



ISSN : 0973-7057

Int. Database Index: 663 www.mjl.clarivate.com

Effect of phosphate concentration on Sporulation of Blue-green Algae

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Received : 20th December, 2019 ; Revised : 17th February, 2020

Abstract: Five local isolates of Blue-green Algae, *Nostoc commune*, *N. linckia*, *Anabaena circinalis*, *Anabaena macrospora*, *Anabaena lapponica* were selected to assess the effect of Phosphate cane on Akinete formation. It was observed that increases in Phosphate conc. Reduced Akinete formation.

Key words: Akinetes, *Anabaena circinalis*, *A. macrospora*, *A. lapponica*, *Nostoc commune*, *N. linckia*.

INTRODUCTION

Blue green Algae are prokaryotic in nature. Sexual reproduction is totally absent in them, however genetic recombination has been reported.¹ They reproduce vegetative and asexually. Most of the unicellular and colonial forms reproduce by cell division. In members of Oscillatoriaceae hormogonia are produced, which are the main source of reproduction.^{2,3} In Nostocaceae and Rivulariaceae Kinetes are the principal means of reproduction. Akinetes are produced adjacent to Heterocyst, Akinetes are thick walled large spores, with two layered wall.^{4,5} Outer wall is thick, yellow or brown in colour. Akinetes are resistant to temperature and desiccation. Akinete formation is dependent on several factors like light quality, pH, Nitrogen & Phosphorous. Dificiency of Ca, Mg, Fe and S led to decrease in number of Akinetes. Increased concentration of Nitrogen enhances akinete formation while increased concentration of Phosphorus decreases akinete formation.^{6,7}

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MATERIAL & METHODS

Blue-green Algae collected from local area were identified on the basis of their morphology with the help of Standard monograph (Desikachari T.V.). Five local strains were selected to assess the effect of Phosphate concentration on their sporulation, selected strains were *Nostoc commune*, *Nostoc linckia*, *Anabaena circinalis*, *Anabaena macrospora* and *Anabaena lapponica*.

Each strain was cultured in BG II medium. Axenic culture was prepared from each strain. To elevate effect of Phosphate concentration 10 different concentration of Dipotassium hydrogen phosphate was prepared (1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9% and 10%) in BG II medium. One ml. of each strain was inoculated in each concentration. BG II medium without Dipotassium hydrogen phosphate was considered as control. After 15 days akinete frequency was calculated as percent of total cell population under light microscope at least 1000 cells were counted for each reading.

RESULT

Number of akinetes increased in the control in which Phosphate was absent, while the number of akinetes

decreased by increasing conc. of Phosphate. In a conc. of Phosphate above 4% no any akinete was produced in both species of *Nostoc*.

In *Anabaena circinalis* No. of akinetes were equal to control in 1% Phosphate concentration but increased conc.

of Phosphate showed decrease in number of akinetes. At a conc. of 7% no any akinete produced. Akinete formation in *Anabaena macrospora* and *Anabaena lapponica* gradually decreased of 6% and above there was no any akinete development.

Table 1- Name of species and no. of Akinetes in different Phosphate conc. of after 15 days

Sl. No.	Name of species	No. of akinetes in control after 15 days	No. of akinetes in different Phosphate conc. of after 15 days									
			1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1.	<i>Nostoc commune</i>	8	6	4	3	2	0	0	0	0	0	0
2.	<i>Nostoc linckia</i>	7	5	3	2	1	0	0	0	0	0	0
3.	<i>Anabaena macrospora</i>	11	9	7	5	4	2	0	0	0	0	0
4.	<i>Anabaena circinalis</i>	9	9	7	6	5	3	2	0	0	0	0
5.	<i>Anabaena lapponica</i>	7	6	4	3	3	2	1	0	0	0	0

CONCLUSION

Phosphate concentration is an important factor in sporulation of Blue-green Algae. As the conc. of Phosphate increases sporulation is decreased. In higher conc. of Phosphate sporulation is completely blocked.

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