Table S1. The results of the liquid absorption capacity test performed for spongin scaffolds from demosponge *S. lamella*

no.	liquid	density [g/ml]	mass of spongin [g]	mass of spongin after liquid sorption [g]	absorbed mass [g]	absorbed volume [g]	times of mass increase (absorbency)	times of mass increase (absorbency) ± standard deviation
1	tap water	0.99	0.09	2.28	2.19	2.21	24.33	30.94 ± 5.73
			0.04	1.41	1.37	1.38	34.25	
			0.04	1.41	1.37	1.38	34.25	
2	distilled water	0.99	0.08	2.15	2.07	2.09	25.88	33.16 ± 7.58
			0.04	1.68	1.64	1.66	41.00	
			0.05	1.68	1.63	1.65	32.60	
3	simulated seawater	1.16	0.05	2.39	2.34	2.02	46.80	37.99 ± 7.76
			0.06	1.99	1.93	1.66	32.17	
			0.04	1.44	1.40	1.21	35.00	
4	dental water	1.00	0.09	2.55	2.46	2.46	27.33	29.63 ± 4.13
			0.06	1.69	1.63	1.63	27.17	
			0.05	1.77	1.72	1.72	34.40	
5	sugar syrup	1.24	0.06	2.99	2.93	2.36	48.83	50.69 ± 3.97
			0.04	2.25	2.21	1.78	55.25	
			0.04	1.96	1.92	1.55	48.00	
6	pork blood	1.04	0.06	2.79	2.73	2.63	45.50	43.31 ± 7.36
			0.09	3.25	3.16	3.04	35.11	
			0.03	1.51	1.48	1.42	49.33	
7	physiological saline (0.9% NaCl)	1.00	0.05	2.01	1.96	1.96	39.20	44.96 ± 6.94
			0.05	2.20	2.15	2.15	43.00	
			0.03	1.61	1.58	1.58	52.67	
8	human plasma	1.01	0.06	2.09	2.03	2.01	33.83	38.53 ± 7.35
			0.04	1.43	1.39	1.38	34.75	
			0.03	1.44	1.41	1.40	47.00	
9	serum (FBS)	1.01	0.06	1.85	1.79	1.77	29.83	34.56 ± 4.89
			0.04	1.41	1.37	1.36	34.25	
			0.05	2.03	1.98	1.96	39.60	
10	cells medium (DMEM)	1.00	0.05	1.76	1.71	1.71	34.20	39.48 ± 7.19
			0.07	2.63	2.56	2.56	36.57	
			0.03	1.46	1.43	1.43	47.67	
11	vinegar, 10%	1.01	0.06	2.32	2.26	2.24	37.67	36.77 ± 3.96
			0.07	2.34	2.27	2.25	32.43	
			0.05	2.06	2.01	1.99	40.20	
12	red wine	1.01	0.06	2.05	1.99	1.97	33.17	31.92 ± 1.78
			0.08	2.47	2.39	2.37	29.88	
			0.07	2.36	2.29	2.27	32.71	
13	beer	1.00	0.08	2.71	2.63	2.63	32.88	34.97 ± 1.82
			0.08	2.95	2.87	2.87	35.88	
			0.06	2.23	2.17	2.17	36.17	
14	glycerin	1.20	0.05	1.89	1.84	1.53	36.80	36.54 ± 1.43
			0.06	2.33	2.27	1.89	37.83	
			0.04	1.44	1.40	1.17	35.00	
15	hyaluronic acid. 1%	1.01	0.05	2.02	1.97	1.95	39.40	36.86 ± 2.21
			0.04	1.47	1.43	1.42	35.75	
			0.07	2.55	2.48	2.46	35.43	

Table S2. Measurement results for analyzed regions (fields) of the carbonized spongin structure presented in **Figure 28B**, obtained using original software of Keyence VHX-6000 microscopy system.

	Area	Unit	Perimeter	Unit	Max diameter	Unit	Min diameter	Unit
Average	11373.14		398.55	µm	138.19	µm	99.50	µm
Standard deviation	7356.00		152.28	µm	53.54	µm	37.42	µm
Max	23726.56	µm²	654.43	µm	236.73	µm	170.39	µm
Min	2460.11	µm²	185.51	µm	60.98	µm	49.97	µm
Total (Main)	159223.97	µm²	5579.71	µm	1934.61	µm	1393.05	µm
No.	**Area**	**Unit**	**Perimeter**	**Unit**	**Max diameter**	**Unit**	**Min diameter**	**Unit**
1	23064.61	µm²	654.43	µm	236.73	µm	146.67	µm
2	12650.76	µm²	452.34	µm	145.98	µm	117.72	µm
3	5578.71	µm²	286.03	µm	97.70	µm	72.89	µm
4	22376.52	µm²	603.19	µm	209.12	µm	153.82	µm
5	2706.74	µm²	199.15	µm	73.53	µm	49.97	µm
6	12737.08	µm²	444.18	µm	156.36	µm	103.80	µm
7	23762.56	µm²	588.41	µm	184.87	µm	170.39	µm
8	14525.13	µm²	503.00	µm	181.54	µm	107.90	µm
9	10535.93	µm²	413.96	µm	155.03	µm	87.37	µm
10	14107.09	µm²	463.40	µm	165.21	µm	118.81	µm
11	2460.11	µm²	185.51	µm	60.98	µm	51.08	µm
12	3679.68	µm²	232.19	µm	79.52	µm	61.81	µm
13	3417.02	µm²	222.77	µm	73.96	µm	61.71	µm
14	7622.02	µm²	331.15	µm	114.08	µm	89.12	µm

