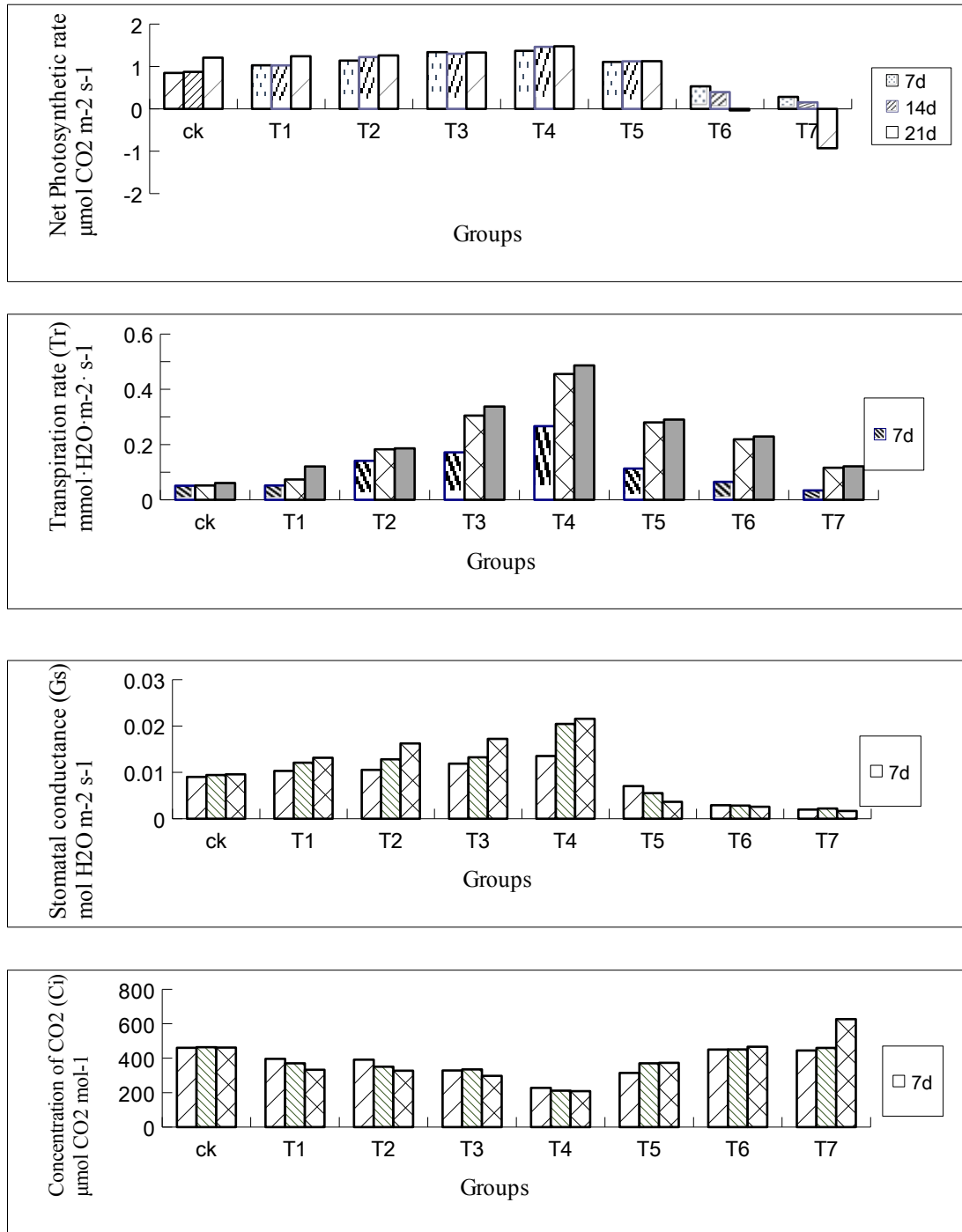
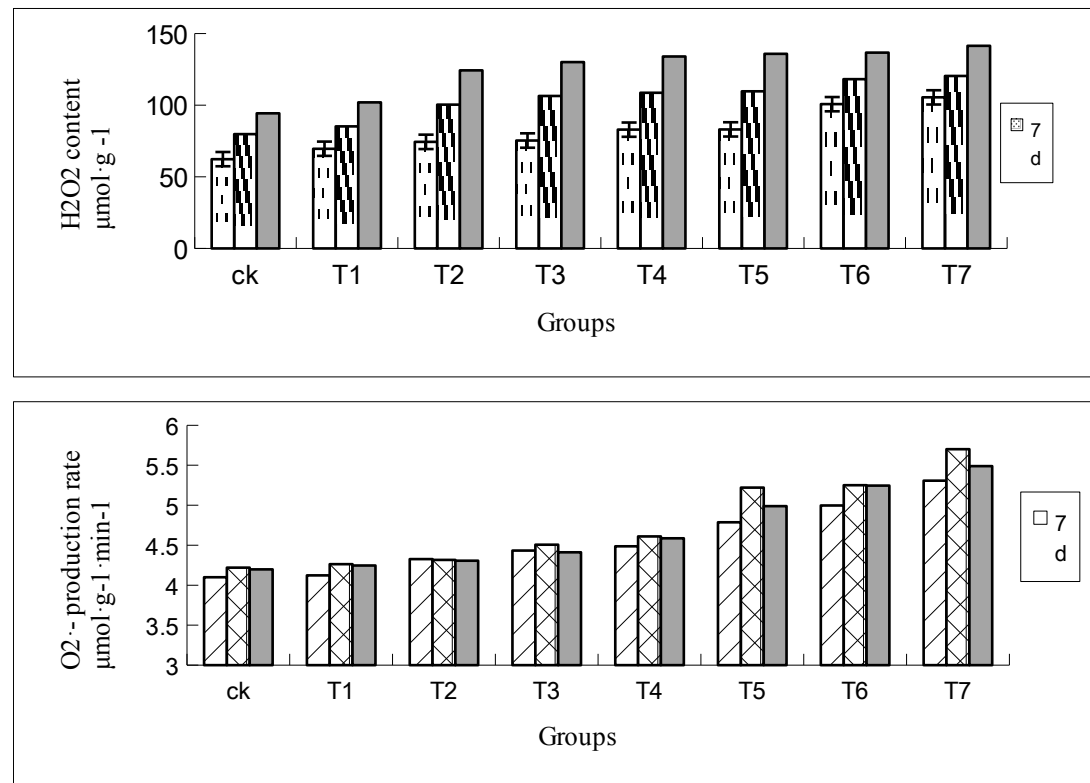


## Figures

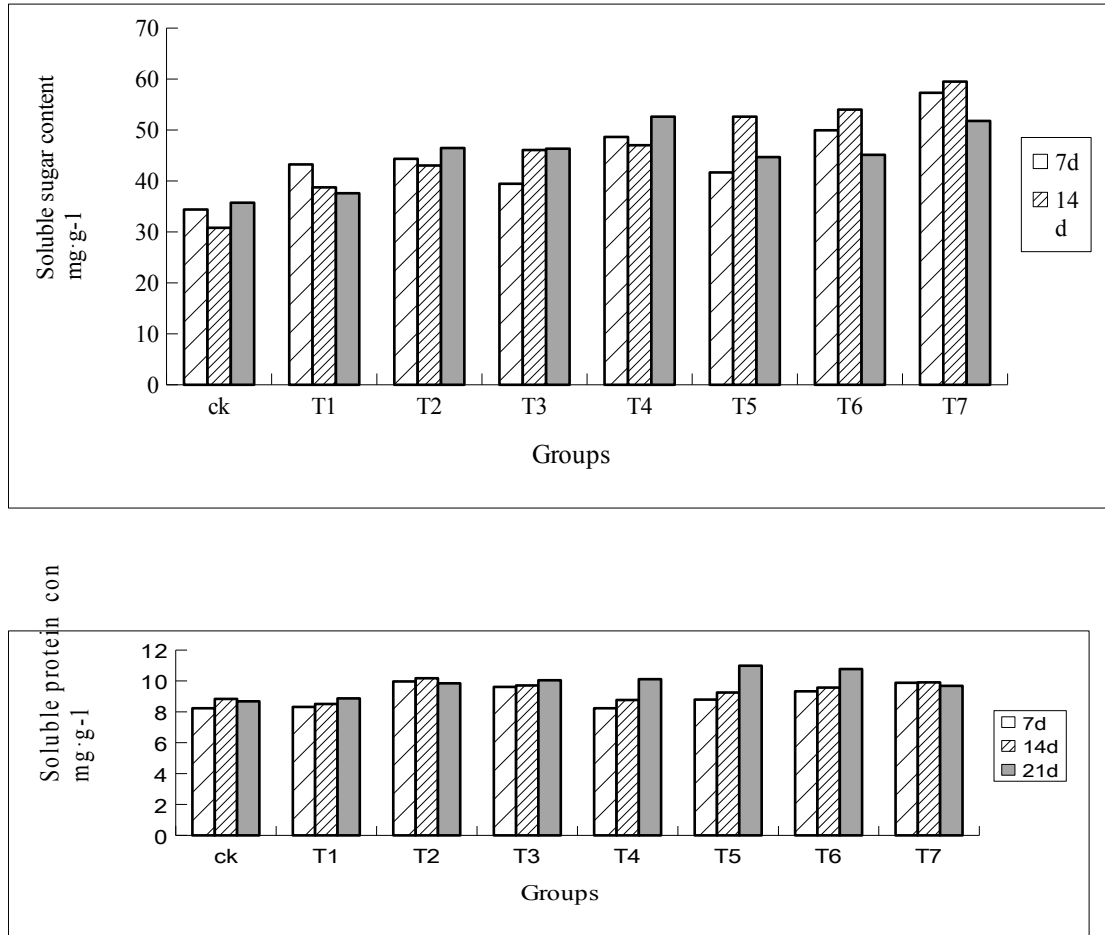


**Fig 1.** Effects of exogenous zinc on photosynthesis of *Dendrobium nobile*. a is net photosynthetic rate (Pn), b is transpiration rate (Tr), c is stomatal conductance (Gs) changes and d is