THE IMPACT OF CULTIVATION METHOD AND SOIL CONTAMINATION ON POLYPHENOL CONTENT AND ANTIOXIDANT ACTIVITY OF CELERY (*Apium graveolens* L.)

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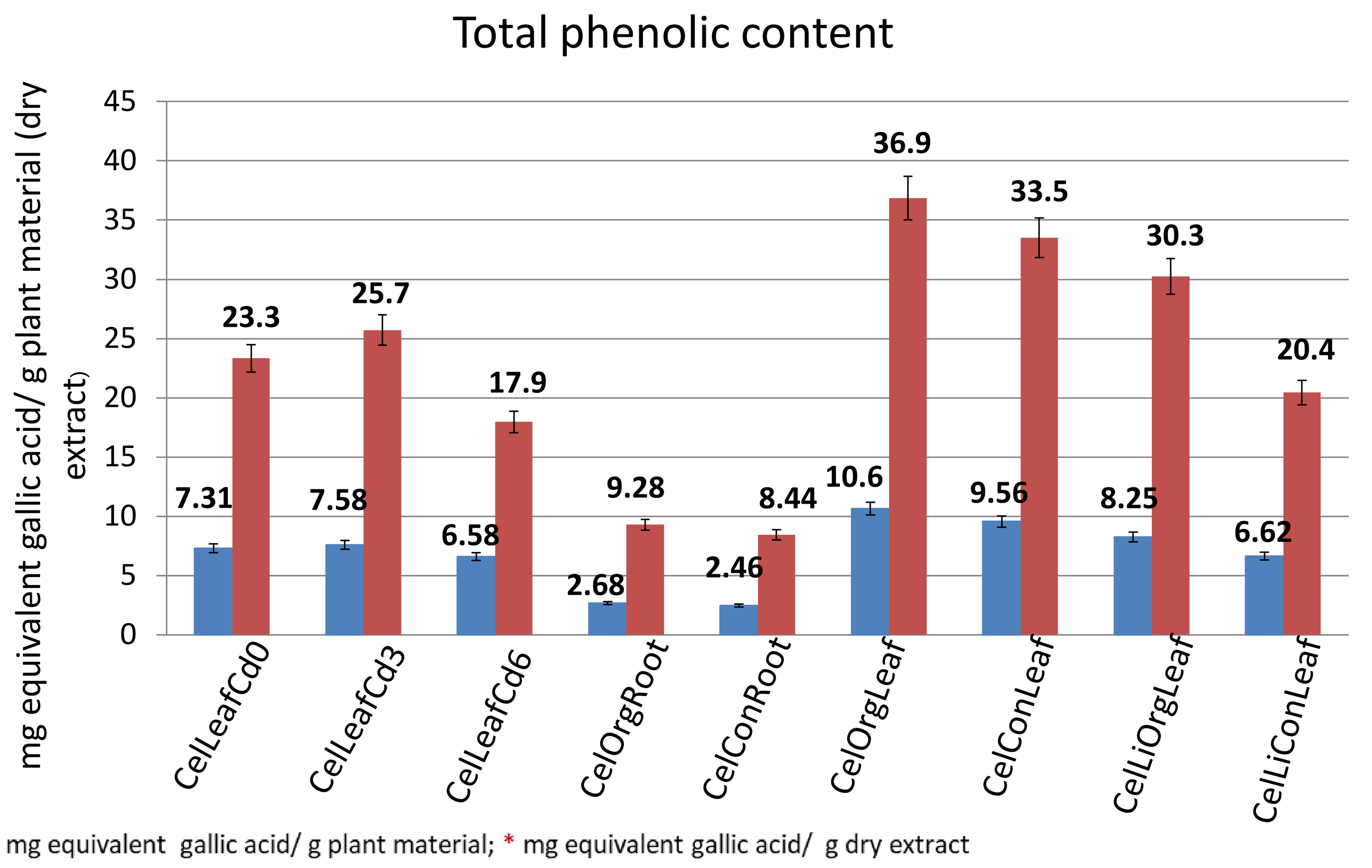
