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Potential of Asian Herbaceous Plants as Source of Micronutrients

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Abstract

Deficiency of micronutrients is a major problem worldwide leading to increasing rates of several illnesses by reducing immune and non-immune defenses. Especially diets of poor people are based on few crops rich in macronutrients, whereas the nutritional value of other plants is not fully exploited.

Previous studies at Humboldt University of Berlin already dealt with various herbaceous, nutraceutical Asian plants like *Oenanthe javanica*, *Ipomoea aquatica*, *Crysanthemum coronarium, Elsholtzia ciliata* and *Ocimum basilicum*. For this research project *Perilla frutescens* and *Persicaria odorata* have been selected due to their high content of antioxidants and their easy cultivation. Both plants are already used as basic ingredients and food additives in Asian cuisine and are known for their health improving and medicinal benefits. Aim of our research was to analyse and to evaluate the nutritional value of its contained micronutrients. Cultivated in a greenhouse in Berlin, *P. odorata* was harvested five weeks after planting the cuttings and *P. frutescens* ten weeks after sowing. Quantity of marketable fresh matter was about 2.5–4.3 kg m^{-2} for *P. odorata* and about 4 kg m^{-2} for *P. frutescens*. Regarding micronutrients *P. odorata* had remarkable high contents of ascorbic acid (around 180 mg/100 g) and flavonoids (around 500 mg/100 g). Therefore, 55 g of *P. odorata* would be sufficient to comply dietary intake recommendation for ascorbic acid by D-A-C-H organisation (Union of German, Austrian and Swiss food associations). *P. frutescens* was particularly rich in polyphenols (880 mg/100 g) and anthocyans (200 mg/100 g FW).

Analyses of mineral contents proved potassium as major constituent (40 mg g^{-1} DW for *P. odorata* and 30 mg g^{-1} DW for *P. frutescens*) and indicated high amounts of magnesium (7 mg g^{-1} DW for *P. odorata* and 5.6 mg g^{-1} DW for *P. frutescens*) and iron (0.15 mg g^{-1} DW for *P. odorata* and 0.14 mg g^{-1} DW for *P. frutescens*). Regarding recommendations of DACH organisation 100 g *P. odorata* could provide around 40 % of recommended magnesium, 34 % of recommended potassium and 25 % of recommended iron intake.

Results demonstrate the potential of *P. odorata* and *P. frutescens* as micronutrient source to satisfy nutritional needs. Both Asian plants are cultivable under protected conditions also in temperate climate zones. Nevertheless, in further researches the influence of different growing conditions and cultivation systems on the yield and micronutrient content should be investigated.

Keywords: Minerals, nutraceutical, *Perilla frutescens*, *Persicaria odorata*, vitamins

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