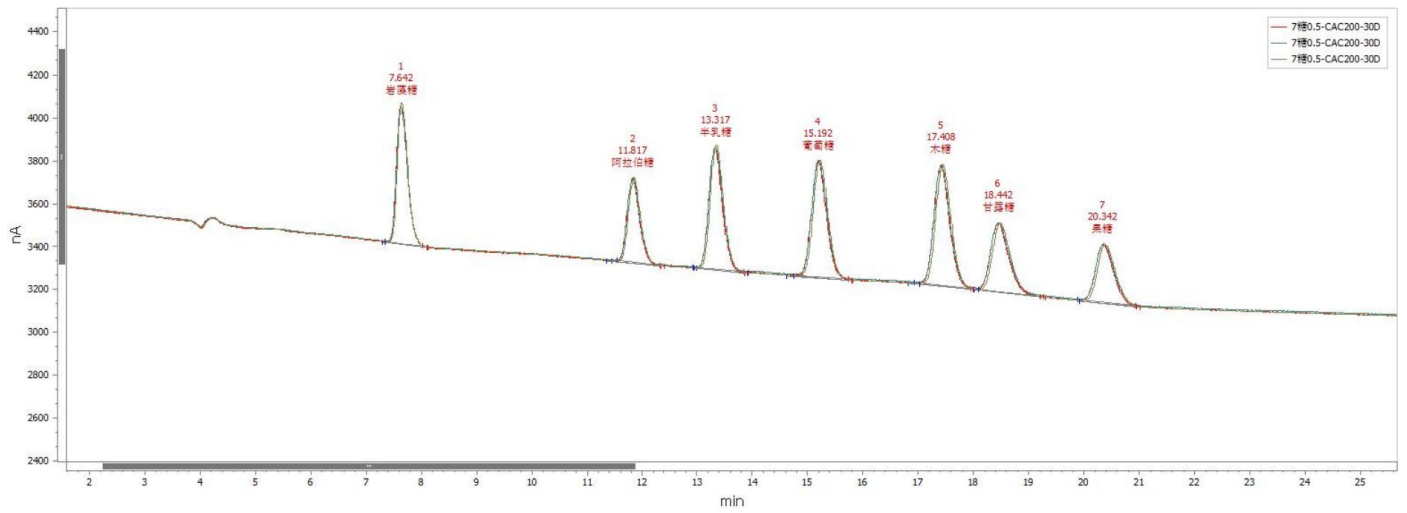
Calibration curves for glucose, ucrose, fructose, lactose, and maltose (0.1, 0.5, 1, 5, 10 mg/L)

(6) Determination of 7 monosaccharides (SH-CAC-200)

Column	SH-CAC-200 (250 mm*4.0 mm) SH-GP-20 (50*4.0mm)	Potential waveform	E1-E5 : 0.10V/0.1V/0.1V/-2V/-2V t1-t5 : 0.00s/0.2s/0.4s/0.41s/0.42s ts: 100ms
Eluent	A: Pure water B: 200mM NaOH	Loop	25 μ L
Flow rate	0.4mL/min	Working electrode	Gold electrode
Column temperature	30 $^{\circ}$ C	Detection mode	Pulse mode



Chromatogram of the standard solution (0.5 mg/L)



3 Injection chromatograms overlay

(**End**)