

Table S1. Two-way ANOVA of yielding and the chemical composition of flowering Chinese cabbage grown under various N nutrition sources and intensity

| | Yielding | | N | | P | | K | |
|------------------------|----------|----------|--------|----------|--------|---------|-------|----------|
| | F | p | F | p | F | p | F | p |
| Pot cultivation | | | | | | | | |
| Fertilizer | 7.98 | 0.000008 | 11.12 | 0.00001 | 5.54 | 0.00183 | 6.03 | 0.00109 |
| N level | 160.74 | 0.000000 | 130.83 | 0.00000 | 2.96 | 0.06711 | 9.45 | 0.00066 |
| Interaction | 3.13 | 0.002840 | 1.18 | 0.34320 | 4.83 | 0.00068 | 4.54 | 0.00106 |
| Hydroponic | | | | | | | | |
| Fertilizer | 1.75 | 0.16375 | 20.59 | 0.000001 | 149.62 | 0.00000 | 15.84 | 0.000007 |
| N level | 35.32 | 0.00000 | 0.33 | 0.723039 | 2.12 | 0.14201 | 3.19 | 0.058969 |
| Interaction | 3.55 | 0.00348 | 4.89* | 0.002138 | 5.47 | 0.00109 | 11.30 | 0.000005 |

| | Ca | | Mg | | Na | |
|------------------------|--------|---------|--------|---------|---------|--------|
| | F | p | F | p | F | p |
| Pot cultivation | | | | | | |
| Fertilizer | 25.32 | 0.00000 | 100.79 | 0.00000 | 806.795 | 0.00 |
| N level | 22.54 | 0.00000 | 31.53 | 0.00000 | 317.317 | 0.00 |
| Interaction | 30.97 | 0.00000 | 8.77 | 0.00000 | 155.918 | 0.00 |
| Hydroponic | | | | | | |
| Fertilizer | 179.19 | 0.00000 | 338.52 | 0.00000 | 521.12 | 0.0000 |
| N level | 0.59 | 0.56013 | 1.15 | 0.33359 | 19.33 | 0.0000 |
| Interaction | 29.60 | 0.00000 | 66.81 | 0.00000 | 11.92 | 0.0000 |

| | Fe | | Mn | | Zn | | Cu | |
|------------------------|-------|---------|-------|---------|-------|---------|-------|---------|
| | F | p | F | p | F | p | F | p |
| Pot cultivation | | | | | | | | |
| Fertilizer | 14.16 | 0.00000 | 1.93 | 0.13096 | 14.42 | 0.00000 | 56.81 | 0.00000 |
| N level | 34.87 | 0.00000 | 33.02 | 0.00000 | 0.94 | 0.40204 | 1.37 | 0.26967 |
| Interaction | 6.12 | 0.00011 | 4.98 | 0.00055 | 3.02 | 0.01304 | 19.84 | 0.00000 |
| Hydroponic | | | | | | | | |
| Fertilizer | 8.37 | 0.00055 | 4.99 | 0.00786 | 92.46 | 0.00000 | 44.46 | 0.0000 |
| N level | 5.75 | 0.00913 | 1.68 | 0.20717 | 7.80 | 0.00245 | 5.61 | 0.0100 |
| Interaction | 14.49 | 0.00000 | 14.55 | 0.00000 | 18.17 | 0.00000 | 8.67 | 0.0000 |

| | Chl a | | Chl b | | (x+c) | | Chl a+ Chl b | |
|------------------------|-------|----------|-------|----------|--------|----------|--------------|----------|
| | F | <i>p</i> | F | <i>p</i> | F | <i>p</i> | F | <i>p</i> |
| Pot cultivation | | | | | | | | |
| Fertilizer | 1.12 | 0.38493 | 2.50 | 0.08673 | 4.32 | 0.01600 | 1.06 | 0.41123 |
| N level | 15.84 | 0.00020 | 4.97 | 0.02204 | 25.19 | 0.00002 | 12.98 | 0.00054 |
| Interaction | 7.23 | 0.00055 | 2.53 | 0.05753 | 14.03 | 0.00001 | 5.98 | 0.00151 |
| Hydroponic | | | | | | | | |
| Fertilizer | 71.27 | 0.00000 | 52.64 | 0.00000 | 180.31 | 0.00000 | 61.10 | 0.00000 |
| N level | 48.04 | 0.00000 | 8.48 | 0.00507 | 220.63 | 0.00000 | 31.92 | 0.00002 |
| Interaction | 62.28 | 0.00000 | 12.75 | 0.00014 | 159.35 | 0.00000 | 44.98 | 0.00000 |

