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"Solidarity in a competing world — fair use of resources"

# The Nutritional Treasure of Leafy Vegetable – *Perilla frutescens*

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**Abstract**

The quantity of consumed fresh herbs is increasing in Europe. In this respect there is also rising interest on use of exotic, especially Asian vegetables in restaurants and at home too. Most of the Asian leafy vegetables and herbs have culinary, nutritional and medicinal importance but intensive cultivation systems are rarely investigated. *Perilla frutescens* (L.) Britt. (Lamiaceae) is an Asian herbaceous plant, native to mountainous areas from India to China, but mainly cultivated and consumed in Korea, Japan, Thailand and Vietnam. Except for culinary use, its fresh leaves and seeds are well-known for a range of beneficial medicinal properties and therefore used in traditional medicine for treatments of various diseases like tumour, heart disease, diabetes, anxiety, depressions, infections and intestinal disorders. The health promoting effects of *Perilla* have been attributed to its high content of secondary metabolites such as polyphenols, flavonoids and anthocyanins. The possibility to cultivate *Perilla* in greenhouse in temperate regions was already shown in previous studies. The aim of the experiments was to investigate the influence of different growing conditions, in particular light intensity and light spectra on plant growth, development of different plant parameters and growth rate. Furthermore, the influence of the light conditions on the content of secondary metabolites as polyphenol, flavonoid, anthocyanin, and the antioxidant activity has been examined. In this study effects of natural light with additional blue, green and red light emitting diodes (LEDs), providing 7–12 $\mu$molm$^{-2}$ s$^{-1}$, have been investigated. Results showed, that use of additional LED lighting had a significant effect on the plant parameters as height and fresh matter of *Perilla*. The different LED light spectra did not influence synthesis of anthocyanins, polyphenols and its antioxidant activity, with exception of flavonoids in green LED treatment, which concentration was 74.26 % higher than those found in control. However, concentration of investigated secondary metabolites found in control was comparable to other studies with *Perilla*, thus its cultivation in temperate region could be possible without negative impact on bioactive compounds.

**Keywords:** Greenhouse, health improving herbs, light spectra, *Perilla frutescens*, secondary metabolites

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