

Assessment of Nutritional Quality of Lettuce as Affected by Iron- and Zinc-Enriched Nutrient Management Techniques

R.M.B.A. Bandara^{1*}, J.P. Eeswara² and D.M.S.B. Dissanayaka²

Postgraduate Institute of Agriculture
University of Peradeniya
Sri Lanka

This study investigated the effect of Fe- and Zn-enriched nutrient management techniques on the fresh weight, and nutritional qualities, including nitrogen, phosphorus, ascorbic acid, antioxidants, and polyphenols of lettuce (*Lactuca sativa*) using Kjeldahl method, dry ashing technique using colorimetric method, visual titration method, DPPH assay and Folin-Ciocalteu assay, respectively. Furthermore, chlorophylls and carotenoids were analyzed by spectrophotometry. Fe and Zn were applied as FeSO₄ and ZnSO₄, respectively using three nutrient management techniques: nutripriming (soaking seeds in a nutrient solution), application to the growth medium, and foliar application. This study was conducted in a completely randomized design with three replicates in each treatment. The data were recorded at the physiological maturity stage. The results were subjected to ANOVA and mean separation using SPSS version 26. A significant ($p < 0.05$) contribution of Fe was observed for the production of carotenoids through nutripriming. Furthermore, nutripriming enhanced the production of pigments such as chlorophylls and carotenoids in both Fe and Zn applications. A significant increase of ascorbic acid could be observed in foliar application of Fe whereas, it was from the growth medium application for Zn. Foliar application of ZnSO₄ recorded a significant difference in antioxidant capacity of lettuce over other treatments, indicating the effectiveness of foliar applied Zn to increase antioxidant capacity of lettuce. In conclusion, nutripriming could improve chlorophylls and carotenoids while growth medium application and foliar application had positive influence on improving ascorbic acid content. A significant contribution of Zn was discovered for the improvement of antioxidants by foliar application.

Keywords: Antioxidants, Foliar application, Hidden hunger, *Lactuca sativa*, Nutripriming

*Corresponding author: amanda@wyb.ac.lk; ORCID: 0000-0002-6717-3702

¹Department of Horticulture and Landscape Gardening, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka, Makandura, Gonawila

²Department of Crop Science, Faculty of Agriculture, University of Peradeniya