TABLE 1

Comparative characters of H. grisea, H. grisea *var.* thermoidea *and* H. grisea *var.* indica

Isolate	Colony	Aleuriophores	Spores	Temperature °C		
				Max.	Opt.	Min.
H. grisea var. *thermoidea*	Gray to dull black	Unbranched septate	Aleuriospores dark brown, smooth, globose 8–16 μm, oval-pyriform, 12–16 × 8–12 μm. wall thick. Always bear distinct apiculus. Phialospores absent[1].	56	38–46	24
H. grisea var. *indica*	Olive green to bluish gray	Rarely branched 11·0–16·5 × 1·1–2·0 μm	Aleuriospores pale brown, smooth, always globose without an apiculus, 7·7–11·0 × 7·7–11·0 μm wall 1 μm thick. Phialospores absent.	60	45–50	24
H. grisea	White to dark gray	Subcylindrical or dilated upwards	Aleuriospores globose, yellow brown, thick walled 9–16 μm. Phialospores occasionally present in some strains[2–5].	30	20–25	5

swollen in the middle, smooth, unbranched, rarely branched 11·0–16·5 × 1·1–2·0 μm terminally bear a single aleuriospore. Aleuric spores pale brown, brown in mass, smooth, one celled, with 1 μm thick wall, apiculus absent, generally carry a small attachment piece 7·7–11·0 × 7·7–11·0 μm.

Habitat : Isolated as Laboratory contaminent.
Date of isolation : 25-3-1979
HACC No. 92 AS

Temperature relations : It grows from 24°–60° C with an optimum range of 45°–50° C.

Thanks are due to Dr. K. S. Gopalkrishnan and Dr. V. H. Pawar.

Hindustan Antibiotics Research Centre, Pimpri, Poona 411 018,
June 19, 1979.

A. SUBRAHMANYAM.

1. Cooney, D. C. and Emerson, R., *Thermophilic Fungi*, Freeman and Co., Sanfransisco, 1964, p. 168.
2. Mason, E. W., *Myc. Papers*, 1941, 3, 67.
3. Traan, A. E., *Nyt. Mag. Naturv.*, 1914, 52, 19.
4. White, L. W. and Dowining, M. H., *Mycologia*, 1953, 45, 951.
5. Wollenber, H. W. and Richter, H., *Zentralbl fur Bakt. Paras und Infekt*, 1934, 90 (2), 74.

SULPHYDRYLS AND SURVIVAL OF SUBAERIAL BLUE-GREEN ALGAE

BLUE-GREEN algae form predominant subaerial flora of the tropics occurring in various habitats. Surfaces of buildings coated with cement or lime or structures covered with asbestos cement sheets are quickly colonised by blue-green algae after a couple of monsoon rains. The usual forms that occur on building terraces at Banaras are tuft forming *Tolypothrix*, *Scytonema* intermixed with *Phormidium* and crust forming *Gloeocapsa* generally mixed with *Myxosarcina*, while *Porphyrosiphon* is very common on soil surface and bark of mango and other plants. It is noteworthy that none of these algae forms akinetes or spores but continue their existence from season to season. During mid-summer months the temperature of terrace goes to upto 60–65°C, this coupled with high light intensity and extreme dryness makes it most inhospitable to any algae. However, the subaerial algae survive the severe conditions for about three months and resume their growth after the onset of monsoons.

During our studies we found that algal crusts collected fromt he hot terraces (60–65° C) are intensely stained after treatment with 2,3,5-triphenyl-tetrazolium chloride (TTC) for SH groups[1], within 15–30 min. Similar reaction is also obtained with

Porphyrosiphon, *Lyngbya* and other subaerial algae, Pre-treatment with 0·1M iodoacetate, ethylmaleimide. PCMB, hydrogen peroxide (0·1%), copper sulphate (0·01%), potassium ferricyanide (0·01%) completely abolished the ability of the alga to reduce TTC. Further, it was observed that heating of the algal mats in dry state to 100° C, for 30 min had no effect on TTC reduction whereas boiling in water even for 1-2 min rendered the algae inactive. Pretreatment of the algae with 10M urea or 0·1% thioglycollate had no effect no reduction. Thus all the tests indicate that the intense TTC reduction is due to the presence of high levels of SH-groups in the subaerial algal cells. Dry algal crusts, when incubated in moist chamber in light for 24–48 hrs, showed marked loss of TTC reduction. Samples collected from soils, barks and terraces and stored over conc. sulphuric acid or silica gel in a desiccator for 2 to 3 yrs were still found to be reactive with TTC.

