A two-stage culture strategy was used for cultivation of Haematococcus pluvialis using various light sources. Therefore, the purpose of this study was to explore the effects of light sources on the accumulation of astaxanthin and biomass of H. pluvialis. In the first stage, cultures were carried out in irradiation of white light (5000 lux) under the light–dark cycle (18:6 hours) for 7 days. In the second stage, to accumulate astaxanthin in various light sources during the stationary growth phase for 7 days. As a control, in irradiation of white light (5000 lux) under the light–dark cycle (18:6 hours) for 14 days using a one-stage culture strategy.

According to the experimental results, blue light was the best treatment for increasing astaxanthin contents in the second stage with light intensity of 6000 lux. The astaxanthin contents and growth yield coefficient (Yp/x) in the two-stage culture strategy increased about 2.19 and 1.6 times of the control, they accounted for 9.09 mg/L and 11.76 mg-production/g-biomass, respectively. In summary, it was found that with energy savings and rising LEDs efficiency, LEDs will be an increasingly better choice for two-stage cultivation, especially if control of morphogenesis and pigment production by selective use of particular wavelengths is desirable.

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