

# Controlling the circadian rhythm with dark pulses leads to improved quality of production in the plant factory

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## Abstract

The plant factory is a facility that aids the steady production of high-quality vegetables all year round by controlling the artificial cultivation environment. This technology will be an important factor for resolution such as food shortage due to the recent population explosion. The endogenous circadian rhythms close to a 24-h period are observed by nearly all living organisms. Plants use the circadian clocks to coordinate gene expression, metabolism, physiology and growth. The phase of circadian rhythm can be changed (advance or delay) by some stimuli. Therefore the circadian clock can be controlled by imposing stimuli artificially in a plant factory. In this study, we have investigated the response of the circadian clock to pulse stimuli. We used a dark pulse in continuous light condition (LL). And in the previous study, we described the phase response curve (PRC) about the 2 h dark pulse perturbation. By application of the PRC, we are able to estimate behavior of rhythm in applying the dark pulse.