	Area	Unit
Total area	159223.97	µm²
Count	14	pcs
Area ratio	75.29	%
Total region area	211469.54	µm²

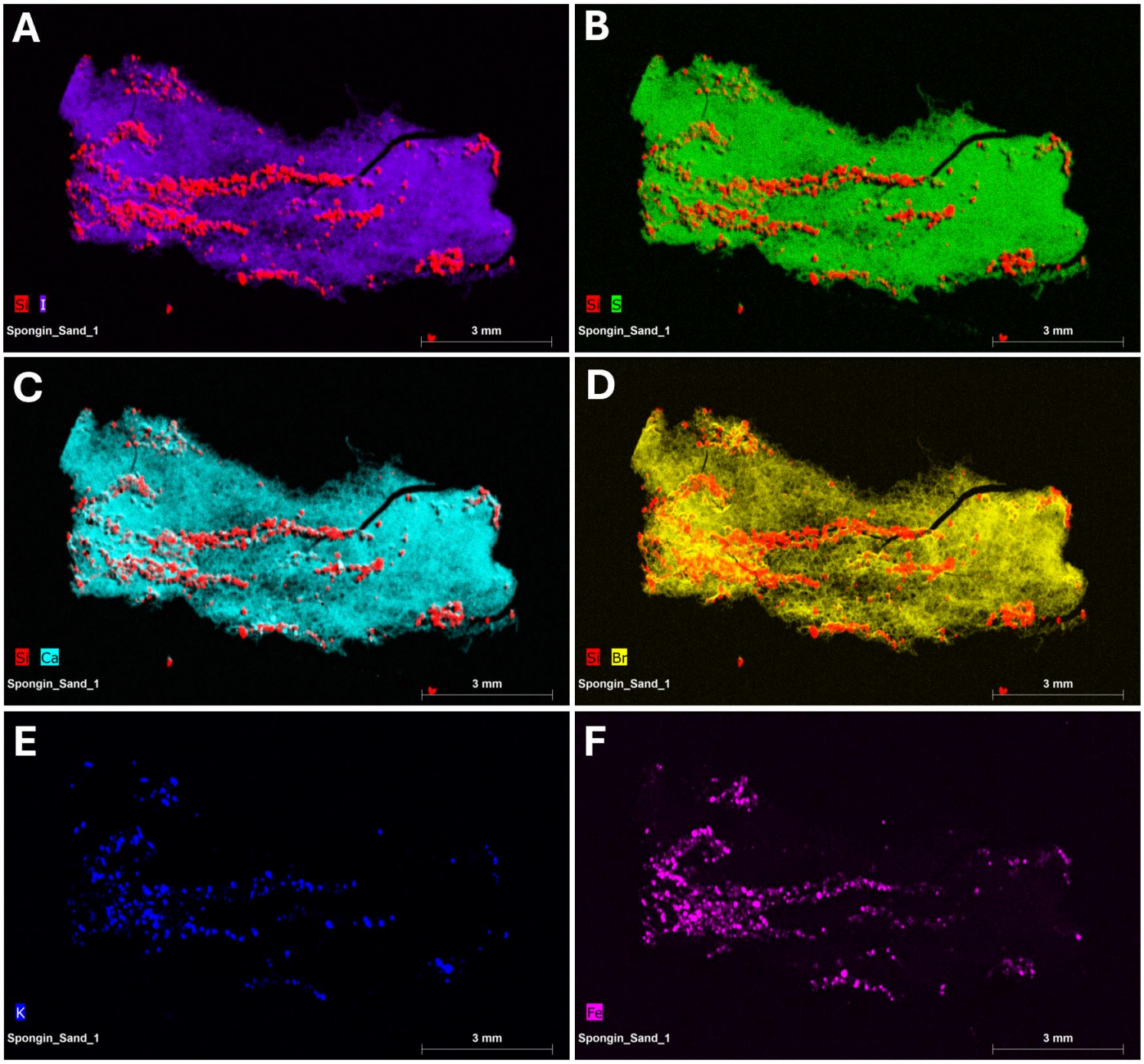


Figure S1. MXRF analysis of the *H. communis* spongin sample: (**A**), (**B**), (**C**), (**D**) element mapping of the I, S, Ca, Br showing uniform distribution in spongin matrix and Si aligned with the fibers; (**E**), (**F**) element mapping of K and Fe with lines repeating typical spongin fibers microarchitecture.