

**Effects of metal concentration, pH, and temperature on the Chlorophyll derivative content, green colour, and Antioxidant activity of amaranth (*amaranthus viridis*) purees**

**ABSTRACT**

The thermal process of green amaranth leads to the partial or complete degradation of chlorophyll pigments and loss of green colour due to the formation of chlorophyll derivatives. This study aimed to evaluate a stabilisation process utilising metal ions to obtain a stable green colour of metal-chlorophyll derivative complexes. In this study, the effects of CuSO<sub>4</sub> (0–240 ppm), ZnCl<sub>2</sub> (0–1800 ppm) ions, pH (4–9), and temperature (60–100 °C) on green amaranth purees with a constant time of 15 min were investigated. In tapered leaf amaranths, the sample depicted higher contents of chlorophyll a (0.33 mg/g), chlorophyll b (0.34 mg/g), and total chlorophyll (0.68 mg/g) than round leaf amaranths (chlorophyll a = 0.28 mg/g, chlorophyll b = 0.29 mg/g, and total chlorophyll = 0.58 mg/g). A higher chlorophyll derivative content (0.62 mg/g), DPPH scavenging activity (93 mM TE/g), and FRAP value (54 mM TE/g) of Cu-amaranth purees were successfully achieved using 210 ppm of CuSO<sub>4</sub> after heating at pH 6 and 80 °C. Zn-amaranth purees were produced using 1500 ppm of ZnCl<sub>2</sub> at pH 8 and 90 °C for 15 min with chlorophyll derivative content of 0.39 mg/g, DPPH scavenging activity of 79 mM TE/g, and FRAP value of 57 mM TE/g. In HPLC chromatograms, two major peaks were identified as chlorophylls a and b in fresh amaranths. Nevertheless, these two peaks disappeared in Cu- and Zn-amaranth purees, presumably due to the formation of metallo-chlorophyll derivatives.