

OPTIMAL MEDIUM FOR GROWTH OF CERTAIN SPECIES OF ALGAE DOMINATING WITHIN THE PHYTOPLANKTON OF THE AQUATIC ECOSYSTEMS OF THE REPUBLIC OF MOLDOVA

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Keywords: *phytoplankton, dominant species, mineral medium, aquatic ecosystems*

Abstract

This study presents research on cultivation conditions dominated by the phytoplankton species in Moldova. Thus it is established that Oscillatoria Amphibia Ag. develops intensely in mineral environment Gromov 6, Navicula cryptocephala Kutz- mineral environment Rixter, Scenedesmus apiculatus (W. et GS West) Chod. var indicus (Hgrtob) - Gromov 6 and Prat.

INTRODUCTION

The study of alga cultures contributes to settle many theoretical and practical problems of the modern algology. The use of algae bodies as biological models contributes to the development of algology, hydrobiology and microbiology [9, 10].

Algae are a relatively common, classic object research of the most various biological processes. This is due mainly to a series of advantages in comparison with other organisms: small size, high coefficient of reproduction, capacity to accumulate solar energy in the photosynthesis process, possibilities of growth in laboratory conditions [4, 2]. The integration of data obtained as a result of the scientific research on algae will allow to develop their potential in different fields of human activity.

An important stage on which depends the correctness of the experimental data represents the selection process of pure cultures and their maintenance. At present a series of growth methods are used: in phytobioreactor and race way; however in laboratory conditions the classical growth method was used [2, 3, 5].

MATERIAL AND METHODS

The investigations were conducted in the Laboratory of Hydrobiology and Ecotoxicology of Institute of Zoology of the Academy of Sciences. In view to fulfil the proposed objectives, there were used usual methods of pure cultures selection and their growth [6, 9].

The process of algae growth consists of several stages. The first is the takeoff of water assays that contain the alga species we are interested in. The second stage is to obtain assays of a large variety and biomass of algae. And the last stage is to obtain a pure culture that is carried out via the reinsemination method on agar-agar jelly environments. From the Petri boxes with the help of an ansa a cell or a cell culture and are reinseminated on liquid environments. This procedure is carried out several times till the pure culture is obtained.

The study involved three stains of algae: *Oscillatoria amphibia* Ag., *Navicula cryptocephala* Kütz. și *Scenedesmus apiculatus* (W. Et G.S. West) Chod. var *indicus* (Hgrtob).

The strain *Oscillatoria amphibia* Ag was collected from a drainage canal in the village Criva, Briceni and separated in the pure culture of Hydrobiology and Ecotoxicology Laboratory of the Institute of Zoology of the ASM, using agarose mediu Gromov. The filaments of *Oscillatoria amphibia* Ag are just whit color blue-green in colour. The cells have ranging sizes is 4-8.5 μ and in length from 2 to 4 μ .

Terminal cells have rounded ends. They represented a typical, commonly encountered in aquatic ecosystems is the filumului Bacilariophyta *Navicula cryptocephala* Kutz, shell form of spear length and width 20-40 μ μ 5-8.5. These species were collected from the fish ponds in the village Nemoreni and separated in the pure culture, using agarose medium Gromov.

The stain of *Scenedesmus apiculatus* (W. Et G.S. West) Chod. var *indicus* (Hgrtob) (division Chlorophyta) was collected from the lake Cuciurgan-Bender/Tighina. Filaments of *Scenedesmus apiculatus* consists of 2, 4, 8 oval cells with thickening dished ends, ranging sizes is 9-10.5 μ and in length from 5 to 6.4 μ .

In order to select the optimal nourishing environments of these species there have been used the medium proposed in the Register of the Cultures of Microalgae of the URSS Collection [5].

Cultivation was performed in laboratory conditions, the balloon Erlenmayer (250 ml) with 100 ml of medium for 12 days. The experiments were conducted at a temperature of 27 to 32 °C and 18-20 °C.

As for growing strain of *Oscillatoria amphibia* Ag. were used medium Gromov 6, Schlosser and Elenkin. Quantity biomass inoculate was 2 ml.

RESULTS AND DISCUSSION

As a result of the experiments with the strain of *Oscillatoria amphibia* Ag. it was established that the largest amount (6 g/l) of algal suspension was obtained on growth in an Gromov 6 environment. Gromov 6 medium contained supplementary NaHCO_3 (0.2 g/l), but it lacked Fe_3Cl_6 in comparison with the Elenkina

environment. As for mineral medium Schlosser was more complex in chemical substances.

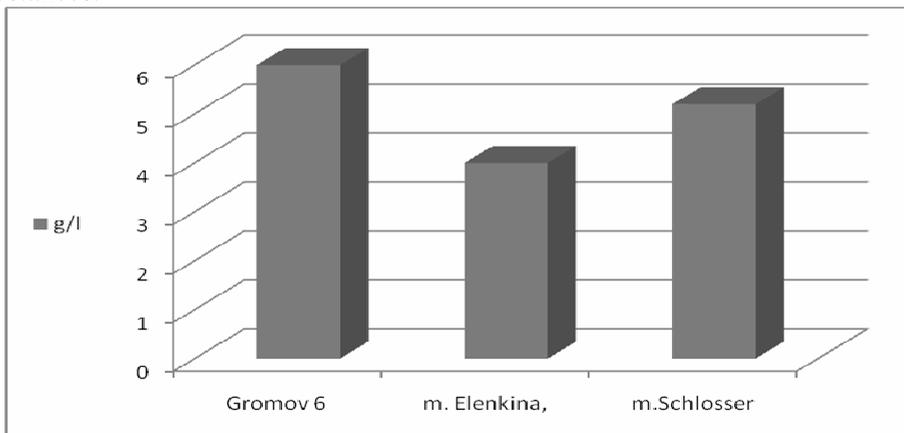


Fig. 1. Quantity of algal biomass of *Oscillatoria amphibia*, grown on different nutrient mediums in the 12th day

In the experiments with *Navicula cryptocephala* Kütz strain there were used the nourishing mediums Rixter and Beneke, that had in their composition the substance Na_2SiO_3 , necessary to the shell. The productivity of *Navicula cryptocephala* strain indicated an abundant development in Rixter environment (170 mii cel/ml) (Figure 2.). This was probably due to the larger content of Na_2HPO_4 - 0.5 g/l in comparison with 0.1 g/l from the Beneke medium.

