Supplementary Materials

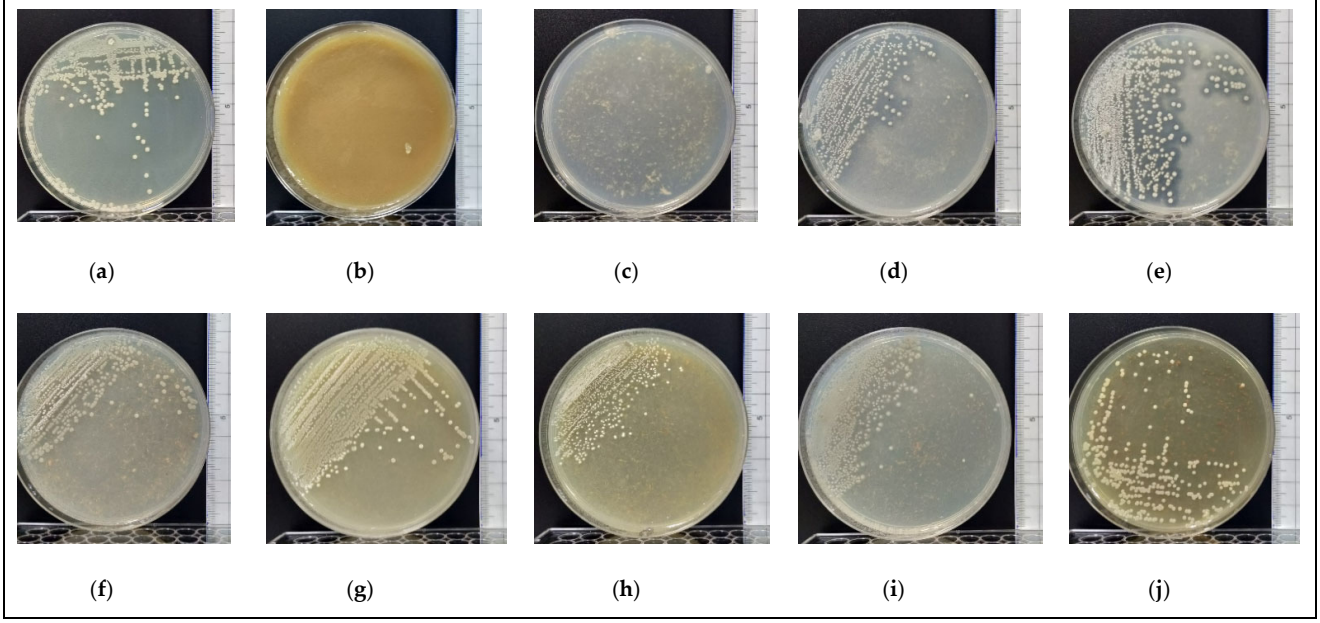

Figure S1. The growth of *S. speibonae TKU048* cells on an agar plate containing 1% of different C/N source ((**a**) NB, (**b**) ISP-2, (**c**) casein, (**d**) SEW1, (**e**) SEW2, (**f**) SHP1, (**g**) SHP2, (**h**) SHP3, (**i**) THP, and (**j**) TVP), 0.05% MgSO4, 1% K_2HPO_4, and 2% agar at 37°C for 3 days.

