



BETACYANIN ACCUMULATION AND GUAIACOL PEROXIDASE ACTIVITY IN *BETA VULGARIS* L. LEAVES FOLLOWING COPPER STRESS.

ABSTRACT

The effect of copper stress on betacyanin accumulation and guaiacol peroxidase (GPOD) activity in leaves of different age was evaluated in red beet (*Beta vulgaris* L. var. Crosby Egyptian) plants. In hydroponic culture, plants were treated with 0.3 μM (control), 50 μM , 100 μM , and 250 μM of CuSO_4 for 6 days. Copper was taken up and accumulated in old roots but was not translocated to leaves. However in young leaves, the increase of lipid peroxidation and reduction of growth were evident from day 3 of copper exposure; whereas in old leaves, the lipid peroxidation and growth were the same from either copper-treated or control plants. In response to copper exposure, the betacyanin accumulation was evident in young leaves by day 3, and continued to increase until day 6. Betacyanin only were accumulated in old leaves until day 6, but the contents were from 4 to 5 times lower than those observed in young leaves at the same copper concentrations. GPOD activity increased 3.3- and 1.4-fold in young and old leaves from day 3 of copper treatment respectively, but only in the young leaves was sustained at the same level until day 6. Old roots shown betacyanin in the control plants, but the betacyanin level and growth were reduced with the copper exposure. In contrast, young roots emerged by copper effect also accumulated copper and showed the highest betacyanin content of all plant parts assayed. These results indicate that betacyanin accumulation and GPOD activity are defense responses to copper stress in actively growing organs.

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