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MICROBIOLOGY

Preparation of Pure Blue-Green Algae

IN the course of measuring the resistance of blue-green algae to γ-radiation from a cobalt-60 source, initially contaminated blue-green algae were found to be free from bacteria after irradiation. Since difficulties are encountered in the purification of Cyanophyta[1] (less than 30 per cent of the organisms in the Indiana University Collection are bacteria-free[2]), γ-radiation may afford an easy, reliable method for purifying algae from bacteria and be of advantage in physiological and biochemical investigations of these organisms. Practical conditions for the purification of a group of typical Cyanophyceae were, therefore, determined.

Filamentous algae were grown in 10 ml. of supernatant Chu[3] medium in 20-ml. loosely capped vials so that the sides and bottom of the vial were covered with a thin filamentous mat. Unicellular algae were inoculated into similar media to form lightly coloured suspensions. Irradiation was provided by a 'Gammacell 220' (Atomic Energy of Canada, Ltd.) furnishing $6 \cdot 48 \times 10^4$ rads/h at the irradiation site. At the end of the irradiation period (Table 1), a sample of algae from each vial was streaked out on trypticase soy agar to test for bacterial growth while another sample was sub-cultured into fresh medium to observe algal growth. The results given in Table 1 show that 4 h irradiation (about 260,000 rads) is capable of producing bacteria-free cultures with no observable algal damage. The only observable change appeared to be an increase in the size of pseudovacuoles which returned to normal with ensuing growth.

The purified algae were sub-cultured three times at 1-week intervals and observed regularly for 6 weeks, during which time they remained pure and in healthy condition. Cultural behaviour and microscopic structure remained characteristic; in the case of some filamentous forms, a slight stimulation of growth was apparent. Tests for anaerobes were negative. Fungi were not observed.

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Table 1

Organism	Algal (*A*) or bacterial (*B*) growth	Radiation: 2 h intermittent (30 min on, 10 off) 130,000 rads	2 h 130,000 rads	3 h 194,000 rads	3·5 h 227,000 rads	4 h 259,000 rads	4·75 h 288,000 rads	8 h 518,000 rads	43 h 2,786,000 rads
Lyngbya estuarii	*A*	+	+	+		+		+	–
	B	+	–	–		–		–	–
Oscillatoria brevis	*A*	+		+	+	– +			–
	B	+		–	+	– +			–
O. tenuis	*A*	+	+			+			–
	B	–	–			–			–
Phormidium autumnale	*A*	+	+			+			–
	B	+	+			–			–
P. luridum	*A*					+	+ +	+	–
	B					–	+ –	–	–
Plectonema boryanum	*A*		+		+		+		
	B		+		+		–		
P. calithricoides	*A*		+			+			–
	B		–			–			–
Microcoleus vaginatus	*A*	+				+			–
	B	+				–			–
Schizothrix calcicola	*A*	+	+			– +	+		
	B	+	+			– –	–		
Scytonema hoffmannii	*A*	+	+		+	+			–
	B	+	+		–	–			–
Nostoc linkia	*A*				+		+		
	B				+		–		
N. muscorum	*A*					+	+		
	B					–	–		
Coccochloris peniocystis	*A*				+ +	+	–		
	B				+ –	–	–		
C. stagnina Spreng	*A*					+ +	+ +		–
	B					+ –	+ –		–
Anacystis thermalis "B"	*A*	+			+ +	+ +			
	B	+			+ –	+ –			
A. thermalis "R"	*A*	+			+				
	B	+			–				
Anabaena variabilis	*A*						+		
	B						–		

Key: + Growth occurred. – Growth did not occur.
+ + / + – } Growth in some cultures, but at least one bacteria-free isolate could be obtained.

Copulation of Ultra-violet-irradiated and Unirradiated *Saccharomyces* Cells of Different Ploidy

THE inactivation of *Saccharomyces* strains of different ploidy induced by radiation has been investigated in detail by various authors[1]. For X-rays, 'recessive'- and 'dominant'-acting damages have been separated[2]. 'Dominant' lethal damage renders a zygote formed by fusion of an irradiated and an unirradiated cell unable to develop into a visible colony. Stein and Laskowski[3] took this type of damage into consideration when building a mathematical model to interpret the inactivation of *Saccharomyces*. Part of their theory was that ultra-violet light of wave-length 254 nm also causes this type of dominant damage. This communication presents results which show that this damage can indeed be observed after ultra-violet irradiation.