Supporting information

Development of a microfluidic dispensing device for multivariate data acquisition and application in molecularly imprinting hydrogel preparation

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Table S1 Composition of MIP hydrogel #1-32.

Gel #	AMPS (μmol)	AIYP (wt.% vs 14G)	Cross-linker, template, solvent
1	1.9	0.58	14G, 80.7 μmol; Lysozyme, 0.38 μmol; 1.0 mM Tris-HCl buffer (pH 7.0), 1.0 ml
2		1.2	
3		1.5	
4		2.1	
5		2.6	
6		3.0	
7		5.4	
8		6.7	
9	3.9	0.58	
10		1.2	
11		1.5	
12		2.1	
13		2.6	
14		3.0	
15		5.4	
16		6.7	
17	6.9	0.58	
18		1.2	
19		1.5	
20		2.1	
21		2.6	
22		3.0	
23		5.4	
24		6.7	
25	8.6	0.58	
26		1.2	
27		1.5	
28		2.1	
29		2.6	
30		3.0	
31		5.4	
32		6.7	

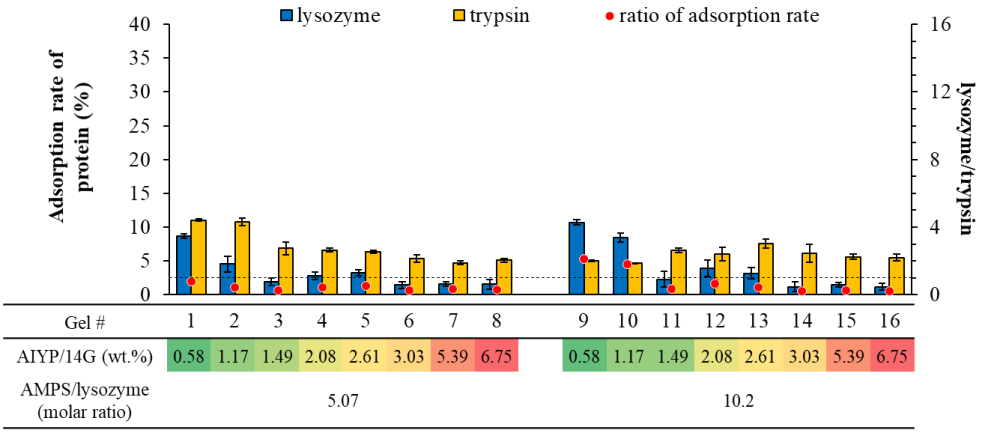
Table S2 Composition of MIP hydrogel #33-56.

Gel #	AMPS (μmol)	SS (μmol)	AS (μmol)	Cross-linker, initiator, template, solvent
33	6.8			
34		6.8		
35			6.8	
36	2.0	4.8		
37	2.6	4.3		
38	2.8	4.0		
39	3.4	3.4		
40	4.0	2.8		
41	4.3	2.6		
42	4.8	2.0		
43	2.0		4.8	14G, 80.7 μmol;
44	2.6		4.3	AIYP, 2.5 wt.% vs. 14G;
45	2.8		4.0	Lysozyme, 0.38 μmol;
46	3.4		3.4	1.0 mM Tris-HCl buffer (pH 7.0), 1.0 ml
47	4.0		2.8	
48	4.3		2.6	
49	4.8		2.0	
50		4.8	2.0	
51		4.3	2.6	
52		4.0	2.8	
53		3.4	3.4	
54		2.8	4.0	
55		2.6	4.3	
56		2.0	4.8	

