Microgreen Biofortification for Human Health

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Iron and zinc are critical for human health. Iron anemia is the most common worldwide nutrient deficiency. Iron and zinc deficiency, particularly early in life, can cause permanent developmental delays, immune system malfunction, and neurological impairment. These deficiencies are often associated with limited access to fresh vegetables. Microgreens are a relatively new class of vegetables that can be grown where space and water are limited. These are nutritionally dense vegetables with potential for biofortification by manipulating fertilizer composition. Two separate replicated experiments were conducted in which zinc and iron concentrations in fertilizer applications were supplemented at 0, 5, 10, and 20ppm. Basil, cabbage, and mint microgreens were grown with each fertilizer treatment replicated four times. Mint microgreens grew poorly and were excluded from analysis. Both basil and cabbage microgreens accumulated zinc efficiently with tissue content reflecting the linear increase in biofortification. Basil microgreens accumulated iron more efficiently than cabbage microgreens, although both showed increased iron content at harvest. Increased zinc and iron in basil was correlated with a decrease in boron, but the same relationship was not seen in cabbage. Increasing iron concentrations did result in increased cabbage biomass, but did not impact basil growth. Biofortification of these two microgreens was easily accomplished with the application of a simple fertilizer solution. Microgreen biofortification may be a simple, effective way to increase nutrient availability for vulnerable populations.

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