All the subaerial algae show characteristic multilayered sheath, either deep brown (porphyry colour) or orange colour. The sheath material of *Porphyrosiphon* or *Tolypothr ix* when homogenised in water by grinding or sonication, gives no detectable peaks in the visible region of the spectrum, but shows high absorption in near-violet and blue regions, the absorption continuously decreasing towards red. It is possible that the coloured sheath filters of the deleterious blue wavelengths of sunlight from reaching the trichome inside. It may also possibly aid the alga in yet an unkown way, to keep the reducing state of the cells needed for the survival during the hot summer. Further, the thick sheath may allow the alga to lose or gain water slowly in a controlled way from the trichomes and this appears to be an important factor in preventing damage during dehydration as in the case of other organisms[2].

The remarkable ability of blue-green algae to survive extremes of dehydration and heat has been commented upon by number of workers and is generally attributed to the 'special nature' of blue-green algal cytoplasm[2]. Levitt[3] pointed out that a plant can protect itself against stress injury by preventing or repairing protein aggregation and denaturation by maintaining reduced state (SH) of the cell, in some cases accomplished by possession of hydrophobic proteins.

This work has been supported by reserach project sanctioned by the University Grants Commission, New Delhi.

Laboratory of Algal Physiology, S. N. TRIPATHI.
Department of Botany, E. R. S. TALPASAYI.
Banaras Hindu University,
Varanasi 221 005,
July 23, 1979,

1. Roberts, L. W. and Lucchese, G., *Stain Technol.*, 1955, 30, 291.
2. Fogg, G. E., in *Dormancy and Survival*, 23rd Symp. Soc. Expt. Biol., 1969, p. 123.
3. Levitt, J., *Responses of Plants to Environmental Stresses*, Acad. Press, N.Y., 1972.

EFFECTS OF COUMARIN ON THE CELL DIVISION OF *RHIZOCLONIUM HIEROGLYPHYCUM* (AG.) KUETZ.

THE effect of coumarin has been extensively studied on a number of higher plants whereas those on algal karyology are comparatively few[1,2]. The present investigation deals with the effects of coumarin on the cell division of *Rhizoclonium hieroglyphycum*, a green alga belonging to the Order Cladophorales.

The alga was collected from a freshwater pond at the Banaras Hindu University and cultured in BBM medium designated as BBMP[3] fortified with 8% soil-extract (1 : 1). A light period of 16 hr of c. 2500 lux per day was provided to the cultures at 22±1° C. Actively growing vegetative filaments from culture were treated for 6, 12, 18, 24 and 32 hr with different concentrations (0·017, 0·034, 0·051 and 0·068 M) of coumarin prepared in culture solution. Materials were fixed in a mixture of absolute alcohol and glacial acetic acid (3 : 1) and stained[4].

Delay in mitosis and reduction in the percentage of mitotic index at peak time were observed in this alga. Mitotic index was retarded and brought down from 39·2% in control to 10·4% in material treated with 0·068 M (highest conc. used) for 32 hr. Stickiness, clumping, breakage of chromosomes at metaphase, bridges and laggards at anaphase were the main visible chromosomal changes. The quantitative data revealed linear increase in the frequency of chromosomal aberrations with increase of conc. of coumarin. While treatment with 0·017 M for 32 hr showed aberrations (stickiness and clumping of chromosomes, chromosome breakage at metabphase and anaphase, laggards and anaphase bridges) upto 4·8%, treatment with 0·068 M conc. for 32 hr revealed aberrations upto 13·6%. Metaphase breakage was obsrved after 24 hr treatment with conc. of 0·051 M solution of coumarin. Anaphase bridges were seen after the treatment with 0·017 M conc. for 32 hr. Besides chromosomal changes, vacuolated nuclei at higher conc. were also recorded. Formation of micronuclei has also been detected frequently at higher conc. Inhibition of cell plate formation as evidenced by the formation of 8-nucleate cells (4-nucleate or rarely less per cell in the control) accompanied with bulging of cells, degeneration of chloroplasts, vacuolation were the observed morphological effects of present investi-