the carbon dioxide concentration (Ci) changes with the time of zinc treatment and zinc concentration. Data are means  $\pm$  SE in the figures. Different letters indicate significant differences among the treatments ( $P < 0.05$ ). CK, T1, T2, T3, T4, T5, T6 and T7 indicate that corresponding Zinc

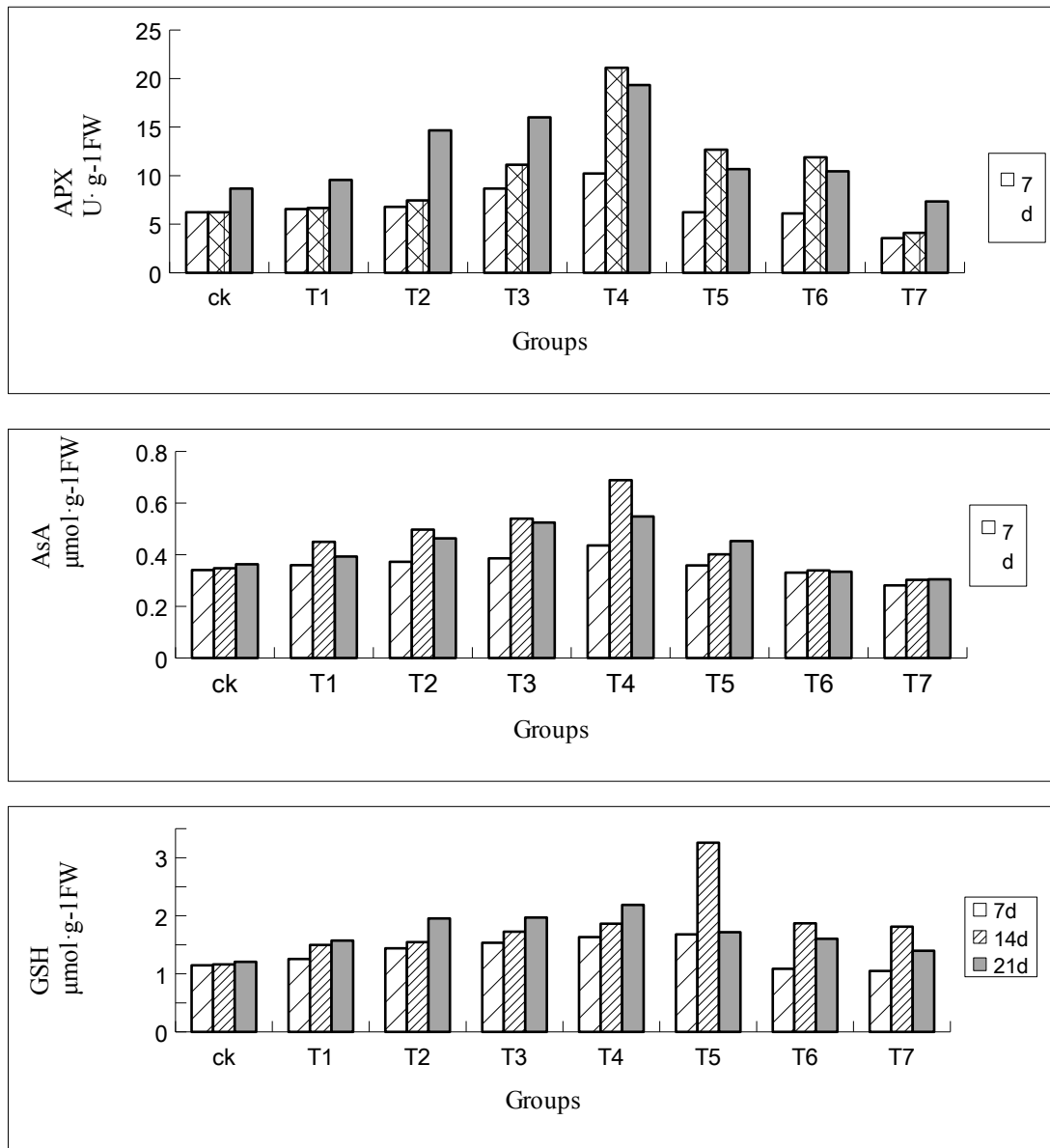