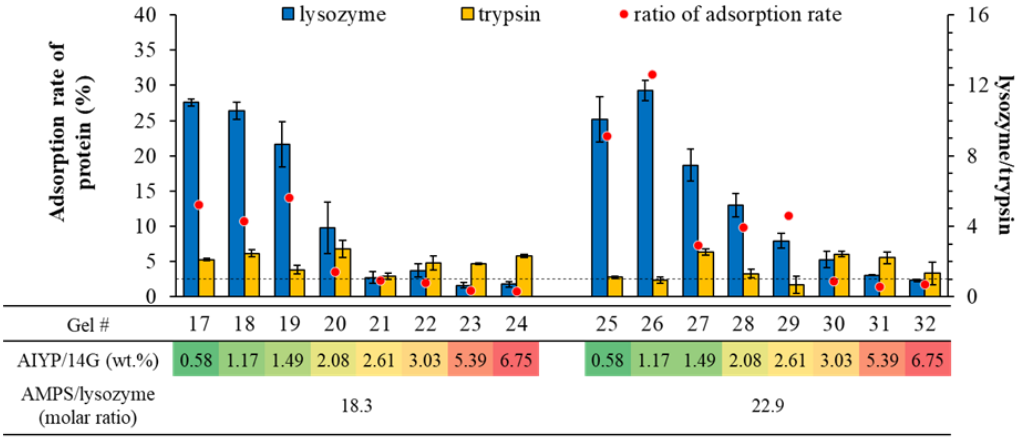
Table S3 Composition of MIP hydrogel #57-77.

Gel #	AMPS (μmol)	SS (μmol)	AS (μmol)	Cross-linker, initiator, template, solvent
57	6.8			14G, 80.7 μmol; AIYP, 1.0 wt.% vs. 14G; Lysozyme, 0.38 μmol; 1.0 mM Tris-HCl buffer (pH 7.0), 1.0 ml
58		6.8		
59			6.8	
60	5.3	1.5		
61	4.7	2.1		
62	3.6	3.2		
63	3.2	3.6		
64	2.1	4.7		
65	1.5	5.3		
66		5.3	1.5	
67		4.7	2.1	
68		3.6	3.2	
69		3.2	3.6	
70		2.1	4.7	
71		1.5	5.3	
72	1.5		5.3	
73	2.1		4.7	
74	3.2		3.6	
75	3.6		3.2	
76	4.7		2.1	
77	5.3		1.5	

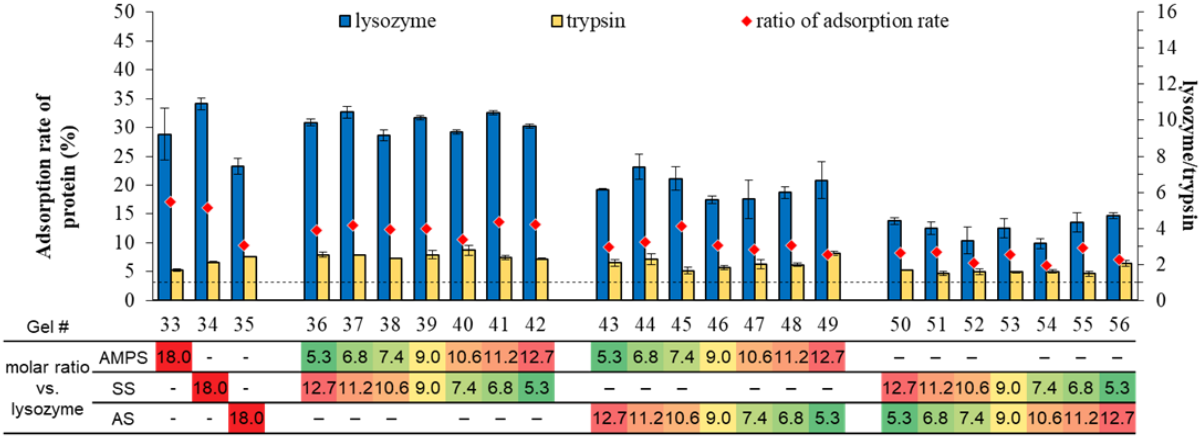
a)


lysozyme
trypsin
ratio of adsorption rate
Adsorption rate of protein (%)
lysozyme/trypsin
Gel # 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
AIYP/14G (wt.%) 0.58 1.17 1.49 2.08 2.61 3.03 5.39 6.75 0.58 1.17 1.49 2.08 2.61 3.03 5.39 6.75
AMPS/lysozyme (molar ratio) 5.07 10.2

