

Medicinal and Aromatic Plants Production in Plant Factory

NA LU

Center for Environment, Health and Field Sciences, Chiba University,

6-2-1 Kashiwanoha, Kashiwa, Chiba 277-0882, Japan

e-mail: na.lu@chiba-u.jp

Abstract

Bioactive compounds in plants have been intensively studied to evaluate their effects on human health and many of them are proved to be clinically active against various types of diseases (e.g. anti-cancer effects). In recent years, consumers prefer to take health product derived from natural plants for disease prevention. The demand on functional plants that contain high concentration of bioactive compounds is increasing rapidly. However, due to fast climate variations, overuse of pesticides, air pollutions, farm land reduction, and restraint on import of medicinal plants, solutions to realize sustainable production of high-quality functional/medicinal plants become extraordinarily important and urgent.

A plant factory with artificial light is an effective system to produce functional plants to satisfy specific demands on growth and bioactive compound accumulation in plants. Because all environmental factors inside a plant factory can be controlled without climate and location limitation. Especially by regulating LED light and root zone environments, the production of bioactive compounds in plants can be largely enhanced.

In our research, aromatic herbs such as coriander and mint; medicinal plants such as perilla and water spinach are subjected to different light and root zone environments in a plant factory. Some bioactive compounds eg. perillaldehyde and rosmarinic acid in perilla leaves; phenolic compounds and flavonoids, especially rutin and chlorogenic acid in coriander were investigated. These compounds are reported having strong antioxidant, anti-mutagen, anti-cancer properties or anti-allergic, anti-inflammatory and antidepressant effects. Different plant species would need different light and EC levels for maximizing their growth and specific bioactive compound accumulation. The responses of the plants to light intensity, light spectra, and interactions among light and root zone environments and their bioactive compound accumulation in plants are revealed.

Keywords: perilla, water spinach, coriander, secondary metabolites, light, root zone

References

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