| | Chl a/Chl b | | (Chl a/Chl b)/(x+c) | | L* | | a* | |
|------------------------|-------------|----------|---------------------|----------|----------|----------|-------|----------|
| | F | <i>p</i> | F | <i>p</i> | F | <i>p</i> | F | <i>p</i> |
| Pot cultivation | | | | | | | | |
| Fertilizer | 4.35 | 0.01566 | 11.99 | 0.00014 | 3.56E+05 | 0.00 | 61918 | 0.00 |
| N level | 2.05 | 0.16285 | 0.67 | 0.52577 | 6.67E+03 | 0.00 | 5912 | 0.00 |
| Interaction | 1.28 | 0.32179 | 3.69 | 0.01418 | 2.65E+05 | 0.00 | 9709 | 0.00 |
| Hydroponic | | | | | | | | |
| Fertilizer | 76.65 | 0.00000 | 161.00 | 0.000000 | 4.54E+05 | 0.00 | 21674 | 0.00 |
| N level | 48.64 | 0.00000 | 78.41 | 0.000000 | 5.87E+05 | 0.00 | 1716 | 0.00 |
| Interaction | 26.87 | 0.00000 | 9.62 | 0.000530 | 8.46E+05 | 0.00 | 10656 | 0.00 |

| | b* | | h | | C* | | DPPH | |
|------------------------|-------|----------|-------|----------|-------|----------|-------|----------|
| | F | <i>p</i> | F | <i>p</i> | F | <i>p</i> | F | <i>p</i> |
| Pot cultivation | | | | | | | | |
| Fertilizer | 4717 | 0.00 | 57761 | 0.00 | 9222 | 0.00 | 63.73 | 0.00000 |
| N level | 1422 | 0.00 | 3973 | 0.00 | 2587 | 0.00 | 90.97 | 0.00000 |
| Interaction | 13179 | 0.00 | 6197 | 0.00 | 14962 | 0.00 | 12.59 | 0.00002 |
| Hydroponic | | | | | | | | |
| Fertilizer | 21946 | 0.00 | 35968 | 0.00 | 17033 | 0.00 | 45.69 | 0.00000 |
| N level | 51212 | 0.00 | 3357 | 0.00 | 53752 | 0.00 | 10.19 | 0.00260 |
| Interaction | 14834 | 0.00 | 13854 | 0.00 | 14569 | 0.00 | 33.05 | 0.00000 |

| | TEAC | | FRAP | | TPC | | TFC | |
|------------------------|--------|----------|--------|----------|--------|----------|-------|----------|
| | F | <i>p</i> | F | <i>p</i> | F | <i>p</i> | F | <i>p</i> |
| Pot cultivation | | | | | | | | |
| Fertilizer | 188.94 | 0.00000 | 145.21 | 0.00000 | 37.12 | 0.00000 | 26.99 | 0.00000 |
| N level | 19.97 | 0.00006 | 68.73 | 0.00000 | 3.96 | 0.04161 | 11.11 | 0.00110 |
| Interaction | 37.17 | 0.00000 | 51.54 | 0.00000 | 14.92 | 0.000010 | 9.61 | 0.00011 |
| Hydroponic | | | | | | | | |
| Fertilizer | 4.84 | 0.01962 | 51.98 | 0.00000 | 74.45 | 0.00000 | 54.23 | 0.00000 |
| N level | 51.91 | 0.00000 | 12.41 | 0.00120 | 41.46 | 0.00000 | 50.94 | 0.00000 |
| Interaction | 55.78 | 0.00000 | 52.37 | 0.00000 | 110.88 | 0.00000 | 13.16 | 0.00012 |

Table S2. Colour coordinates of flowering Chinese cabbage cultivated under various N nutrition sources.

