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Effect of different light intensities on the growth of the diatom *Chaetoceros calcitrans*

Eve C. Jereos

Batch cultures of the diatom *Chaetoceros calcitrans* were maintained indoors at a temperature range of 21 to 25°C and continuously illuminated by 40-watt daylight fluorescent bulbs. The cultures were exposed to 5 different light intensities from 200 to 26,000 lux. Population counts show that light intensity affects growth and reproduction of the algae cultivated. A comparison of population peak growths showed cultures illuminated by 12,000 lux to have higher cell counts than those exposed to higher or lower light intensities.

One-liter cultures with initial populations of 100×10^3 cells/mL in baxter bottles were set up in triplicate and exposed to different light intensities. Light coming from fluorescent bulbs were measured by a lux meter. Illumination from 4 fluorescent bulbs was equivalent to 26,000 lux; 3 fluorescent bulbs, 23,000 lux; 2 fluorescent bulbs, 12,000 lux; and no fluorescent bulb, 200 lux.

Figure 1 shows the growth response of *C. calcitrans* when exposed to different light intensities. Cultures exposed to 26,000 lux and 23,000 lux reached peak growths one day earlier than cultures exposed to lower light intensities, and declined thereafter. However, cultures exposed to very low light intensity, i.e., 200 lux exhibited very low growth rate but increased rapidly when illumination was increased to 2,200 lux up to 12,000 lux. Cultures exposed to these 2 light intensities reached peak growth on the 3rd day with high cell densities. Cell counts were made using a hemacytometer 3 times a day.

Table 1 shows the range of maximum growth attained for the different light intensities. The results of 5 trials show that cultures exposed to 12,000 lux gave the most yield in terms of cell densities.

Table 1. Maximum growth attained by cultures of *Chaetoceros calcitrans* exposed to different light intensities.

Light intensity (lux)	Number of replicates	Maximum population (cells/mL x 10 ⁶)	
		Range (5 trials)	Average
26,000	3	4.3-8.1	5.30
23,000	3	6.3-18.1	11.50
12,000	3	11.6-20.3	15.25
2,200	3	6.6-18.4	13.06
200	3	0.32-0.37	0.34

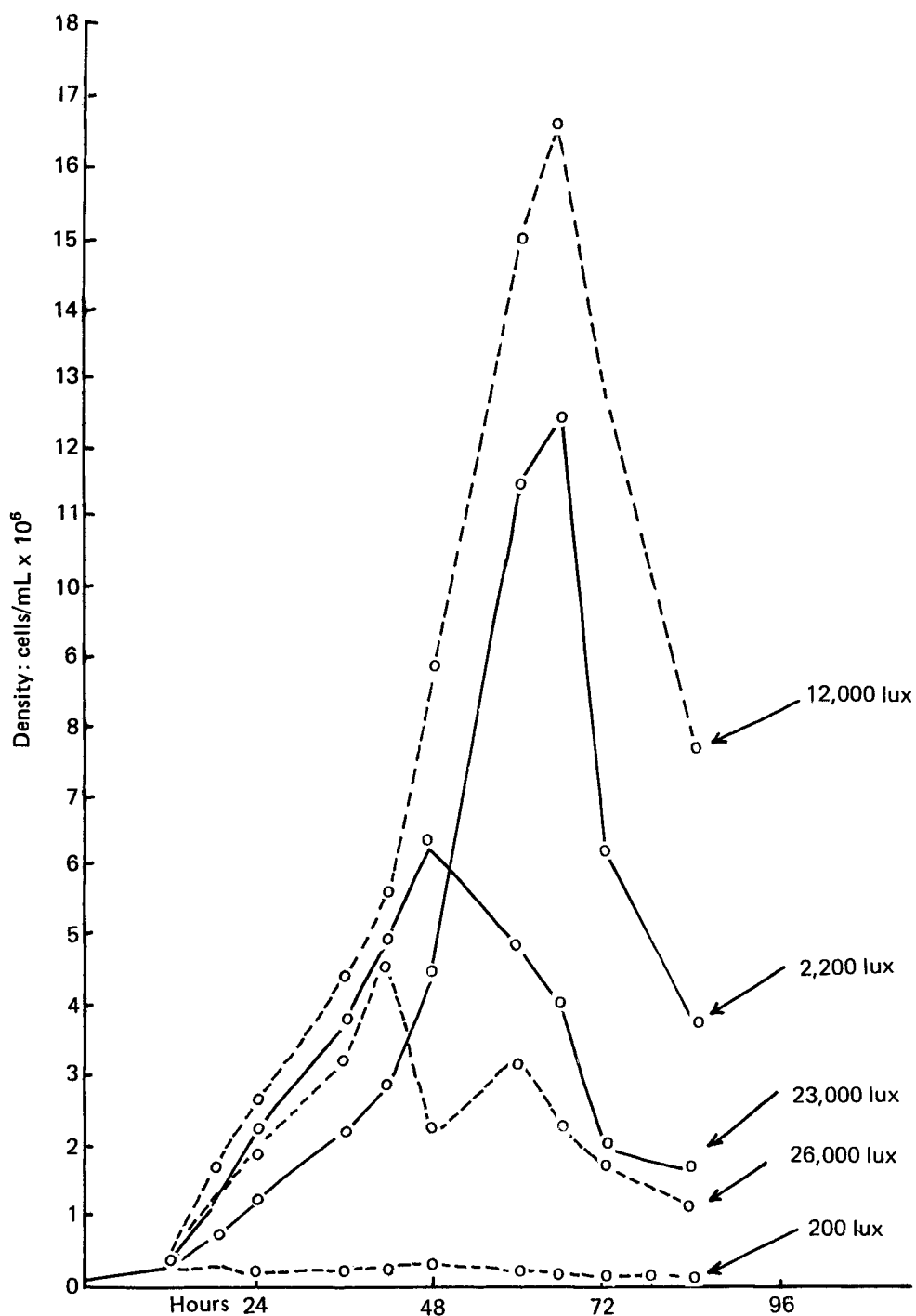


Fig. 1. Effect of different light intensities on the growth of *Chaetoceros calcitrans*, as typified by Run No. 5 in the experiment, with initial population of 100,000 cells/mL.