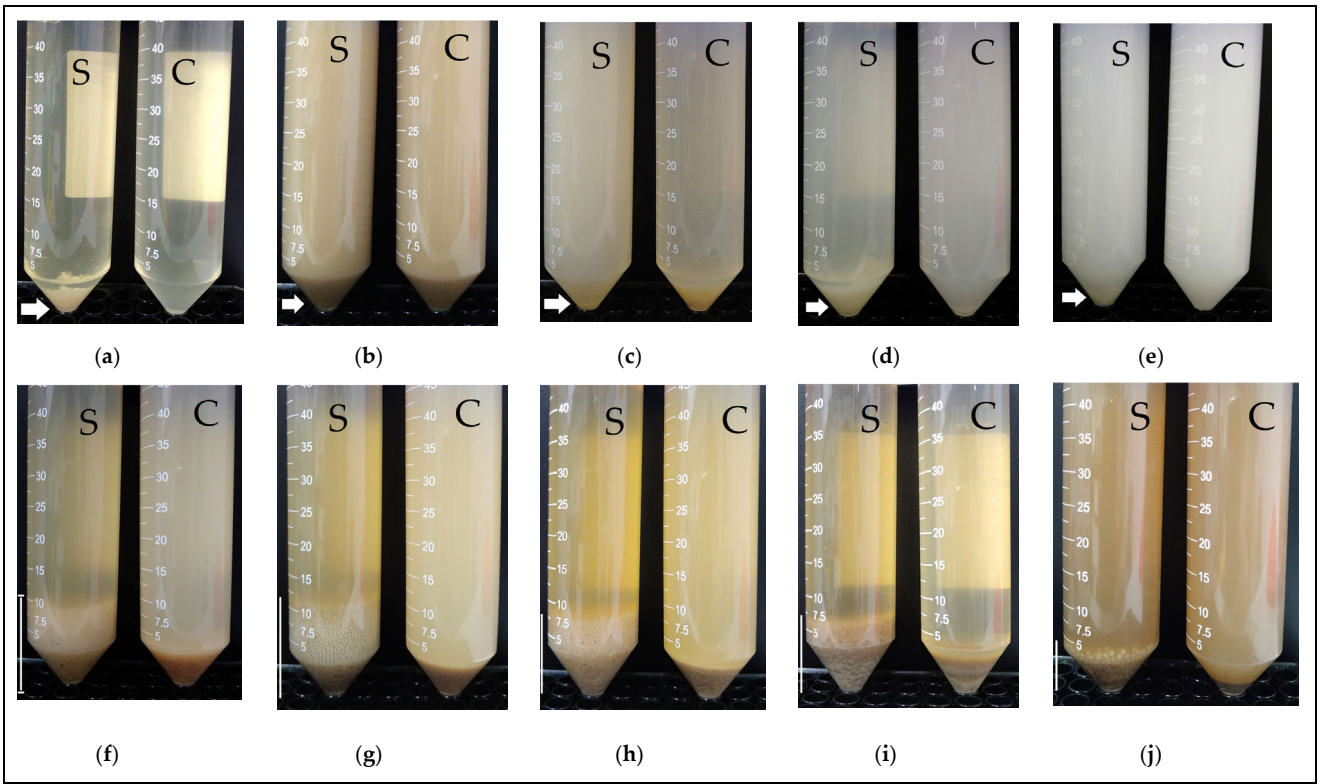

Figure S2. Growth of strain *S. speibonae* TKU048 in 50 mL of liquid medium in an Erlenmeyer flask (250 mL) containing 1% of different C/N source ((**a**) NB, (**b**) ISP-2, (**c**) casein, (**d**) SEW1, (**e**) SEW2, (**f**)

SHP1, (**g**) SHP2, (**h**) SHP3, (**i**) THP, and (**j**) TVP), 0.05% MgSO4, and 1% K_2HPO_4, in a shaking incubator at 150rpm for 3 days at 37°C. **S**: with *S. speibonae* TKU048; **C**: without *S. speibonae* TKU048.