concentration is 0, 50, 100, 200, 400, 800, 1000 and 2000 $\mu\text{mol/L}$ .



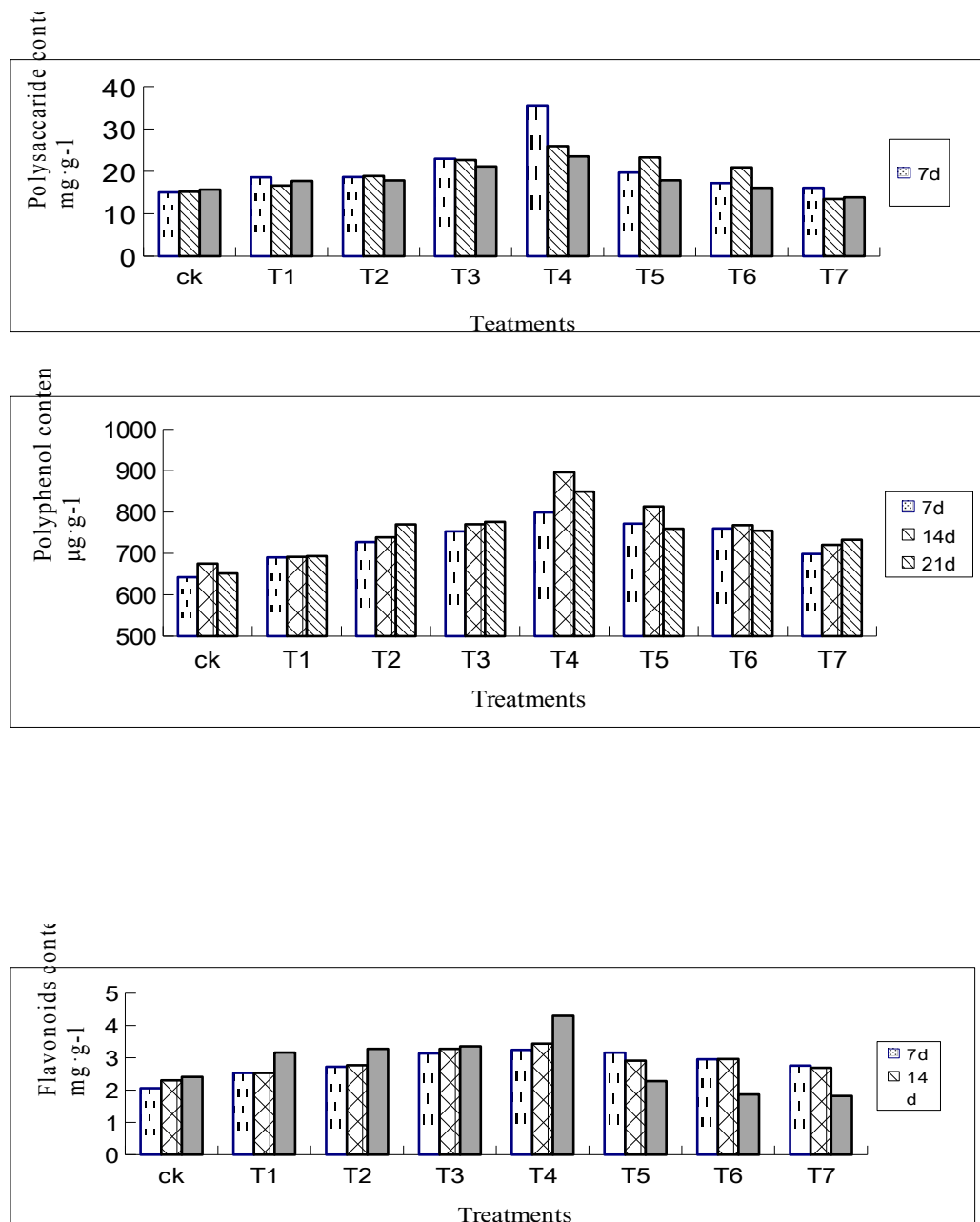
**Fig. 2** Effect of H<sub>2</sub>O<sub>2</sub> (a) and superoxide content (b) of *Dendrobium nobile* under different Zn treatment. Data are means  $\pm$  SE in the figures. Different letters indicate