

**Table S1** Details of pure sialic acid purchased from e-commerce platforms, with information taken from platform publicity. “/” mean: no information available there.

Sample	Synthesis method	Purity	Country
Commercial SA 1	Fermentation	99%	China
Commercial SA 2	Fermentation	98%	China
Commercial SA 3	Fermentation	98%	China
Commercial SA 4	Enzymes	98%	China
Commercial SA 5	Enzymes	98%	China
N-Acetylneuraminic Acid Solid Drink	/	98%	China

**Table S2** Sample details of each tin of freshly braised bird's nest.

Sample	Years	Ingredient list	Country
Freshly stew bird's nest 1	2020	Bird's nest, crystal Sugar, water	China
Freshly stew bird's nest 2	2021	Bird's nest, crystal Sugar, water	China
Freshly stew bird's nest 3	2021	Bird's nest, crystal Sugar, water	China
Freshly stew bird's nest 4	2020	Bird's nest, crystal Sugar, water	China
Freshly stew bird's nest 5	2020	Water, crystal Sugar, Marine Fish Collagen, bird's nest, agar	China
Freshly stew bird's nest 6	2020	Bird's nest, crystal Sugar, water	Malaysia

**Table S3.** Fermentation data were recorded simulating the sugar and sialic acid concentrations in freshly stewed bird's nest samples. 0.03 g of sialic acid consisted of  $\delta^{13}\text{C}$  values of -28.17‰ and -12.91‰ pure sialic acid in the proportions of 0%, 25%, 75% and 100% respectively.

	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
Glucose(g)	6.08	6.05	6.12	6.09	6.08	6.10	6.07	6.02	6.04	6.07
SA(g)	0.03	0.03	0.0225	0.0225	0.0150	0.0150	0.0074	0.0075	0.0302	0.0301
			5	0	0	0	5	5		
Water(mL)	100	100	100	100	100	100	100	100	100	100
Yeast(g)	0.202	0.205	0.209	0.203	0.209	0.210	0.201	0.201	0.201	0.205

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Initial Brix	5	5.2	5	5.9	5	5	5	5	5.2	5
Final Brix	1.2	2	1.5	/	1.5	1.4	2	2	1.8	1.3
Sugar removal rate	76%	60.2%	70%	/	70%	72%	60%	60%	65.4%	72.8%

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