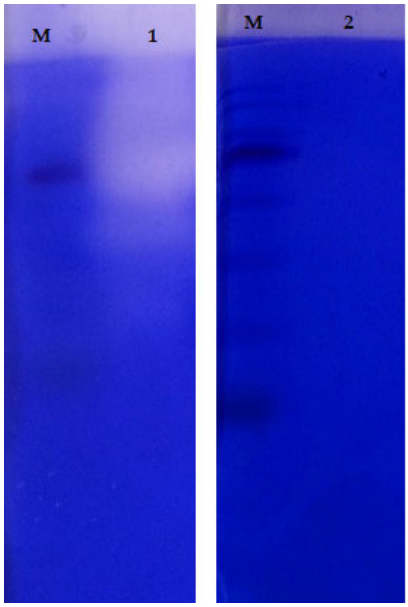

Figure S3. In-gel detection of the inhibitory effect of EDTA. M, protein markers; 1, without EDTA; 2, with EDTA.

Table S1. DPPH and ABTS radical scavenging activity of the hydrolysates produced by papain, bromelain, and *S. speibonae* TKU048's crude-enzyme cocktail. All data points are means ± S.D. of three different replicates.

	DPPH radical scavenging activity				**ABTS radical scavenging activity**			
	Control	**Bromalein**	**Papain**	**TKU048 crude enzyme**	**Control**	**Bromalein**	**Papain**	**TKU048 crude enzyme**
SBP	5.46±3.22	1.62±2.29	5.15±6.63	**38.14±4.72**	6.97±1.37	28.91±2.12	24.38±0.98	32.96±0.71
THP	24.94±2.18	21.47±1.35	38.46±0.66	61.61±3.96	8.26±1.93	10.97±3.72	11.66±3.17	27.93±0.48
TMP	29.92±3.62	31.35±2.43	57.82±8.05	51.02±8.76	7.81±1.04	32.25±2.82	47.00±3.77	53.34±4.09
TVP	57.60±6.24	33.24±3.80	61.13±10.15	**70.73±7.39**	44.86±2.03	57.99±0.53	62.56±1.86	**74.26±3.90**
TiHP	20.70±5.42	9.09±2.54	31.05±2.86	65.03±0.19	8.65±0.95	17.93±1.86	16.31±4.15	23.21±0.84
TiMP	31.39±11.51	13.50±11.36	29.97±8.64	62.17±2.34	8.15±1.00	41.88±3.66	39.38±1.14	47.01±0.73
TiVP	59.48±6.97	30.29±3.72	57.07±6.35	69.28±9.43	21.82±1.76	19.99±3.50	26.28±0.43	31.76±0.03
SHP	31.13±2.12	47.88±3.45	31.87±5.10	61.65±11.32	36.79±3.08	43.75±5.55	39.73±3.67	58.48±0.93
SMP	29.47±2.56	14.22±3.35	34.50±8.59	70.66±6.22	13.15±1.71	41.49±2.48	49.38±2.56	60.36±1.29
SSP	6.45±2.03	6.81±5.98	15.11±5.26	53.98±5.42	7.09±2.06	22.83±2.93	25.32±1.36	47.43±4.89
CSP	4.04±1.84	4.72±1.73	9.40±1.47	48.03±2.38	0.23±0.75	8.18±1.82	5.77±3.50	**12.31±0.52**
SPP	19.50±3.08	6.61±1.18	15.95±4.72	64.71±3.18	9.82±2.10	10.64±5.04	16.14±2.89	67.10±2.40
cTHP	25.26±1.02	12.35±0.48	27.82±0.23	64.20±0.33	6.90±0.25	9.46±1.09	9.23±2.28	23.07±3.02
cTMP	18.46±0.32	15.22±0.60	35.13±3.04	65.00±5.95	5.19±0.64	19.24±2.14	22.68±1.20	30.67±1.23
cTVP	49.27±3.60	27.98±2.75	57.56±1.54	68.71±2.61	29.26±2.47	41.76±1.45	33.77±9.07	56.45±2.45
cTiHP	25.27±3.37	4.78±3.33	24.56±2.29	55.52±0.07	10.19±1.35	17.82±0.94	18.53±0.16	30.20±1.15
cTiMP	35.60±1.44	11.73±3.05	45.93±0.69	64.45±10.55	7.97±1.26	32.70±5.18	58.65±0.91	40.76±0.05
cTiVP	51.30±2.45	27.95±3.64	38.60±3.22	65.63±0.82	19.09±1.07	18.56±0.97	17.65±1.84	26.15±4.57

Table S2. DPPH radical scavenging activity of the hydrolysates produced by crude-enzyme cocktails from different proteolytic bacterial strains. All data points are means ± S.D. of three different replicates.