significant differences among the treatments ( $P < 0.05$ ). CK, T1, T2, T3, T4, T5, T6 and T7 indicate that corresponding Zinc concentration is 0, 50, 100, 200, 400, 800, 1000 and 2000 $\mu\text{mol/L}$ .



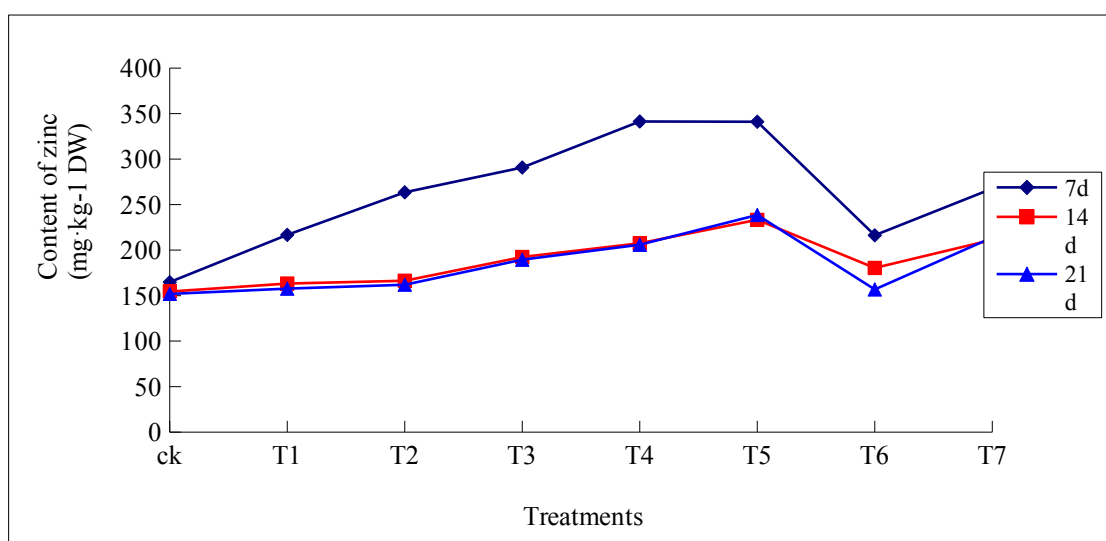
**Fig. 3** Effect of different concentrations of zinc on the content of soluble sugar(a) and soluble protein(b) in *Dendrobium nobile* leaves. Data are means  $\pm$  SE in the figures. Different letters indicate significant differences among the treatments ( $P < 0.05$ ). CK, T1, T2, T3, T4, T5, T6 and T7 indicate that corresponding Zinc concentration is 0, 50, 100, 200, 400, 800, 1000 and 2000 $\mu$ mol/L.



