

Mechanical performance of spider silk is robust to nutrient-mediated changes in protein composition

Sean J Blamires^{†,*}, Chen-Pan Liao[†], Chung-Kai Chang[§], Yu-Chun Chuang[§], Chung-Lin Wu[‡],
Todd A. Blackledge[⊥], Hwo-Shuenn Sheu[§] and I-Min Tso[†]

[†]Department of Life Science, Tunghai University, Taichung 40704, Taiwan.

[‡]Evolution & Ecology Research Centre, School of Biological, Earth & Environmental Sciences,
The University of New South Wales, Sydney 2052, Australia

[§]National Synchrotron Radiation Research Center, Hsinchu 3000, Taiwan

[‡]Center for Measurement Standards, Industrial Technology Research Institute, Hsinchu 30011,
Taiwan

[⊥]Department of Biology, Integrated Bioscience Program, The University of Akron, Akron, OH
44325, USA.

Supporting information

Table S1. Comparison across experimental treatments of the mechanical parameters: ultimate strength, extensibility, toughness, Young's modulus and % shrink at supercontraction, of *Nephila pilipes* major ampullate silks. Shows means \pm s.e. for silks from spiders after pre-treatment feeding, and upon feeding on either the protein rich (P) or protein deprived (NP) solutions and outcomes of Fisher's Least Significant Difference (LSD) post-hoc analyses.

Property	Pre-treatment	Treatment NP	P	Fisher's LSD
Ultimate strength (MPa)	519.1 \pm 87.0	534.7 \pm 122.4	366.5 \pm 194.5	P>NP
Extensibility (mm mm ⁻¹)	0.3 \pm 0.2	0.5 \pm 0.2	0.3 \pm 0.0	P> NP
Toughness (MJ m ⁻³)	177.0 \pm 25.5	235.1 \pm 14.1	211.1 \pm 20.4	P=NP
Young's modulus (GPa)	6.2 \pm 0.6	7.7 \pm 0.9	6.0 \pm 2.0	P>NP
% shrink	0.4 \pm 0.0	0.4 \pm 0.1	0.3 \pm 0.1	P>NP

Table S2. Comparison across experimental treatments of the mechanical parameters: ultimate strength, extensibility, toughness and Young's modulus, in *Nephila pilipes* major ampullate silks when supercontracted. Shows means \pm s.e. for silks from spiders after pre-treatment feeding, and upon feeding on either the protein rich (P) or protein deprived (NP) solutions and outcomes of Fisher's Least Significant Difference (LSD) post-hoc analyses.

Property	Treatment		Fisher's LSD
	P	NP	
Ultimate strength (MPa)	297.7 \pm 130.3	315.7 \pm 153.5	P=NP
Extensibility (mm mm ⁻¹)	0.9 \pm 0.3	0.9 \pm 0.4	P=NP
Toughness (MJ m ⁻³)	213.7 \pm 13.0	229.8 \pm 22.2	P=NP
Young's modulus (GPa)	7.3 \pm 1.2	8.1 \pm 2.1	P=NP