1.	2. Control	3. *Bacillus* 4. *licheniformis* TKU004	5. *Paenibacillus macerans* TKU029	6. *Paenibacillus* 7. *mucilaginosus* TKU032	8. *Paenibacillus* sp. TKU042	9. *Streptomyces* 10. *thermocarboxydus* TKU045	11. *Streptomyces speibonae* TKU048
THP	28.72±6.60	**53.88±2.28**	**47.68±0.46**	**51.10±3.97**	**51.73±0.84**	35.97±11.65	72.04±0.50
TVP	53.49±0.73	54.99±2.65	54.01±1.93	55.58±2.27	**56.27±0.85**	45.57±5.96	76.44±3.29
TiHP	22.30±6.55	31.39±4.65	18.93±3.03	36.31±9.32	27.53±8.13	**37.08±5.39**	68.38±7.89
TiVP	45.67±0.90	**52.35±5.34**	50.11±4.05	**57.70±3.47**	**52.02±3.86**	47.34±4.65	**78.21±1.00**
SHP	43.84±3.32	41.12±0.88	34.92±10.09	40.70±3.31	47.67±4.33	38.23±6.01	75.55±6.36
SSP	26.05±5.43	13.55±3.21	20.09±1.99	31.65±6.34	27.51±8.30	27.76±9.45	72.64±8.68
CSP	14.68±10.60	**31.08±0.71**	12.53±11.98	26.04±11.43	17.17±9.31	**41.54±3.28**	**60.01±4.88**
SPP	20.42±8.90	32.81±4.56	24.54±7.71	34.87±8.67	23.24±8.07	**38.73±4.71**	69.39±4.24

Table S3. ABTS radical scavenging activity of the hydrolysates produced by crude-enzyme cocktails from different proteolytic bacterial strains. All data points are means ± S.D. of three different replicates.

12. Control	13. *Bacillus* 14. *licheniformis* 15. TKU004	16. *Paenibacillus* 17. *macerans* 18. TKU029	19. *Paenibacillus* 20. *mucilaginosus* TKU032	21. *Paenibacillus* sp. TKU042	22. *Streptomyces* 23. *thermocarboxydus* TKU045	24. *Streptomyces speibonae* 25. TKU048
THP	7.96±1.21	23.39±1.43	16.61±2.64	17.08±4.40	17.39±3.96	34.68±2.64	32.96±2.64
TVP	58.35±1.98	**77.59±3.85**	**77.67±2.86**	**73.70±2.75**	**68.95±3.96**	**72.30±0.11**	65.36±2.42
TiHP	9.99±1.43	21.98±1.87	17.86±3.74	20.04±1.32	17.08±1.54	30.94±0.22	32.11±0.77
TiVP	12.01±2.31	26.73±6.82	30.08±2.75	43.95±11.78	27.67±0.44	40.83±10.02	37.79±1.76
SHP	41.22±7.70	70.19±9.69	56.64±5.50	44.10±2.53	42.00±2.42	**73.23±5.17**	62.40±5.28
SSP	5.78±0.55	36.55±1.54	38.11±2.20	31.10±1.10	33.35±2.53	48.07±9.69	50.64±0.33
CSP	5.63±2.09	**12.56±2.42**	**6.41±1.21**	**12.01±4.07**	**9.06±2.31**	**21.05±0.11**	**17.93±2.53**
SPP	6.72±3.85	47.76±7.48	59.99±8.04	32.03±7.26	38.18±1.65	54.62±3.08	**84.76±1.65**