# Effect of different coloured Light-emitting Diodes (LEDs) on the selected growth attributed traits of Rice (*Oryza sativa* L.)

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## Abstract

Rice (*Oryza sativa* L) is the second most important cereal crop in the world and the staple food in many Asian countries. In Sri Lanka rice is cultivated during *Yala* and *Maha* seasons and produces about 95 % of its total rice requirement. Even though, Sri Lanka is nearly self-sufficient in rice, a further increase in rice production is needed to cater to the growing population. Light plays a major role in plant growth and development by regulating diverse physiological and morphological processes in rice plants. The rate of photosynthesis and yield directly depends on the intensity of photosynthetically active radiation. The yield would be reduced under low light intensity and duration. During the Maha season in the dry zone of Sri Lanka, light intensity is reduced due to the cloud cover, thus rice plants do not receive the optimum level of light. In this experiment, we investigated the possibility of using light-emitting diodes (LED) with different wavelengths to provide supplementary light for the rice plant. Red LED (628 nm), blue LED (445 nm), and red and blue combinations were used in the experiment as supplementary light. For the control, no supplementary light was used. Rice plants (BG 251) were grown in 2 L pots filled with Yoshida nutrient solution. Twelve plants were used for each light treatment and the plants were kept inside a glass house allowing the plants to get normal sunlight during the daytime. Supplementary lighting was done from 6.00 p.m. to 10.00 p.m. All supplementary light had a similar light intensity level (50 µmol $m^{-2}$ $s^{-1}$). When compared with the control, the highest plant height, root depth, and SPAD meter values were observed in the blue light treatment. These values were 15.1% plant height, 17.2% root depth, and 32.1% (SPAD) higher than the control, respectively. Plants exposed to red and blue-red combination also had significantly higher values than that of the control. Results of this experiment showed that by providing blue, red, and red-blue light combination for 4 hours at night time, plant height, root depth, and SPAD meter values of the rice plants can be increased.

**Keywords:** Different wavelengths, LED light, Plant and root growth, Rice plants

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