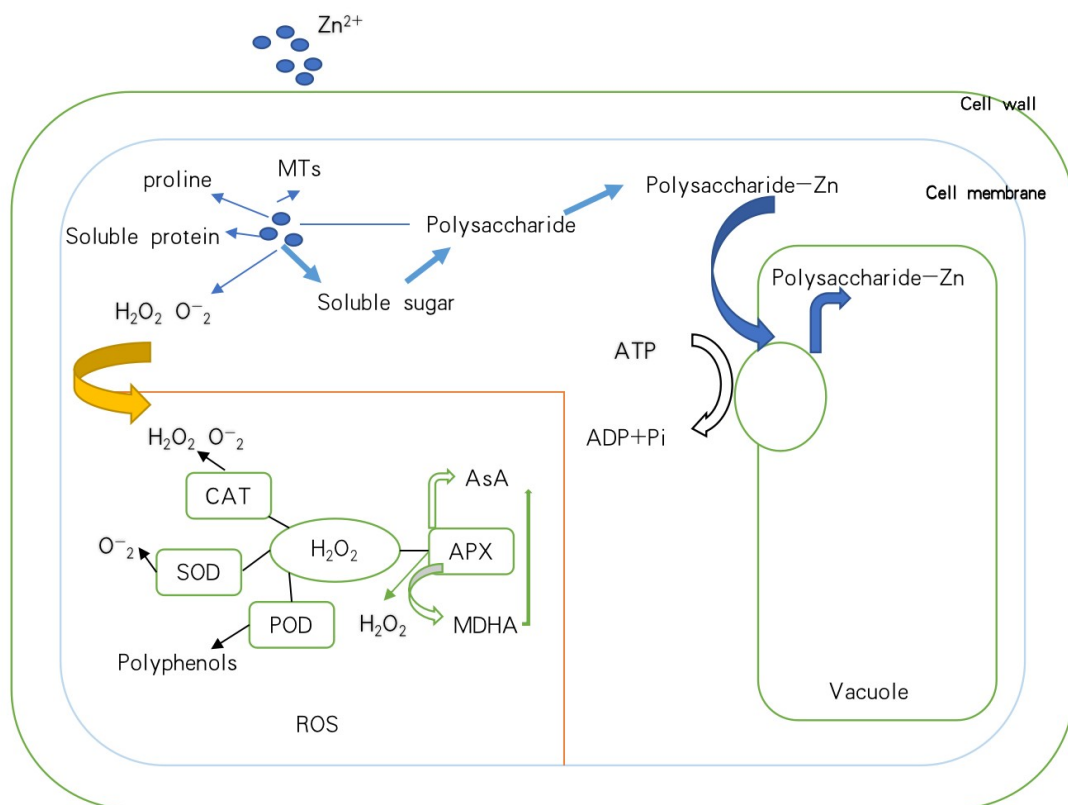
**Fig. 4** Effect of APX, AsA and GSH content of *Dendrobium nobile* under different Zn treatment. a for APX, b for AsA and c for GSH. Data are means  $\pm$  SE in the figures. Different letters indicate significant differences among the treatments ( $P < 0.05$ ). CK, T1, T2, T3, T4, T5, T6 and T7 indicate that corresponding Zinc concentration is 0, 50, 100, 200, 400, 800, 1000 and 2000  $\mu\text{mol/L}$ .



**Fig.5** Effect of polysaccharide(a), polyphenols(b) and flavonoids(c) content of *Dendrobium nobile*. under different Zn<sup>2+</sup> treatment. Data are means  $\pm$  SE in the figures. Different letters indicate significant differences among the treatments ( $P < 0.05$ ). CK, T1, T2, T3, T4, T5, T6 and T7 indicate that corresponding Zinc concentration is 0, 50, 100, 200, 400, 800, 1000 and 2000µmol/L.



**Fig.6** The contents of zinc in polysaccharides. Note: Data are means  $\pm$  SE in the figures. Different letters indicate significant differences among the treatments ( $P < 0.05$ ). CK, T1, T2, T3, T4, T5, T6 and T7 indicate that corresponding Zinc concentration is 0, 50, 100, 200, 400, 800, 1000 and 2000  $\mu\text{mol/L}$ .



**Fig.7** The process of alleviating zinc stress injury in *Dendrobium nobile*. The oxidation protection achieved by producing antioxidants, soluble substances and chelating zinc.