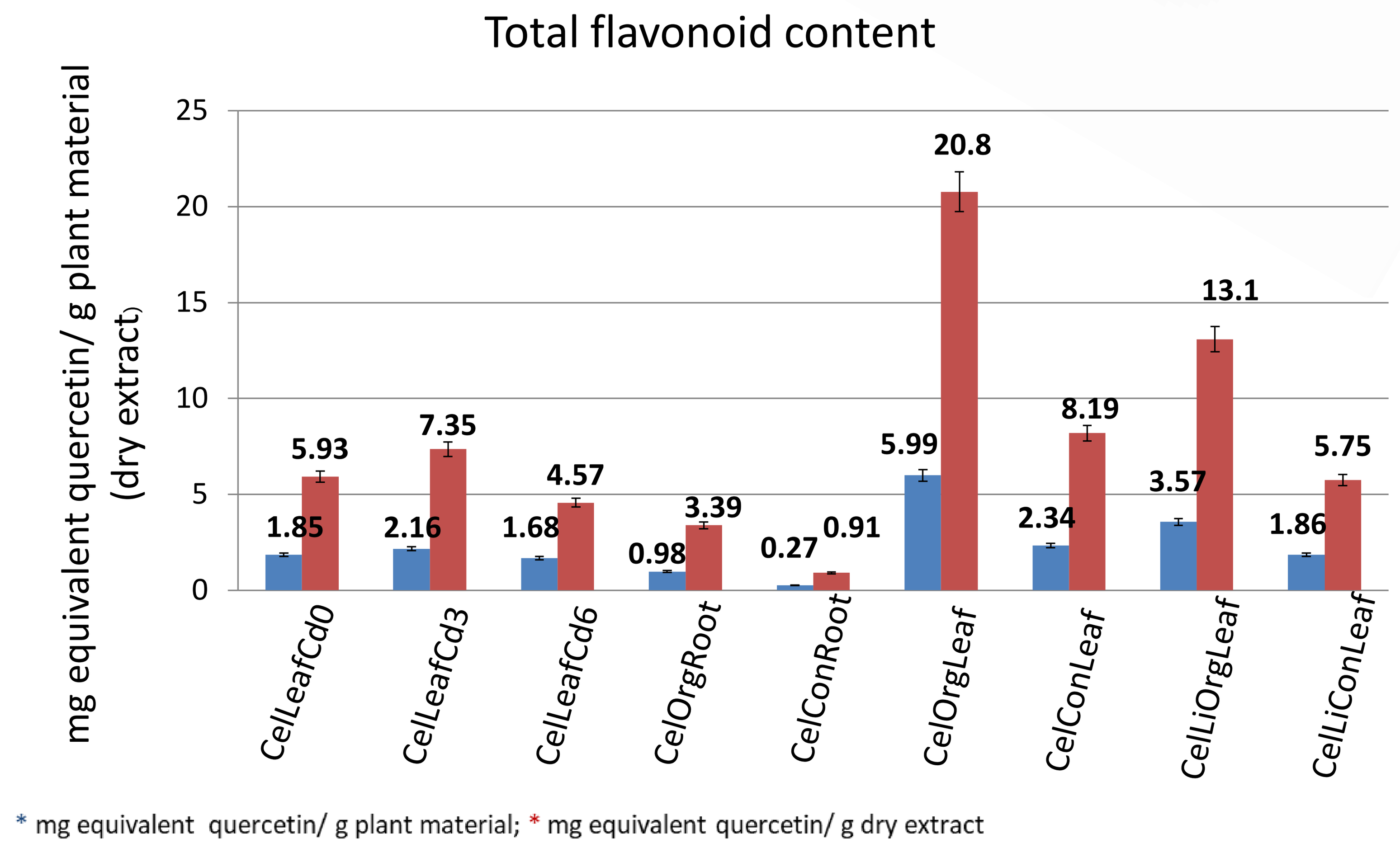
INTRODUCTION

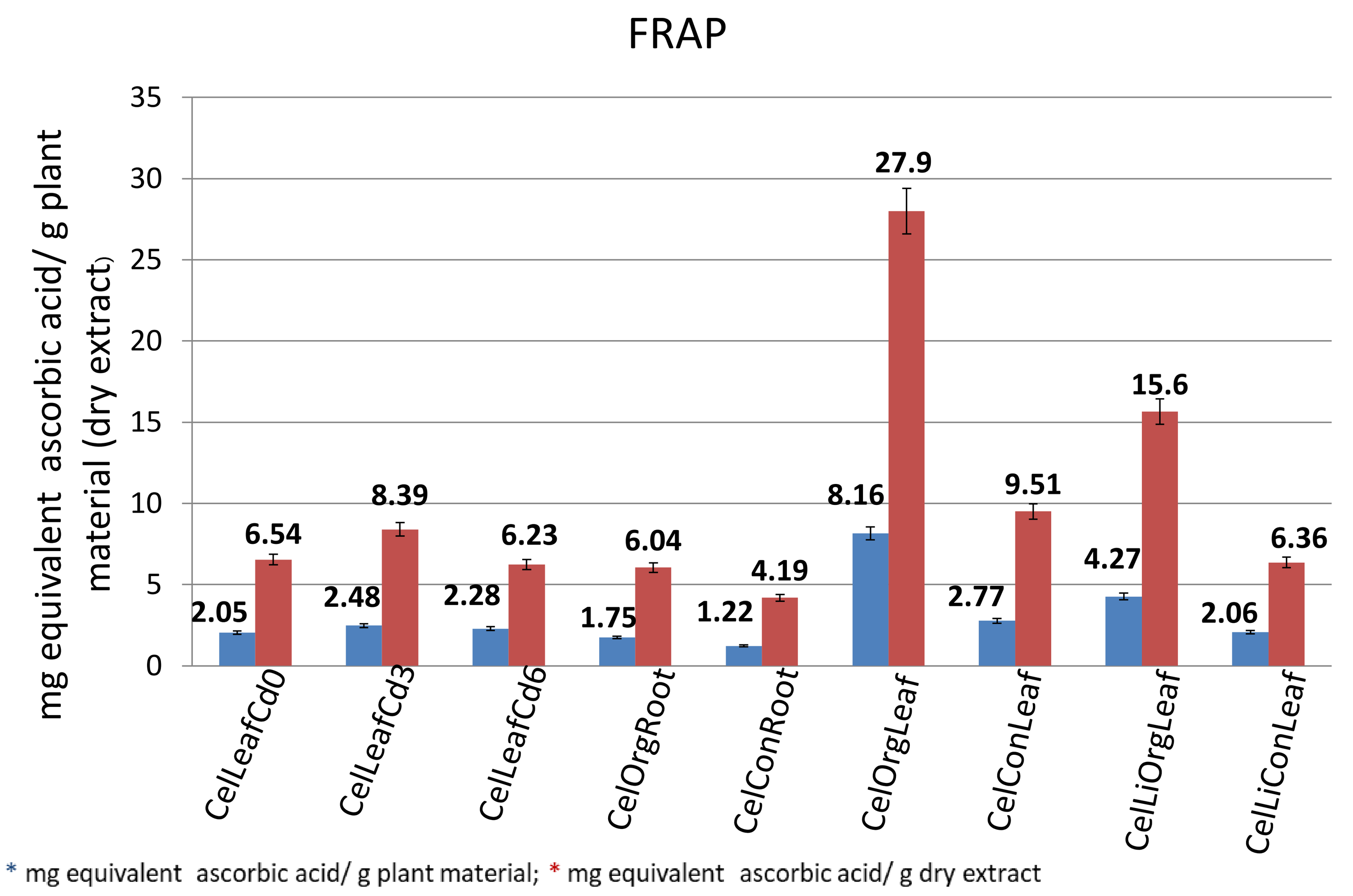
Celery (*Apium graveolens* L.) has been cultivated since ancient times for dietary or medicinal uses. It can be cultivated by organic and conventional methods. The aim of this study was to examine how cultivation method and presence of heavy metals in the soil affect chemical composition (total phenolic content (TPC) and total flavonoid content (TFC)) and antioxidant activity of celery.