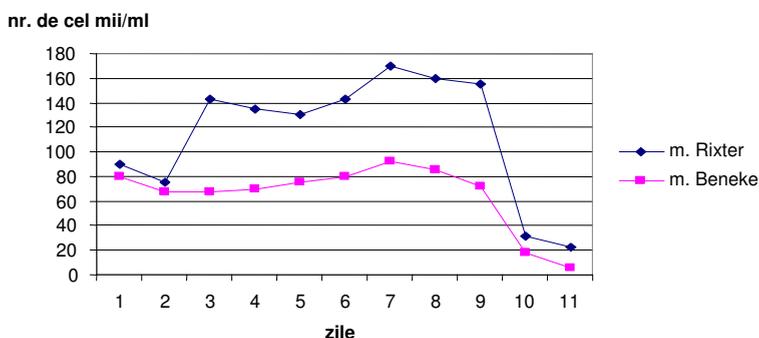
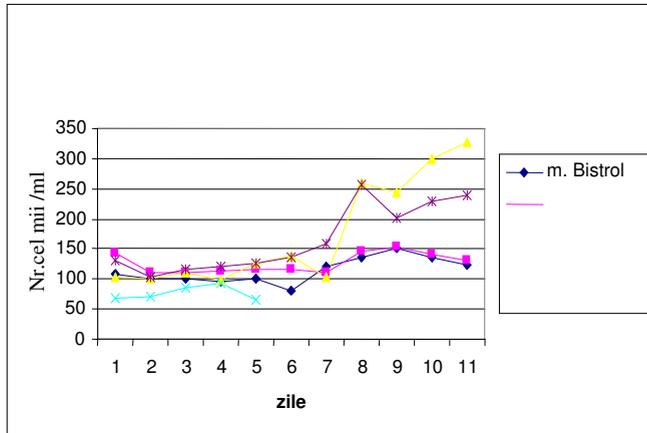


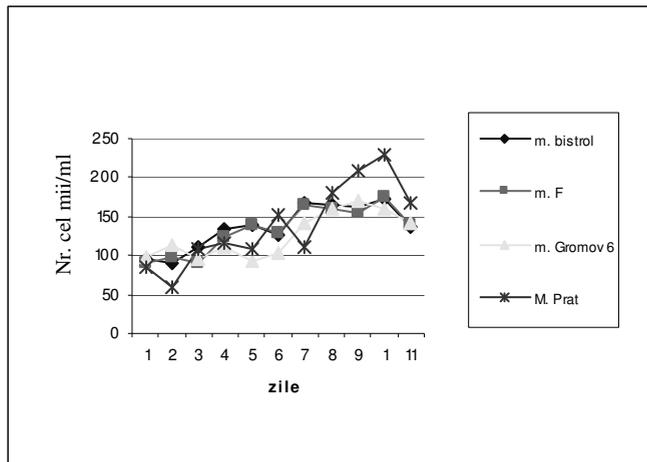
Fig. 2. Development of *Navicula cryptocephala* Kütz species in different nourishing mediums

Figure 3 A, B highlights the development of *Scenedesmus apiculatus* (W. Et G.S. West) *Chod. var indicus* (Hgrtob) species in different nourishing mediums. For this culture there were tested 2 temperature modes: I- 27-32 °C; II- 18-20 °C. The obtained results indicate that, at the temperature of 27- 32 °C, the culture

developed well in Prat medium, the productivity being of 230 thousand of sells/ml. And at a lower temperature of 18-20 °C, the cells of *Sc. apiculatus* grow and multiplied intensively in Gromov 6 medium.



A



B

Figure 2. The development of *Scenedesmus apiculatus* (*W. Et G.S. West*) *Chod. var indicus* (*Hgrtob*) species in different mineral media and at different temperatures (A- 18-20°C and B at 27- 32°C).

This confirms the data from the bibliography which state that the green algae, Chlorophyta phylum, develops intensively, generating even the waters efflorescence during the summer period at a high temperature of the water. In spite of the lower concentration of nourishing substances in Prat medium (KNO_3 -0.1 mg/l; K_2HPO_4 -0.01 mg/l; $MgSO_4$ -0.01 mg/l; $FeCl_3$ -0.001 mg/l) in comparison with Gromov 6 medium, the said strain developed intensively.

CONCLUSIONS

1. As a result of the performed research, it was stated that the selected strains are subject to growth in laboratory conditions and can be used in different experimental research. The optimal nourishing mediums for the development and reproduction of the strains are: Gromov 6 for *Oscillatoria amphibia* Ag., Rixter for *Navicula cryptocephala* Kütz. For *Scenedesmus apiculatus* (W. Et G.S. West) Chod. var *indicus* (Hgrtob) - Gromov 6 at low temperatures (18-20 °C) and Prat at higher temperatures (27- 32 °C). The obtained results indicate that each species has its physiological and biochemical specific that influences a specific developments. The experiments carried out demonstrate that the selected mediums can be proposed for strain growth and biotechnological tests.

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