| | N source | N level | L* | a* | b* | h | C |
|------------------------|--|---------|--------------------------|-------------------------|-------------------------|---------------------------|-------------------------|
| Pot cultivation | NH ₄ NO ₃ | N-50 | 44.46±0.01 ^{m*} | -8.33±0.02 ^m | 20.92±0.01 ^g | 111.72±0.04 ^b | 22.51±0.01 ^e |
| | | N-70 | 46.15±0.00 ^d | -8.21±0.00 ^l | 21.41±0.02 ^d | 110.98±0.02 ^e | 22.93±0.01 ^c |
| | | N-90 | 44.52±0.01 ^l | -7.42±0.02 ^f | 19.08±0.02 ⁿ | 111.26±0.04 ^c | 20.47±0.02 ⁿ |
| | Ca(NO ₃) ₂ | N-50 | 44.90±0.01 ⁱ | -7.83±0.01 ⁱ | 21.03±0.01 ^f | 110.42±0.03 ^f | 22.44±0.01 ^f |
| | | N-70 | 41.58±0.00 ^o | -7.49±0.01 ^g | 19.34±0.03 ^l | 111.18±0.02 ^d | 20.74±0.03 ^m |
| | | N-90 | 44.76±0.00 ^j | -6.85±0.01 ^e | 21.51±0.03 ^b | 107.67±0.05 ^h | 22.57±0.03 ^d |
| | Mg(NO ₃) ₂ | N-50 | 43.58±0.01 ⁿ | -6.71±0.01 ^d | 20.22±0.02 ^j | 108.34±0.03 ^g | 21.31±0.02 ^l |
| | | N-70 | 45.02±0.00 ^h | -8.72±0.00 ^o | 21.88±0.02 ^a | 111.73±0.01 ^b | 23.55±0.01 ^a |
| | | N-90 | 46.02±0.00 ^e | -8.61±0.01 ⁿ | 21.47±0.01 ^c | 111.86±0.01 ^a | 23.14±0.01 ^b |
| | NaNO ₃ | N-50 | 45.05±0.01 ^g | -7.99±0.01 ^j | 20.58±0.02 ⁱ | 111.23±0.01 ^{cd} | 22.08±0.02 ^g |
| | | N-70 | 46.88±0.01 ^c | -7.80±0.01 ^h | 20.04±0.01 ^k | 111.26±0.02 ^c | 21.51±0.01 ^k |
| | | N-90 | 45.88±0.01 ^f | -8.05±0.01 ^k | 20.04±0.01 ^k | 111.90±0.03 ^a | 21.59±0.01 ^j |
| | Urea CH ₄ N ₂ O | N-50 | 47.65±0.00 ^a | -5.37±0.02 ^a | 19.29±0.01 ^m | 105.55±0.03 ^j | 20.02±0.01 ^o |
| | | N-70 | 46.99±0.01 ^b | -6.18±0.02 ^c | 20.80±0.01 ^h | 106.55±0.05 ⁱ | 21.70±0.01 ⁱ |
| | | N-90 | 44.54±0.00 ^k | -5.82±0.01 ^b | 21.19±0.01 ^e | 105.36±0.03 ^k | 21.97±0.01 ^h |
| | | Mean | 45.20±1.47 | -7.43±1.00 | 20.59±0.86 | 109.8±2.35 | 21.90±0.98 |
| Hydroponic cultivation | NH ₄ NO ₃ | N-50 | 45.87±0.01 ⁱ | -7.48±0.00 ^f | 19.91±0.01 ⁱ | 110.58±0.02 ^f | 21.27±0.01 ^h |
| | | N-70 | 45.07±0.00 ^j | -8.02±0.01 ^h | 19.02±0.02 ^k | 112.86±0.04 ^a | 20.64±0.01 ^j |
| | | N-90 | 46.84±0.00 ^h | -8.54±0.01 ^k | 20.45±0.01 ^g | 112.67±0.03 ^b | 22.17±0.01 ^e |
| | Ca(NO ₃) ₂ | N-50 | 48.77±0.01 ^e | -7.79±0.01 ^g | 20.55±0.02 ^f | 110.77±0.03 ^e | 21.97±0.01 ^f |
| | | N-70 | 50.08±0.00 ^c | -6.98±0.02 ^d | 22.32±0.02 ^b | 107.35±0.02 ⁱ | 23.39±0.02 ^a |
| | | N-90 | 47.76±0.01 ^g | -8.35±0.02 ^j | 21.81±0.03 ^e | 110.96±0.05 ^d | 23.35±0.02 ^b |
| | Mg(NO ₃) ₂ | N-50 | 48.28±0.01 ^f | -8.04±0.02 ⁱ | 19.73±0.01 ^j | 112.18±0.03 ^c | 21.31±0.01 ^g |
| | | N-70 | 45.02±0.00 ^k | -7.00±0.01 ^d | 19.99±0.01 ^h | 109.29±0.02 ^g | 21.18±0.01 ⁱ |
| | | N-90 | 50.77±0.01 ^a | -6.81±0.01 ^c | 22.37±0.02 ^a | 106.93±0.03 ^j | 23.38±0.02 ^a |
| | NaNO ₃ | N-50 | 42.10±0.01 ^l | -5.87±0.03 ^a | 18.81±0.02 ^l | 107.33±0.04 ⁱ | 19.71±0.03 ^k |
| | | N-70 | 50.67±0.01 ^a | -7.35±0.01 ^e | 22.14±0.02 ^d | 108.37±0.03 ^h | 23.32±0.01 ^c |
| | | N-90 | 49.38±0.00 ^d | -6.58±0.00 ^b | 22.24±0.01 ^c | 106.48±0.02 ^k | 23.19±0.01 ^d |
| | | Mean | 47.55±2.58 | -7.40±0.77 | 20.78±1.29 | 109.65±2.25 | 22.07±1.22 |

