

Supplementary Table S1. Correlation analysis of subsection integral in ¹H NMR spectra with allergenic properties and AFM surface topography indexes in control and different HHP treated squid TMTp1.

Range number: ppm	Pressure [#]	Cycle	Allergenic properties								AFM surface topography indexes			
			IgE binding					IgG binding			R _a	R _{max}	S	K
			P ¹	P ²	P ³	P ⁴	P ⁵	R	R-SGF	R-SIF				
1: 0.71-0.75	-0.41	-0.47*	0.43	0.58**	0.51*	0.57**	0.65**	0.60**	0.56**	0.73***	-0.05	-0.25	-0.03	0.04
2: 0.75-0.80	0.24	0.34	-0.27	-0.41	-0.34	-0.43	-0.47*	-0.43	-0.39	-0.57**	-0.06	0.21	0.05	0.00
3: 0.80-0.84	0.10	0.21	-0.12	-0.25	-0.18	-0.28	-0.31	-0.27	-0.24	-0.44*	-0.17	0.13	0.10	0.07
4: 0.84-0.89	0.17	0.30	-0.21	-0.33	-0.28	-0.36	-0.40	-0.37	-0.32	-0.53*	-0.11	0.16	0.07	0.02
5: 0.89-0.94	-0.22	-0.31	0.24	0.36	0.28	0.39	0.42	0.38	0.35	0.57**	0.06	-0.23	-0.04	0.00
6: 0.94-0.99	-0.38	-0.48*	0.44	0.56**	0.48*	0.58**	0.62**	0.58**	0.55**	0.70***	-0.10	-0.35	0.06	0.12
7: 0.99-1.03	-0.45*	-0.56**	0.53*	0.65**	0.56**	0.66**	0.69***	0.65**	0.63**	0.74***	-0.19	-0.44	0.13	0.19
8: 1.04-1.08	-0.40	-0.60**	0.64**	0.46*	0.53**	0.53**	0.41	0.47**	0.49**	0.28	-0.77***	-0.76***	0.73***	0.73***
9: 1.09-1.13	-0.16	-0.45*	0.37	0.30	0.25	0.40	0.30	0.30	0.32	0.43	-0.36	-0.66**	0.46*	0.46*
10: 1.14-1.19	-0.32	-0.49*	0.41	0.49*	0.44*	0.54*	0.55**	0.52*	0.48*	0.68**	-0.13	-0.41	0.14	0.19
11: 1.19-1.24	0.41	0.58**	-0.51*	-0.65**	-0.62**	-0.65**	-0.72***	-0.68***	-0.63**	-0.75***	0.17	0.33	-0.11	-0.18
12: 1.24-1.29	0.19	0.21	-0.16	-0.34	-0.25	-0.34	-0.41	-0.36	-0.32	-0.49*	-0.21	0.04	0.21	0.16
13: 1.29-1.34	0.25	0.29	-0.24	-0.41	-0.33	-0.41	-0.48*	-0.43	-0.39	-0.57**	-0.13	0.10	0.15	0.10
14: 1.34-1.38	0.26	0.32	-0.27	-0.43	-0.33	-0.44	-0.48*	-0.44*	-0.41	-0.54**	-0.08	0.20	0.08	0.03
15: 1.39-1.44	-0.35	-0.53**	0.46*	0.52*	0.47*	0.57**	0.58**	0.55**	0.51*	0.73***	-0.18	-0.46*	0.18	0.23
16: 1.44-1.49	-0.35	-0.64**	0.53**	0.56**	0.55**	0.62**	0.61**	0.60**	0.56**	0.74***	-0.31	-0.56*	0.34	0.38
17: 1.49-1.53	-0.29	-0.61**	0.58**	0.36	0.46*	0.47*	0.34	0.40	0.40	0.32	-0.74***	-0.80***	0.78***	0.77***

Table (Continued)

