Effect of tea saponin on the foaming properties of pea protein

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1. Methods

1.1. Chemical structure characteristics

Fourier transform infrared spectroscopy spectra of the PPI, TS, PPI-TS complexes in powder form were measured by using a FTIR spectrometer (Vertex 70, Bruker). The PPI-TS complexes were prepared by immediately freezing the foam prepared from 50 mg/mL PPI and 0.4% TS complex solution in liquid nitrogen at pH7, and then freeze-dried. Individual PPI and TS were purchased sample powders without any treatment. The samples (1 mg) were mixed with potassium bromide (KBr) powder (99 mg) and then pressed into pellets. The samples were scanned in the wavenumber range of 4000 cm^{-1} to 400 cm^{-1} by accumulating 64 scans with a resolution of 4 cm^{-1}.

2. Result and discussion

2.2. Chemical structure analysis

Figure 1S illustrates the potential intermolecular interaction between pea protein isolate and tea saponin by FTIR spectrum. After the addition of TS, no new absorption peak was found, indicating that there was no new chemical group.

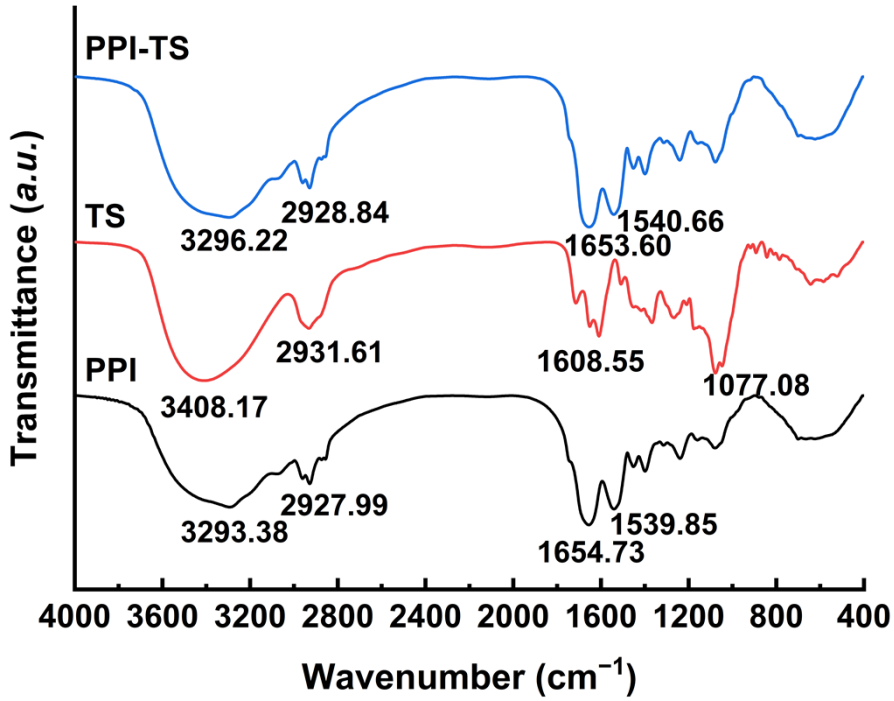

Figure 1S. Fourier transform infrared spectroscopy spectra of pea protein isolate, tea saponin and PPI-TS complexes.

Table 1S. Effects of pea protein concentrations, tea saponin percent, and pH values on the droplet sizes ($D_{3,2}$, $D_{4,3}$).

Sample	$D_{3,2}$ (μm)	$D_{4,3}$ (μm)
10 mg/mL PPI+0.2% TS	50.45 ± 0.64	113.50 ± 2.12
25 mg/mL PPI+0.2% TS	53.60 ± 0.71	123.00 ± 1.41
50 mg/mL PPI+0.2% TS	38.17 ± 1.55	95.20 ± 4.36
100 mg/mL PPI+0.2% TS	38.05 ± 0.92	85.90 ± 2.26
50 mg/mL PPI	33.67 ± 1.02	81.73 ± 1.91
50 mg/mL PPI+0.2% TS	38.17 ± 1.55	95.20 ±4.36
50 mg/mL PPI+0.4% TS	29.85 ± 0.35	75.10 ± 0.42
50 mg/mL PPI+0.6% TS	41.35 ± 0.07	103.00 ± 1.41
50 mg/mL PPI+0.8% TS	40.03 ± 1.61	95.83 ± 3.01
50 mg/mL PPI+0.4% TS pH3	16.70 ± 0.20	43.23 ± 0.38
50 mg/mL PPI+0.4% TS pH5	17.00 ± 0.28	31.05 ± 0.07
50 mg/mL PPI+0.4% TS pH7	29.85 ± 0.35	75.10 ± 0.42
50 mg/mL PPI+0.4% TS pH9	26.55 ± 0.35	71.15 ± 2.19