* Values with the same letter within one type of cultivation for the parameter were not significantly different ($p > 0.05$, Duncan's test).

Table S3. Antioxidant activity (DPPH, TEAC(ABTS), FRAP) and phenolic content (TPC – total phenolic content and TFC – total flavonoid content) of flowering Chinese cabbage cultivated under various N nutrition sources.

| | N source | N level | DPPH μmol/g | TEAC(ABTS) μmol/g | FRAP mmol TE/g | TPC mg GAE/g | TFC mg QE/g |
|------------------------|---------------------------------------|---------|----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|
| Pot cultivation | NH ₄ NO ₃ | N-50 | 69.25±1.82 ^{h*} | 400.19±1.34 ^g | 22.45±0.03 ^d | 4.26±0.11 ^{def} | 1.20±0.03 ^{cd} |
| | | N-70 | 76.22±1.82 ^{fgh} | 447.22±23.13 ^{ef} | 22.60±0.32 ^d | 4.73±0.02 ^{bc} | 1.25±0.01 ^{a-d} |
| | | N-90 | 87.77±7.99 ^{de} | 493.85±2.29 ^b | 24.66±0.18 ^{abc} | 4.53±0.09 ^{cde} | 1.13±0.00 ^{de} |
| | Ca(NO ₃) ₂ | N-50 | 75.56±0.74 ^{gh} | 408.16±3.44 ^g | 21.34±0.13 ^{ef} | 5.12±0.01 ^{ab} | 1.19±0.02 ^{cd} |
| | | N-70 | 90.57±0.16 ^{cd} | 434.11±2.29 ^f | 25.05±0.27 ^{ab} | 4.53±0.36 ^{cde} | 1.14±0.05 ^{de} |
| | | N-90 | 82.25±3.92 ^{efg} | 399.38±2.48 ^g | 18.27±1.22 ^g | 4.11±0.31 ^{ef} | 1.34±0.07 ^{ab} |
| | Mg(NO ₃) ₂ | N-50 | 73.81±1.2 ^h | 443.57±0.76 ^{ef} | 23.97±0.04 ^{ac} | 4.73±0.02 ^{bc} | 1.26±0.00 ^{abc} |
| | | N-70 | 115.88±0.19 ^a | 472.63±15.48 ^{cd} | 25.73±0.89 ^b | 5.26±0.44 ^a | 1.36±0.01 ^a |
| | | N-90 | 106.12±3.22 ^b | 442.63±3.25 ^{ef} | 23.71±0.23 ^c | 4.47±0.07 ^{c-f} | 1.28±0.03 ^{abc} |
| | NaNO ₃ | N-50 | 83.27±4.65 ^{def} | 458.44±5.35 ^{de} | 20.61±0.64 ^f | 4.18±0.04 ^{def} | 1.18±0.00 ^{cd} |
| | | N-70 | 87.82±0.39 ^{de} | 488.58±3.25 ^{bc} | 21.34±0.21 ^{ef} | 4.07±0.00 ^f | 1.02±0.03 ^f |
| | | N-90 | 96.49±2.56 ^c | 536.69±0.57 ^a | 25.05±0.06 ^b | 4.6±0.28 ^{cd} | 1.23±0.14 ^{bcd} |