Range number: ppm	Pressure	Cycle	Allergenic properties								AFM surface topography indexes			
			IgE binding					IgG binding			R _a	R _{max}	S	K
			P ¹	P ²	P ³	P ⁴	P ⁵	R	R-SGF	R-SIF				
18: 1.54-1.59	0.24	0.23	-0.19	-0.38	-0.28	-0.37	-0.45*	-0.39	-0.36	-0.53*	-0.19	0.05	0.22	0.17
19: 1.59-1.64	0.30	0.22	-0.21	-0.43	-0.32	-0.39	-0.49*	-0.43	-0.39	-0.54*	-0.20	-0.02	0.29	0.22
20: 1.64-1.69	-0.22	-0.59**	0.48*	0.37	0.42	0.48*	0.39	0.42	0.39	0.50*	-0.47*	-0.71***	0.58**	0.59**
21: 1.69-1.74	-0.34	-0.61**	0.52*	0.55**	0.53*	0.61**	0.59**	0.58**	0.55**	0.68***	-0.30	-0.56**	0.33	0.38
22: 1.74-1.79	-0.32	-0.69***	0.58**	0.51*	0.55**	0.61**	0.55**	0.56**	0.53*	0.64**	-0.48*	-0.71***	0.55**	0.58**
23: 1.79-1.84	0.47*	0.61**	-0.58**	-0.73***	-0.64**	-0.73***	-0.76***	-0.73***	-0.71***	-0.71***	0.25	0.44*	-0.18	-0.23
24: 1.84-1.89	-0.09	-0.49*	0.35	0.22	0.29	0.35	0.26	0.28	0.25	0.40	-0.37	-0.61**	0.54**	0.53*
25: 1.90-1.94	0.23	0.16	-0.13	-0.34	-0.24	-0.30	-0.41	-0.35	-0.31	-0.49*	-0.26	-0.07	0.32	0.26
26: 1.94-1.97	0.27	0.29	-0.25	-0.42	-0.33	-0.41	-0.48*	-0.43	-0.39	-0.58**	-0.13	0.11	0.16	0.11
27: 1.97-2.02	0.28	0.30	-0.25	-0.42	-0.35	-0.42	-0.49*	-0.44*	-0.40	-0.60**	-0.12	0.10	0.16	0.10
28: 2.02-2.06	-0.15	-0.46*	0.36	0.33	0.32	0.42	0.35	0.36	0.35	0.43	-0.29	-0.57**	0.41	0.41
29: 2.06-2.12	-0.27	-0.48*	0.39	0.47*	0.42	0.51*	0.52*	0.49*	0.46*	0.62**	-0.13	-0.41	0.17	0.21
30: 2.12-2.16	0.23	0.25	-0.19	-0.36	-0.29	-0.36	-0.43	-0.38	-0.34	-0.55**	-0.17	0.06	0.19	0.13
31: 2.17-2.22	0.15	-0.21	0.10	-0.04	0.01	0.06	-0.06	-0.03	-0.01	-0.03	-0.30	-0.45*	0.51*	0.46*
32: 2.22-2.27	-0.25	-0.46*	0.37	0.43	0.39	0.49*	0.48*	0.46*	0.43	0.59**	-0.14	-0.43	0.19	0.23
33: 2.27-2.32	-0.27	-0.43	0.35	0.45*	0.38	0.49*	0.50*	0.47*	0.44*	0.61***	-0.07	-0.36	0.10	0.14
34: 2.32-2.36	-0.27	-0.43	0.35	0.45*	0.39	0.49*	0.51*	0.48*	0.44*	0.61**	-0.05	-0.33	0.08	0.12

Table (Continued)

