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**Effect of nutrients on the growth and physiological features of newly isolated  
*Haematococcus pluvialis* TMU1**

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**Abstract:**

The vegetative growth of *Haematococcus pluvialis* TMU1 was studied under batchwise cultivation in three common media, namely BBM, BG11, and 3NBBM. The BBM provided the best condition for the algal growth. It was further studied at different levels of nitrate and phosphate as macronutrients as well as iron and boron as trace elements. The dose-response of the algal growth to these macro/micronutrients was modeled with Monod/hormetic-type kinetics. Applying the modified BBM with 3-fold higher phosphate led to the highest cell density and up to 86% increase in the growth rate. At an inoculum size of  $2 \times 10^5$  cells mL<sup>-1</sup>, the algal growth rate in BBM containing either 0.185 mM boron or 0.046 mM iron was higher than the medium containing half or twice ion levels. These optimal concentrations depend on inoculum size, so that changes from the optima increased the level of peroxide signaling molecules and induced defense pathways.

**Keywords**

Culture media; Growth characteristics; *Haematococcus pluvialis*; Peroxide signaling molecules; Algal physiology

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