| Hydroponic cultivation | Urea CH ₄ N ₂ O | N-50 | 60.15±5.24 ⁱ | 408.57±1.34 ^g | 16.44±0.15 ^h | 2.79±0.02 ^h | 0.85±0.01 ^h |
| | | N-70 | 76.60±1.75 ^{fgh} | 371.54±0.19 ^h | 22.15±0.61 ^{de} | 3.61±0.12 ^g | 1.04±0.04 ^{ef} |
| | | N-90 | 75.51±1.98 ^{fgh} | 346.13±9.75 ⁱ | 16.06±0.18 ^h | 4.34±0.00 ^{c-f} | 1.19±0.05 ^{cd} |
| | | | 83.82±14.30 | 436.78±49.25 | 21.96±3.01 | 4.36±0.60 | 1.18±0.13 |
| | NH ₄ NO ₃ | N-50 | 122.41±0.12 ^a | 362.62±12.81 ^{de} | 19.71±0.33 ^{cd} | 2.78±0.08 ^g | 0.79±0.05 ^g |
| | | N-70 | 93.58±3.57 ^{ef} | 409.51±5.35 ^a | 20.35±0.04 ^c | 4.05±0.02 ^c | 1.13±0.01 ^{cd} |
| | | N-90 | 116.4±1.24 ^a | 352.07±4.40 ^e | 23.89±0.69 ^a | 3.33±0.01 ^{de} | 0.95±0.03 ^{ef} |
| | Ca(NO ₃) ₂ | N-50 | 100.44±1.32 ^{b-e} | 377.89±1.15 ^{cd} | 22.14±0.60 ^b | 4.02±0.18 ^c | 1.29±0.03 ^b |
| | | N-70 | 103.04±2.91 ^{bc} | 384.24±8.60 ^b | 23.07±0.22 ^{ab} | 4.01±0.08 ^c | 1.30±0.06 ^b |
| | | N-90 | 95.69±3.14 ^{def} | 396.54±7.26 ^{ab} | 24.13±0.07 ^a | 4.34±0.09 ^b | 1.36±0.01 ^{ab} |
| | Mg(NO ₃) ₂ | N-50 | 106.17±1.90 ^b | 394.51±2.10 ^{ab} | 23.04±0.66 ^{ab} | 4.61±0.01 ^a | 0.95±0.01 ^{ef} |
| | | N-70 | 84.37±2.02 ^g | 374.92±5.73 ^{cd} | 17.34±0.81 ^{ef} | 3.28±0.15 ^e | 1.02±0.12 ^{de} |
| | | N-90 | 97.04±2.40 ^{c-f} | 358.97±6.50 ^e | 18.52±0.01 ^{de} | 3.54±0.07 ^d | 1.13±0.00 ^{cd} |
| Hydroponic cultivation | NaNO ₃ | N-50 | 79.59±7.45 ^g | 303.01±11.09 ^f | 16.21±0.08 ^f | 3.01±0.13 ^f | 0.86±0.01 ^{fg} |
| | | N-70 | 101.73±2.06 ^{bcd} | 406.14±0.96 ^a | 22.85±1.24 ^{ab} | 4.73±0.12 ^a | 1.24±0.10 ^{bc} |
| | | N-90 | 93.23±0.04 ^f | 408.57±0.96 ^a | 20.10±0.28 ^c | 4.76±0.12 ^a | 1.43±0.03 ^a |
| | | | 99.47±11.97 | 377.42±30.28 | 20.94±2.61 | 3.87±0.67 | 1.12±0.21 |

* Values with the same letter within one type of cultivation for the parameter were not significantly different ($p > 0.05$, Duncan's test).