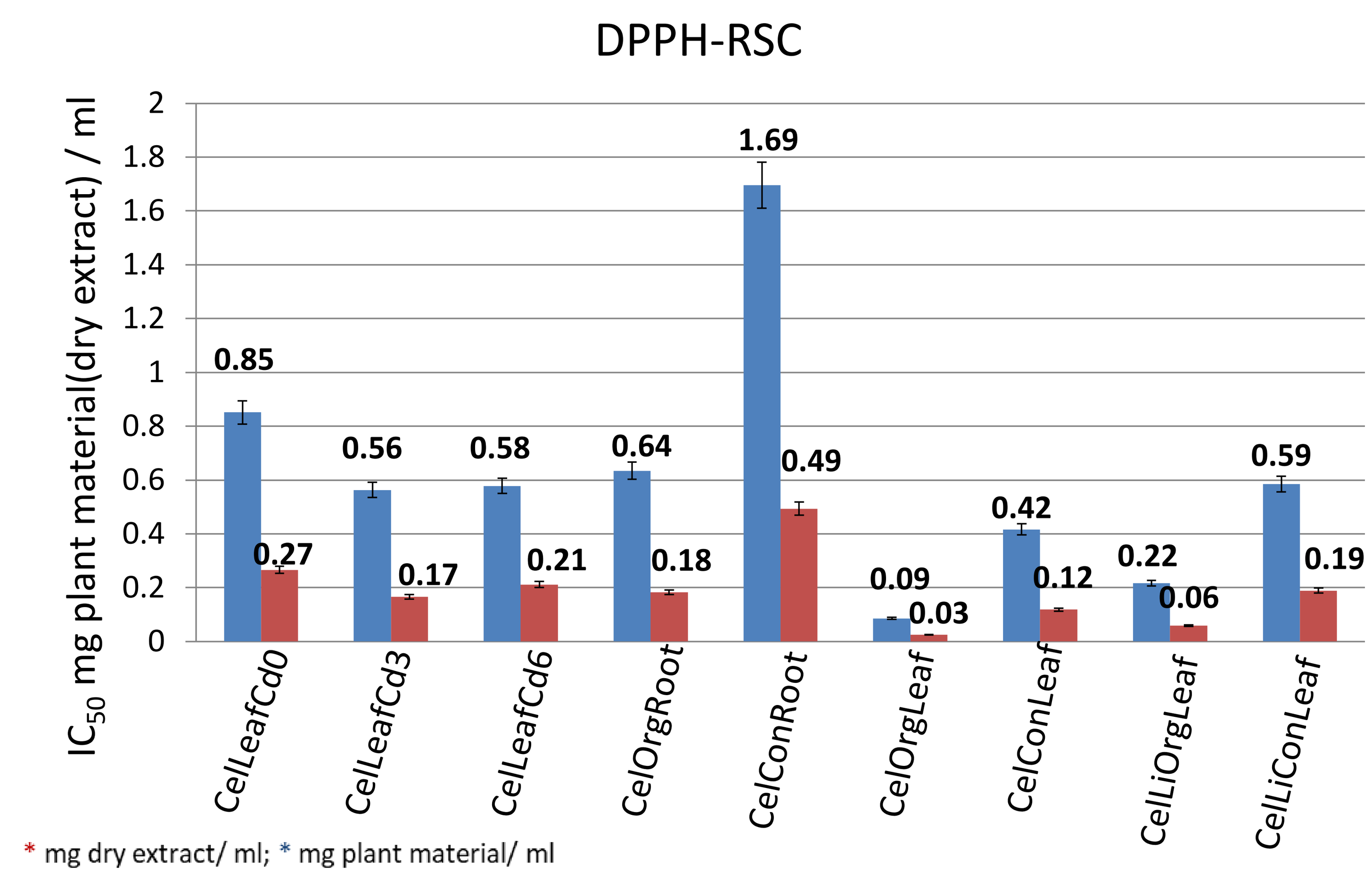
MATERIAL AND METHODS

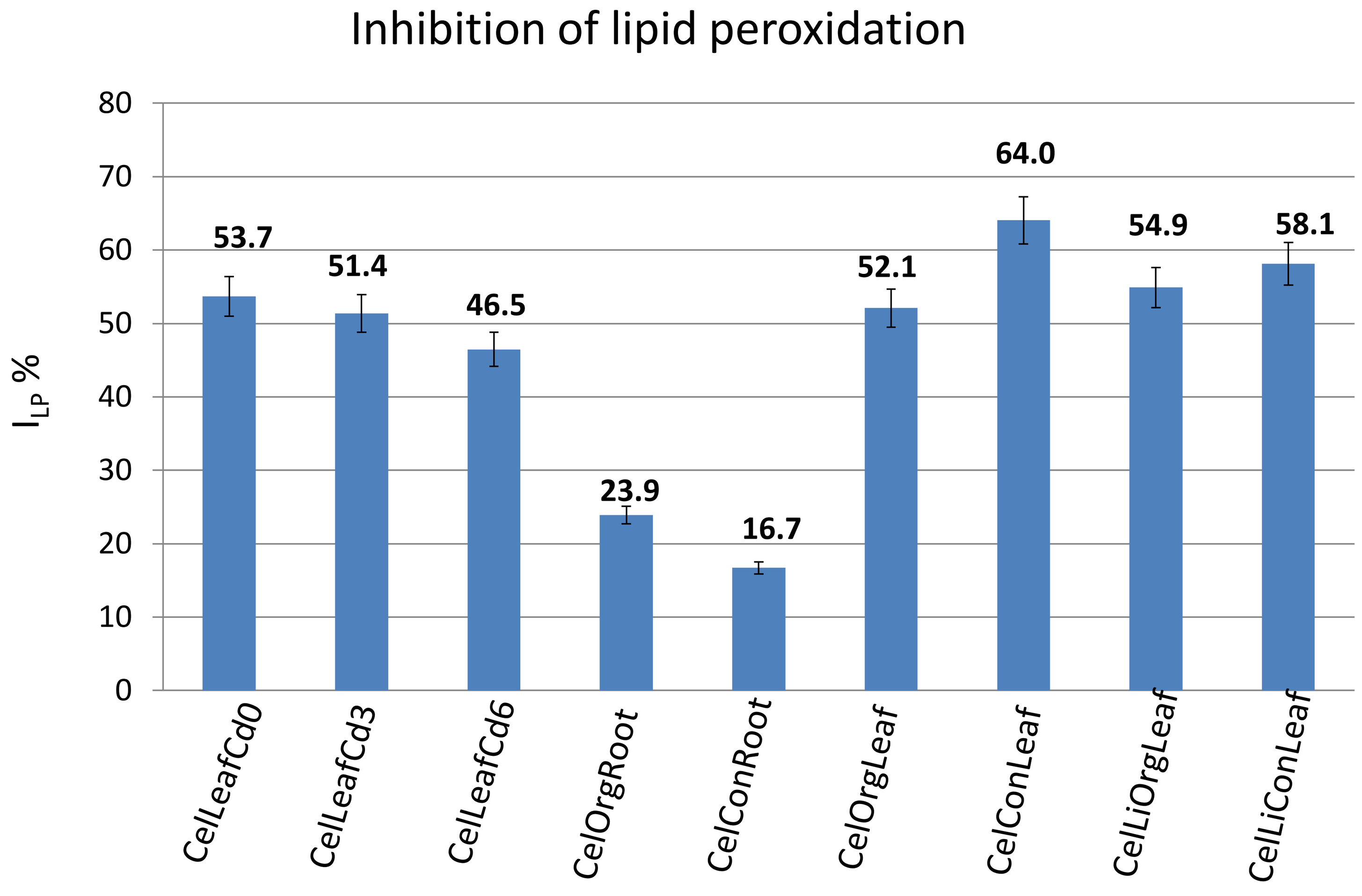
The samples were grown under controlled conditions in experimental glass house. The first group of samples was grown according the organic practice (marked as CelOrg), the second group according conventional practice (marked as CelConv), while in the third group, soil was treated with different concentrations of Cd (0, 3, 6 mg/kg) before seeding and than plants were grown using conventional method. After harvesting, the roots were separated from leafs, chopped, dried and used for preparation of 80% EtOH extracts. The extracts were evaporated to dryness and used in further experiments. TPC and TFC were determined by standard spectrophotometric methods. Antioxidant capacity was estimated by determining the potential of leaf and root extracts to inhibit lipid peroxidation and neutralize DPPH radicals, as well as by FRAP assay.











CONCLUSIONS

- Leaf extracts contained higher amounts of TPC and TFC compared to root extracts, and consequently showed higher antioxidant activity.
- In general, organic production contributes to the increase of TPC and TFC in celery and rises its antioxidant potential when compared to conventional production.
- Low concentration (3 mg/kg) of Cd^{2+} in the soil induces an increase of the TPC and TFC in plants probably because these secondary metabolites participate in the plant defense mechanisms.
- High concentration of cadmium (6 mg/kg) in the soil have toxic effect on celery plants and reduce the content of phenolic compounds and antioxidant activity.

Acknowledgements

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