

Cite this as: Yongcong ZHU, Wei CHENG, Yuemin NI, Wuzhong NI. Changes of folate constituents and contents in pakchoi as affected by nitrate to ammonium ratio in nutrient solution under hydroponic conditions. *Journal of Zhejiang University-SCIENCE B*, 26(12):1245-1259.
<https://doi.org/10.1631/jzus.B2500011>

Changes of folate constituents and contents in pakchoi as affected by nitrate to ammonium ratio in nutrient solution under hydroponic conditions

Key words: Pakchoi (*Brassica rapa* subsp. *chinensis*); Nitrate; Ammonium; Folate; Biosynthesis

Research Summary

This experiment **mainly focused on** the effects of the $\text{NO}_3^-/\text{NH}_4^+$ ratio on the folate constituents and contents of pakchoi, and was to find the best ratio for stimulating folate synthesis and reveal the mechanism by which $\text{NO}_3^-/\text{NH}_4^+$ ratio regulates folate accumulation in pakchoi.

$\text{NO}_3^-/\text{NH}_4^+$
ratio



Research Summary

70/30
NO₃⁻/ NH₄⁺ ratio



Metabolic flux of folate biosynthesis metabolism ↑

GGH activity ↑



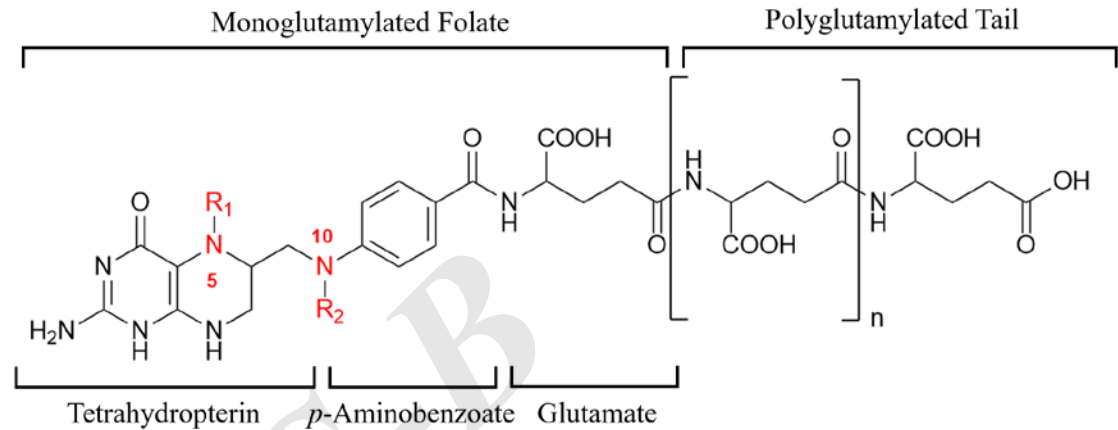
- (1) Polyglutamylated 5-CHO-THF ↑
- (2) Polyglutamylated 5-CH₃-THF ↑



231 µg per 100 g FW

151 µg per 100g FW
100/0 NO₃⁻/ NH₄⁺ ratio

1.5 fold



Innovation points

- **Investigating** the effects of the integrated application of $\text{NO}_3^-/\text{NH}_4^+$ on the folate constituents and contents of pakchoi
- **Finding** the best $\text{NO}_3^-/\text{NH}_4^+$ ratio for stimulating pakchoi folate synthesis
- **Rvealing** the mechanism by which $\text{NO}_3^-/\text{NH}_4^+$ ratio regulates folate accumulation in pakchoi

Conclusions

- 1 | The appropriate 70/30 $\text{NO}_3^-/\text{NH}_4^+$ ratio increased folate contents in pakchoi shoots**
- 2 | 70/30 $\text{NO}_3^-/\text{NH}_4^+$ ratio promote pakchoi folate accumulation by increasing polyglutamylated 5-CHO-THF and polyglutamylated 5- CH_3 -THF**
- 3 | 70/30 $\text{NO}_3^-/\text{NH}_4^+$ ratio promote pakchoi folate accumulation by increasing the consumption of the folate precursors and intermediate metabolites**
- 4 | 70/30 $\text{NO}_3^-/\text{NH}_4^+$ ratio improve pakchoi folate stability folate by reducing γ -glutamyl hydrolase (GGH) activity to weaken folate deglutamylation**
- 5 | Strategic selection of the $\text{NO}_3^-/\text{NH}_4^+$ ratio should be considered for the hydroponic cultivation of foliar vegetable crops**