

**Table S1.** The changes in amino acid content of different soybean meal powders.

Amino acids	SP ( $\mu\text{mol/g}$ )	SSP ( $\mu\text{mol/g}$ )	PFSP ( $\mu\text{mol/g}$ )	HFSP ( $\mu\text{mol/g}$ )	FFSP ( $\mu\text{mol/g}$ )
Asp	65.941 $\pm$ 3.474 <sup>c</sup>	66.369 $\pm$ 3.612 <sup>c</sup>	81.214 $\pm$ 4.772 <sup>a</sup>	71.285 $\pm$ 3.305 <sup>b</sup>	67.326 $\pm$ 3.640 <sup>c</sup>
Thr	24.787 $\pm$ 1.389 <sup>cd</sup>	24.063 $\pm$ 1.563 <sup>d</sup>	29.767 $\pm$ 1.512 <sup>a</sup>	26.403 $\pm$ 1.783 <sup>b</sup>	25.161 $\pm$ 1.584 <sup>bc</sup>
Glu	97.957 $\pm$ 4.103 <sup>c</sup>	99.202 $\pm$ 4.385 <sup>bc</sup>	120.771 $\pm$ 5.450 <sup>a</sup>	103.449 $\pm$ 5.278 <sup>b</sup>	101.829 $\pm$ 5.518 <sup>bc</sup>
Gly	41.176 $\pm$ 2.031 <sup>b</sup>	41.145 $\pm$ 2.611 <sup>b</sup>	51.526 $\pm$ 2.771 <sup>a</sup>	44.346 $\pm$ 2.658 <sup>b</sup>	43.409 $\pm$ 2.407 <sup>b</sup>
Ala	38.672 $\pm$ 1.514 <sup>c</sup>	42.418 $\pm$ 2.784 <sup>bc</sup>	52.557 $\pm$ 3.531 <sup>a</sup>	46.574 $\pm$ 2.508 <sup>ab</sup>	43.118 $\pm$ 2.743 <sup>b</sup>
Cys	32.455 $\pm$ 2.531 <sup>b</sup>	33.251 $\pm$ 2.644 <sup>b</sup>	40.513 $\pm$ 2.792 <sup>a</sup>	35.663 $\pm$ 2.491 <sup>b</sup>	34.758 $\pm$ 2.518 <sup>b</sup>
$\beta$ -ala	24.393 $\pm$ 1.296 <sup>c</sup>	27.667 $\pm$ 1.392 <sup>b</sup>	32.656 $\pm$ 2.396 <sup>a</sup>	29.520 $\pm$ 2.298 <sup>ab</sup>	27.851 $\pm$ 2.307 <sup>bc</sup>
Lys	32.281 $\pm$ 2.342 <sup>a</sup>	23.359 $\pm$ 1.432 <sup>b</sup>	29.686 $\pm$ 2.472 <sup>a</sup>	23.341 $\pm$ 1.310 <sup>b</sup>	24.814 $\pm$ 1.487 <sup>b</sup>
His	13.354 $\pm$ 1.182 <sup>bc</sup>	13.409 $\pm$ 1.101 <sup>bc</sup>	16.844 $\pm$ 1.274 <sup>a</sup>	14.693 $\pm$ 1.172 <sup>b</sup>	13.870 $\pm$ 1.165 <sup>bc</sup>
Arg	32.682 $\pm$ 2.310 <sup>a</sup>	27.328 $\pm$ 1.315 <sup>b</sup>	34.314 $\pm$ 2.335 <sup>a</sup>	28.250 $\pm$ 1.249 <sup>b</sup>	27.877 $\pm$ 1.240 <sup>b</sup>
Pro	34.866 $\pm$ 2.341 <sup>b</sup>	34.840 $\pm$ 2.347 <sup>b</sup>	42.657 $\pm$ 2.409 <sup>a</sup>	37.902 $\pm$ 2.376 <sup>ab</sup>	36.636 $\pm$ 2.396 <sup>b</sup>

SP: soybean meal powder; SSP: sterilized soybean meal powder; PFSP: *Pleurotus ostreatus* fermented soybean meal powder; HFSP: *Hericium erinaceus* fermented soybean meal powder; FFSP: *Flammulina velutipes* fermented soybean meal powder. Data is mean  $\pm$  SD of triplicates, values in the same row with different letters (a-d) present significant difference ( $p < 0.05$ ).

**Table S2.** The changes in isoflavone content of different soybean meal powders.

Isoflavone forms	Daidzin ( $\mu\text{g/g}$ )	Genistin ( $\mu\text{g/g}$ )	Daidzein ( $\mu\text{g/g}$ )	Genistein ( $\mu\text{g/g}$ )
SP	15.63 $\pm$ 0.71 <sup>c</sup>	176.73 $\pm$ 7.16 <sup>b</sup>	22.29 $\pm$ 1.33 <sup>c</sup>	28.86 $\pm$ 1.40 <sup>d</sup>
SSP	39.52 $\pm$ 1.64 <sup>a</sup>	286.19 $\pm$ 10.84 <sup>a</sup>	11.36 $\pm$ 0.30 <sup>d</sup>	15.38 $\pm$ 0.53 <sup>e</sup>
PFSP	13.78 $\pm$ 0.57 <sup>d</sup>	n.d.	72.13 $\pm$ 3.32 <sup>a</sup>	122.40 $\pm$ 5.42 <sup>a</sup>
HFSP	18.53 $\pm$ 0.63 <sup>b</sup>	n.d.	44.82 $\pm$ 2.27 <sup>b</sup>	69.87 $\pm$ 2.59 <sup>c</sup>
FFSP	9.36 $\pm$ 0.35 <sup>e</sup>	n.d.	47.70 $\pm$ 2.04 <sup>b</sup>	89.94 $\pm$ 3.61 <sup>b</sup>

SP: soybean meal powder; SSP: sterilized soybean meal powder; PFSP: *Pleurotus ostreatus* fermented soybean meal powder; HFSP: *Hericium erinaceus* fermented soybean meal powder; FFSP: *Flammulina velutipes* fermented soybean meal powder; n.d.: not detected Data is mean  $\pm$  SD of triplicates, values in the same column with different letters (a-e) present significant difference ( $p < 0.05$ ).