Effects of micronutrients (Cu, Zn, Mn, and Fe) on the growth of Spathoglottis plicata plantlets

ABSTRACT

The micropropagation of valuable orchid species such as Spathoglottis plicata could help in their conservation and increase their propagation rate. The objective of this study was to investigate the effects of micronutrients ($CuSO_4$, $ZnSO_4$, $MnSO_4$ and Fe-EDTA) on the growth of S. plicata plantlets. Plantlets of uniform height (1.5 cm) were transferred to a half-strength MS media supplemented with vitamin B5 and different concentrations of selected micronutrients (copper, zinc, manganese and iron). The highest production of soluble protein content (38.98 mg/g of fresh weight, FW) was recorded when plantlets were treated with 25 μM $MnSO_4$. Spathoglottis plicata plantlets formed the highest amount of chlorophyll (22.32 mg/g FW) when the growth media were supplemented with 75 μM Fe-EDTA. A total of 25 μM Fe-EDTA induced the production of up to 19.78 mg/g FW of carbohydrates in S. plicata plantlets. Furthermore, we demonstrate that different concentrations of micronutrients had different effects on the activities of several enzymes, such as peroxidase, catalase, polyphenol oxidase and nitrate reductase.

Keyword: Antioxidant enzymes; Micronutrients; Micropropagation; Orchid; Spathoglottis plicata