

## Effect of procaine concentration on the growth of some species of microalgae and cyanobacteria

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Procaine has several physiological effects for mankind and animals. Its another beneficial function is for stimulating plant growth (Cachita-Cosma & Ardelean 1996). The agent has been used in agriculture to increase the productivity of plants and to promote the development of fruits and seeds in Romania. Although the exact mechanism of action has not yet been fully elucidated it seems that the cellular cycle or the rate of division of cells is influenced by this agent. The aim of this study is to examine the effect of procaine hydrochloride (PHCl) concentration on the growth of several species of microalgae and cyanobacteria.

In the autotrophic culture of the cyanobacterium *Anabaena cylindrica*, an increase of about 30% over the control culture (without PHCl) in the growth rate was observed by adding 0.1 mg/L of PHCl during the active growth phase as indicated by a representative experiment (Fig. 1). In contrast, addition of PHCl resulted in a negative effect on the growth at the higher concentrations more than 1 mg/L. The growth inhibitory effect by PHCl increased with an increase in the PHCl concentration. Similar results were obtained for *A. variabilis* and the halophilic green alga *Dunaliella primolecta*. The simultaneous administration of hydrolyzed products from procaine, PABA (para-aminobenzoic acid) and DEAE (diethyl amino ethanol), to the culture in place of PHCl showed a comparable stimulating effect on *A. cylindrica* cells over the concentration levels studied.

The combined effects of PHCl with several environmental factors, cultivation temperature, light intensity, CO<sub>2</sub> concentration in the flushing gas, and NaCl concentration in the culture, on photosynthesis of *D. primolecta* were tested based on a chemometrics approach. It has become clear that the

influence of PHCl is not significant at optimum culturing conditions for maximal growth rate of the algal cells.

The role and utility of this agent for the heterotrophic cultures of the green alga *Chlorella ellipsoidea* and the petroleum-degrading achlorophyllous alga *Prototheca zopfii* were discussed. There was no positive or negative effect of PHCl on the growth of these cells over the concentration levels studied. From these results, it is supposed that this agent promotes some metabolic reactions in photosynthetic pathway for growth of several species of microalgae and cyanobacteria.

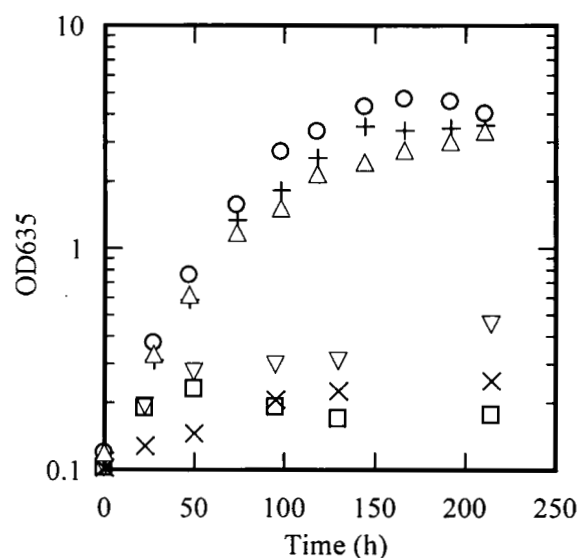


Fig. 1. The effect of procaine concentration on the growth rate of *Anabaena cylindrica* (at 30 °C, aeration with plain air and light intensity of 2 klux). +, 0mg/L-PHCl (control); ○, 0.1 mg/L; △, 1 mg/L; ▽, 10 mg/L; □, 100 mg/L; ×, 1000mg/L.

Cachita-Cosma, D., Ardelean, A. (1996) Procaina, Mirton, Timisoara