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Exploring possibilities to fortify hydroponically grown baby vegetables with Fe and Zn

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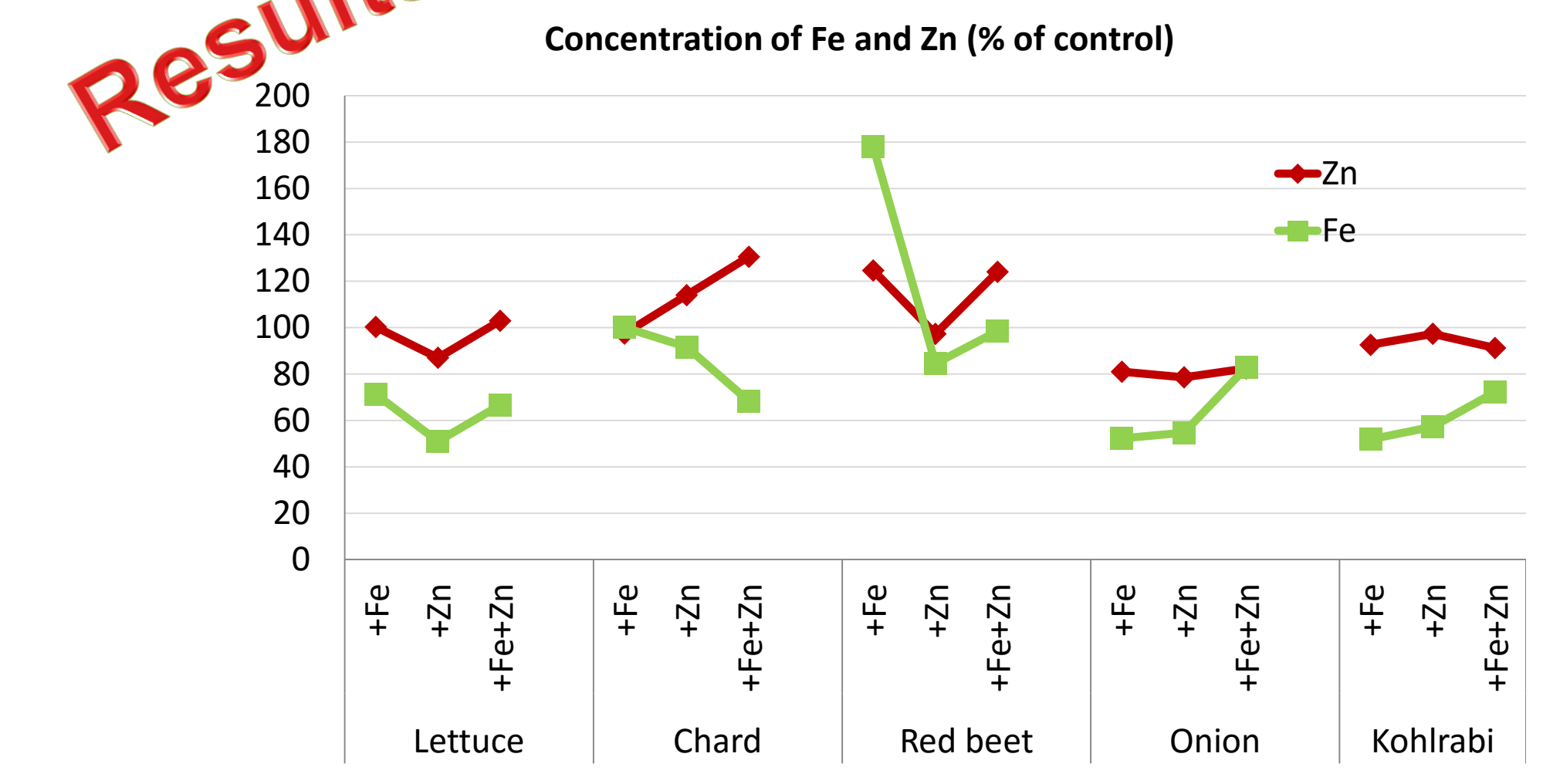
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Introduction