Range number: ppm	Pressure	Cycle	Allergenic properties								AFM surface topography indexes			
			IgE binding					IgG binding			R _a	R _{max}	S	K
			P ¹	P ²	P ³	P ⁴	P ⁵	R	R-SGF	R-SIF				
35: 2.36-2.40	-0.34	-0.45*	0.39	0.52*	0.44*	0.54*	0.58**	0.54*	0.51*	0.67***	-0.06	-0.32	0.04	0.09
36: 2.40-2.45	-0.30	-0.43	0.36	0.49*	0.41	0.51*	0.54*	0.50*	0.47*	0.63**	-0.05	-0.32	0.05	0.10
37: 2.45-2.50	-0.23	-0.38	0.29	0.40	0.34	0.44*	0.46*	0.43	0.39	0.58**	0.00	-0.29	0.03	0.07
38: 2.50-2.55	-0.23	-0.41	0.32	0.41	0.36	0.45*	0.47*	0.44*	0.40	0.59**	-0.04	-0.32	0.09	0.13
39: 2.55-2.60	-0.22	-0.38	0.29	0.40	0.35	0.44*	0.46*	0.43	0.39	0.57**	0.00	-0.29	0.05	0.09
40: 2.60-2.65	0.28	0.32	-0.27	-0.43	-0.34	-0.43	-0.50*	-0.45*	-0.41	-0.61**	-0.10	0.14	0.13	0.08
41: 2.65-2.70	-0.16	-0.31	0.22	0.34	0.27	0.37	0.39	0.36	0.32	0.52*	0.06	-0.23	0.00	0.04
42: 2.70-2.75	-0.33	-0.43	0.38	0.52*	0.42	0.53**	0.56**	0.52*	0.50*	0.63**	-0.05	-0.33	0.04	0.09
43: 2.75-2.80	-0.22	-0.34	0.26	0.39	0.32	0.41	0.45*	0.41	0.37	0.57**	0.06	-0.22	-0.03	0.02
44: 2.80-2.85	0.17	0.24	-0.17	-0.32	-0.23	-0.33	-0.37	-0.33	-0.30	-0.50**	-0.14	0.15	0.10	0.07
45: 2.85-2.90	0.46*	0.44*	-0.44*	-0.60**	-0.48*	-0.59**	-0.64**	-0.60**	-0.58*	-0.70***	0.06	0.31	0.04	-0.03
46: 2.90-2.95	0.02	-0.07	-0.03	0.11	0.04	0.13	0.18	0.13	0.09	0.34	0.30	0.02	-0.21	-0.18
47: 2.95-3.00	-0.35	-0.48*	0.43	0.55**	0.46*	0.57**	0.59**	0.56**	0.54*	0.64**	-0.11	-0.38	0.10	0.15
48: 3.00-3.05	-0.33	-0.44*	0.39	0.53*	0.44*	0.54**	0.57**	0.54*	0.51*	0.62**	-0.07	-0.33	0.06	0.10
49: 3.05-3.10	-0.14	-0.16	0.10	0.28	0.18	0.28	0.34	0.29	0.26	0.44*	0.23	-0.03	-0.21	-0.18
50: 3.10-3.15	0.21	0.27	-0.34	-0.17	-0.26	-0.18	-0.11	-0.16	-0.20	0.05	0.60**	0.34	-0.49*	-0.48*
51: 3.15-3.20	0.37	0.47*	-0.54*	-0.39	-0.47*	-0.40	-0.33	-0.38	-0.41	-0.15	0.72***	0.50*	-0.58**	-0.59**

Table (Continued)

Range number: ppm	Pressure	Cycle	Allergenic properties									AFM surface topography indexes			
			IgE binding					IgG binding				R _a	R _{max}	S	K
			P ¹	P ²	P ³	P ⁴	P ⁵	R	R-SGF	R-SIF					
52: 3.20-3.24	-0.02	0.05	-0.10	0.11	0.01	0.08	0.18	0.12	0.08	0.29	0.45*	0.22	-0.43	-0.39	
53: 3.24-3.27	0.22	0.65**	-0.55**	-0.42	-0.49*	-0.52*	-0.42	-0.45*	-0.45*	-0.42	0.62**	0.74***	-0.71***	-0.71***	
54: 3.27-3.31	0.11	0.23	-0.28	-0.06	-0.16	-0.10	0.01	-0.05	-0.09	0.13	0.59**	0.41	-0.56**	-0.53*	
55: 3.32-3.36	0.41	0.69***	-0.70***	-0.52*	-0.57**	-0.59**	-0.47*	-0.52*	-0.55**	-0.39	0.84***	0.84***	-0.79***	-0.80***	
56: 3.36-3.39	0.45*	0.75***	-0.74***	-0.58**	-0.62**	-0.66**	-0.54*	-0.59**	-0.61**	-0.49*	0.83***	0.89***	-0.80***	-0.81***	
57: 3.40-3.43	0.46*	0.78***	-0.73***	-0.66**	-0.66**	-0.75***	-0.67***	-0.68***	-0.68***	-0.69***	0.65**	0.84***	-0.64**	-0.67***	
58: 3.43-3.47	0.32	0.56**	-0.48*	-0.51*	-0.47*	-0.57**	-0.55**	-0.54**	-0.51**	-0.67***	0.26	0.55**	-0.30	-0.34	
59: 3.47-3.51	0.01	0.18	-0.08	-0.15	-0.07	-0.20	-0.19	-0.16	-0.14	-0.35	-0.11	0.22	-0.02	-0.03	