b)


lysozyme
trypsin
ratio of adsorption rate
Adsorption rate of protein (%)
lysozyme/trypsin
Gel # 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
AIYP/14G (wt.%) 0.58 1.17 1.49 2.08 2.61 3.03 5.39 6.75 0.58 1.17 1.49 2.08 2.61 3.03 5.39 6.75
AMPS/lysozyme (molar ratio) 18.3 22.9

c)


lysozyme
trypsin
ratio of adsorption rate
Adsorption rate of protein (%)
lysozyme/trypsin
Gel # 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
molar ratio vs. lysozyme
AMPS 18.0 - - 5.3 6.8 7.4 9.0 10.6 11.2 12.7 5.3 6.8 7.4 9.0 10.6 11.2 12.7 – – – – – – –
SS - 18.0 - 12.7 11.2 10.6 9.0 7.4 6.8 5.3 – – – – – – – 12.7 11.2 10.6 9.0 7.4 6.8 5.3
AS - - 18.0 – – – – – – – 12.7 11.2 10.6 9.0 7.4 6.8 5.3 5.3 6.8 7.4 9.0 10.6 11.2 12.7

d)

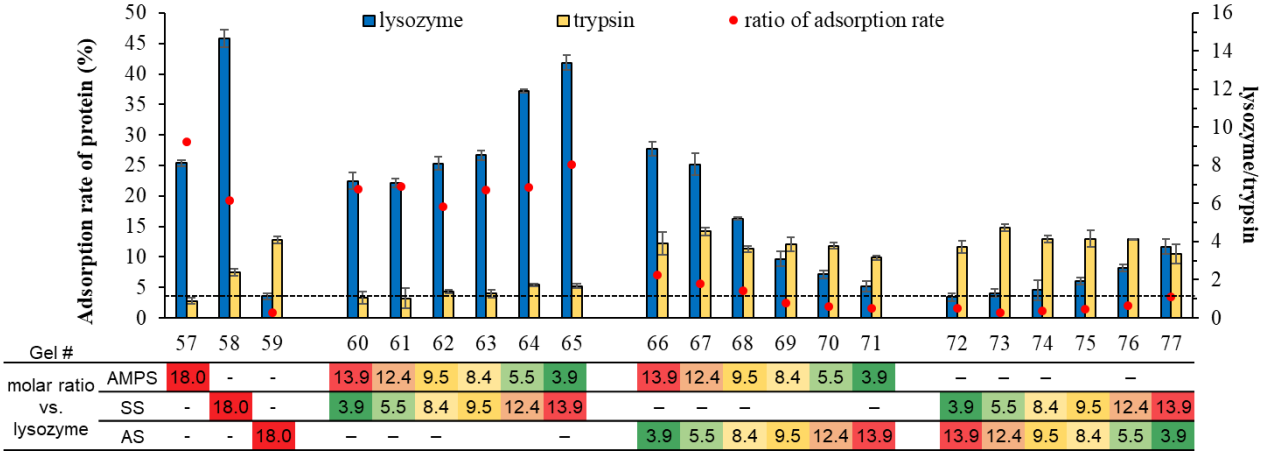


Figure 1S Adsorption performance toward lysozyme and trypsin of MIP hydrogels #1-77. Adsorption condition: gel size, 100 µL; solution volume, 2.5 mL; concentration of protein, 0.02 mM; concentration of NaCl, 50 mM; solvent, 1.0 mM Tris-HCl buffer (pH 7.1).

<u>HPLC condition for protein measurement</u>

HPLC system: LC-40B X3

Detection wavelength: 210 nm

Column: Aeris widepore XB-C8, 3.6 µm, 150mm x 2.1 mm

Mobile phase A: 0.1% TFA in H2O; Mobile phase B: 0.1% TFA in ACN

Gradient: 0-1 min 10% B, 1-3 min 30% B, 3-15 min 55% B, 15-18 min 90% B, 18-25 min 10% B

Flow rate: 0.2 mL/min; Temperature: 75 ºC; Sample injection: 10 µL