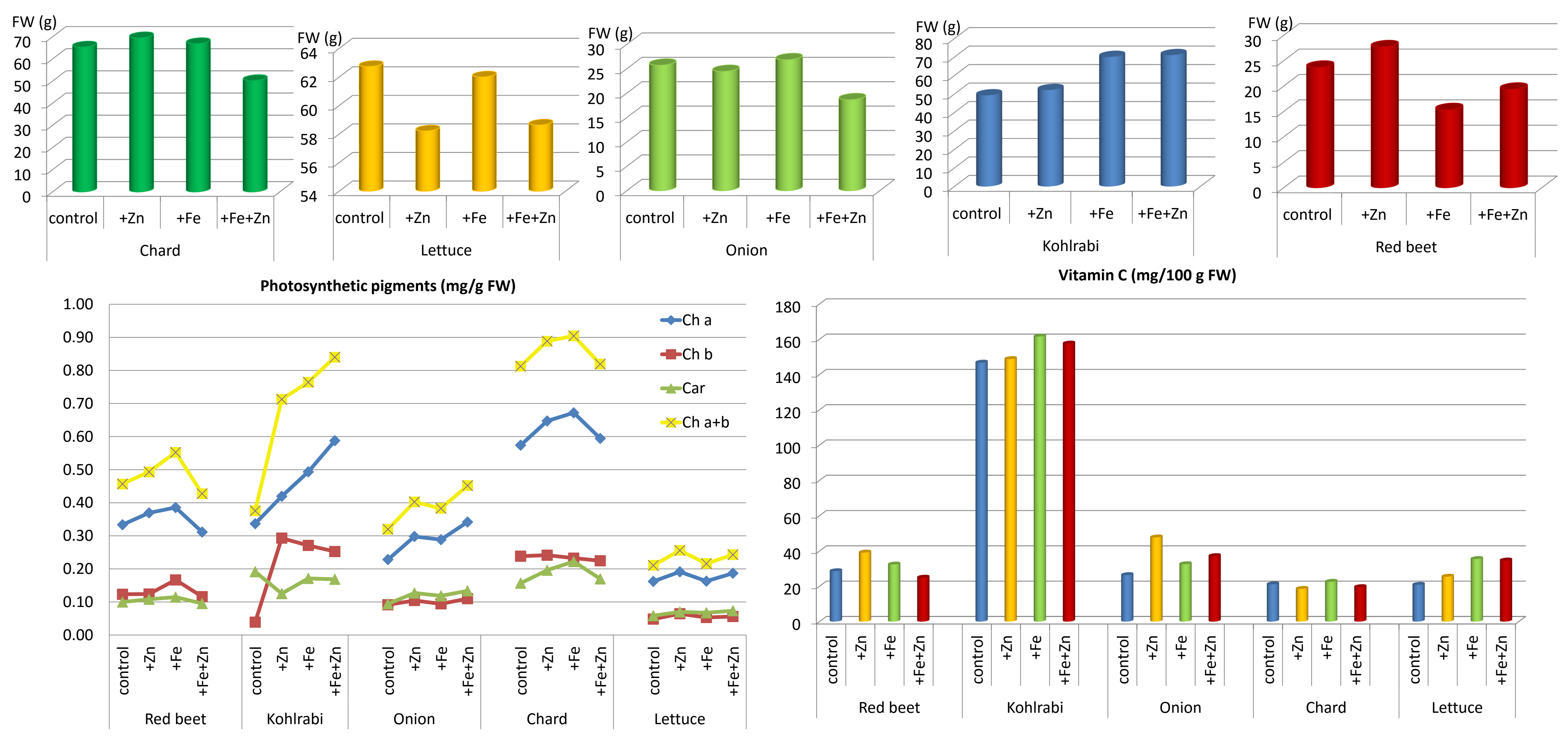
Micronutrient malnutrition, primarily the result of diets poor in bio-available vitamins and minerals, affects more than half of the world's population. Two micronutrients that are widely recognized by the World Health Organization (WHO) as limiting are iron and zinc.

Results

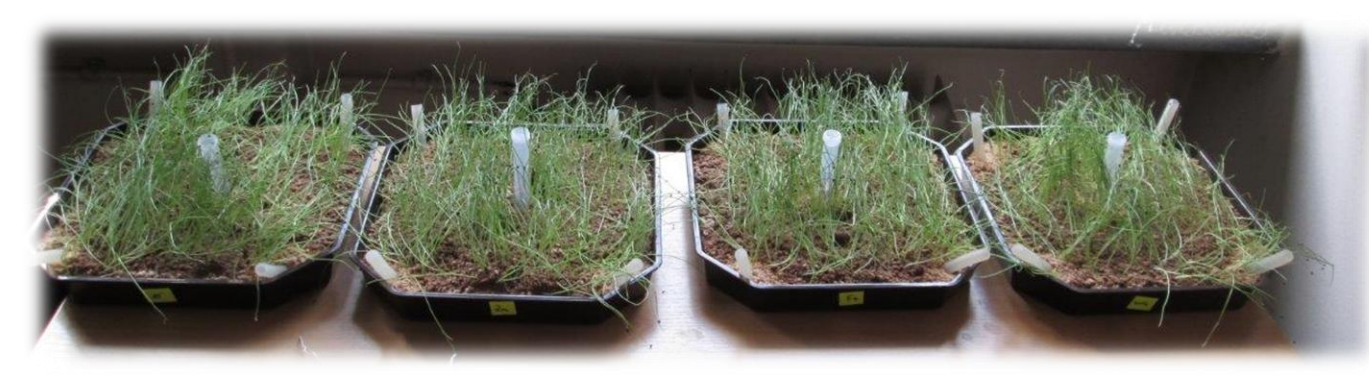


Materials and methods

In order to screen 5 botanically distinct vegetable species with respect to their reactions to increased supply of Fe and Zn, an experiment was set up under semi-controlled conditions. Seeds were sown in the mixture of agroperlite (AGROPERLIT EXTRA, Termika Zrenjanin) and sand. About 100 seeds of chard, onion, red beet, kohlrabi or lettuce were sown and grown hydroponically using Hoagland nutrient solution (HS, control). After emergence, three treatments were introduced: HS with doubled concentration of Fe, HS with doubled concentration of Zn and HS with doubled concentrations of Fe and Zn. Experiment was set in three replications and treatment lasted up to 30 days. Aerial plant parts were harvested and analyzed for Fe, Zn, ash, photosynthetic pigments and vitamin C content.



Conclusion



- All three treatments (+Zn, +Fe and +Zn+Fe) increased biomass production only in kohlrabi.
- In kohlrabi, concentration of vit C was 3-4 times higher than in the other examined vegetables.
- The lowest concentration of vit C was recorded in chard.
- Kohlrabi and chard had the highest concentration of chlorophylls and carotenoids and lettuce the lowest.
- Taking into account the effect of enrichment of nutrient solution with Zn and/or Fe on both biomass production and concentration of those elements, biofortification of chard with Zn and of red beet with Fe and Zn seems possible.
- In chard, synergistic effect of +Fe+Zn on concentration of Zn and antagonistic on concentration of Fe was noticed.
- Species – specificity with respect to needs and reactions to particular nutrients was clearly expressed in this experiment.



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