#Pressure: 0.1, 200, 400 or 600 MPa of control or HHP treated pressure. Cycle: single- or two-cycle high hydrostatic pressure. P¹–P⁵: indirect ELISA with human sera of five allergic patients. R: indirect ELISA with rabbit anti-squid TMTp1 polyclonal antibodies. R-SGF: indirect ELISA with rabbit anti-squid TMTp1 polyclonal antibodies for hydrolysates after Simulated Gastric Fluid digestion (SGF) digestion. R-SIF: indirect ELISA with rabbit anti-squid TMTp1 polyclonal antibodies for hydrolysates after Simulated Intestinal Fluid (SIF) digestion. R_a: mean roughness, R_{max}: max height, S: skewness, K: kurtosis.

Significant at *($p < 0.05$); **($p < 0.01$); ***($p < 0.001$).

Supplementary Table S2. Correlation analysis of allergenic properties with AFM surface topography indexes in control and different HHP treated squid TMTp1.

Pressure [#]	Mode	Allergenic properties									AFM surface topography indexes			
		IgE binding					IgG binding				R _a	R _{max}	S	K
		P ¹	P ²	P ³	P ⁴	P ⁵	R	R-SGF	R-SIF					
Pressure	1.00	-	-0.79***	-0.81***	-0.75***	-0.77***	-0.79***	-0.79***	-0.79***	-0.58**	0.41	0.53*	-0.06	-0.15
Mode	1.00	-0.90***	-0.84***	-0.86***	-0.90***	-0.85***	-0.87***	-0.86***	-0.89***	0.90***	0.88***	-0.80***	-0.85***	
P ¹		1.00	0.93***	0.93***	0.96***	0.92***	0.92***	0.94***	0.81***	-0.82***	-0.85***	0.60**	0.67***	
P ²			1.00	0.93***	0.97***	0.98***	0.97***	0.98***	0.84***	-0.66**	-0.68***	0.41	0.49*	
P ³				1.00	0.94***	0.93***	0.94***	0.94***	0.79***	-0.70***	-0.69***	0.48*	0.56**	
P ⁴					1.00	0.97***	0.97***	0.99***	0.86***	-0.74***	-0.78***	0.52*	0.60**	
P ⁵						1.00	0.98***	0.98***	0.88***	-0.64**	-0.67***	0.40	0.48*	
R							1.00	0.98***	0.87***	-0.68***	-0.70***	0.44*	0.52*	
R-SGF								1.00	0.83***	-0.70***	-0.71***	0.45*	0.53*	
R-SIF									1.00	-0.67***	-0.73***	0.53*	0.61**	
R _a										1.00	0.91***	-0.92***	-0.95***	
R _{max}											1.00	-0.84***	-0.87***	
S												1.00	0.99***	
K													1.00	

[#]Pressure: 0.1, 200, 400 or 600 MPa of control or HHP treated pressure. Cycle: single- or two-cycle high hydrostatic pressure. P¹–P⁵: indirect

ELISA with human sera of five allergic patients. R: indirect ELISA with rabbit anti-squid TMTp1 polyclonal antibodies. R-SGF: indirect ELISA with rabbit anti-squid TMTp1 polyclonal antibodies for hydrolysates after Simulated Gastric Fluid digestion (SGF) digestion. R-SIF: indirect ELISA with rabbit anti-squid TMTp1 polyclonal antibodies for hydrolysates after Simulated Intestinal Fluid (SIF) digestion. R_a : mean roughness, R_{max} : max height, S: skewness, K: kurtosis.

Significant at $*(p < 0.05)$; $** (p < 0.01)$; $*** (p < 0.001)$.