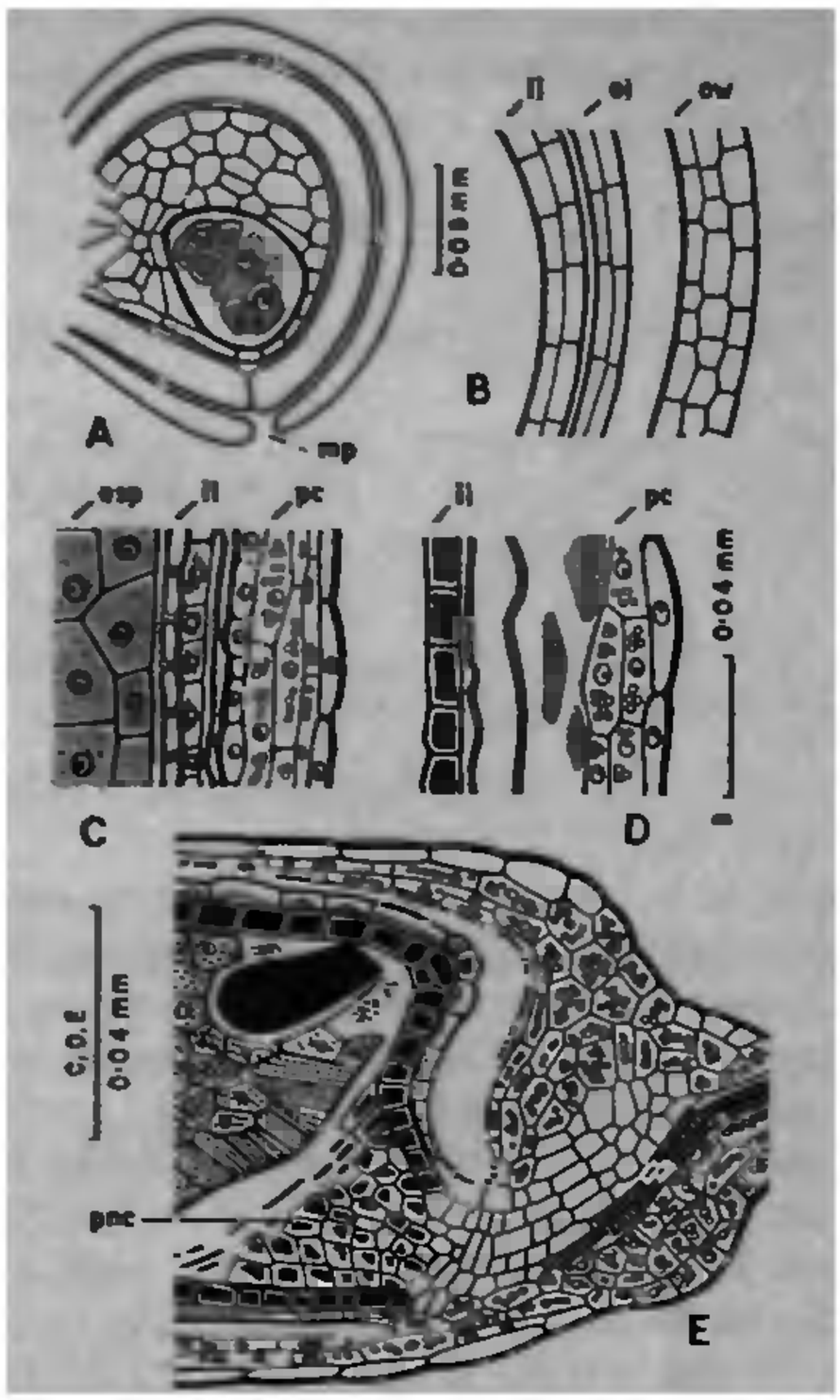

Figures 1A-E. Structure and development of the caryopsis in *Sporobolus coromandelianus*. **A.** Morphology of the ovule. **B.** Part of an young ovary showing ovarian wall, outer integument and inner integument. **C.** Part of an young caryopsis wall showing remnants of the outer integument and two layered inner integument. **D.** Part of an young caryopsis wall showing outer layers of the pericarp and inner layer of the inner integument which are separated by a number of cuticles. **E.** L.s. of an young fruit showing pericarp, inner layer of the inner integument consisting of tannin filled cells, endosperm, embryo and persisting nucellar cells at the base.
(*esp*, endosperm; *ii* inner integument; *mp*, micropyle; *oi*, outer integument; *ow*, ovarian wall; *pc*, pericarp; *pnc*, persisting nucellar cells; *v*, vasculature)

integuments of two cells in thickness each except at the micropyle where they are three celled thick. The micropyle is formed by both the integuments (figure 1A).

The mature ovary wall is three-celled thick (figure 1B) but undergoes periclinal divisions forming up to 7 to 8 layers during postfertilization stages (figure 1C). These cells are filled with starch in their later stages of development and the inner 3 to 4 layers of the pericarp are destroyed and the outer layers of the ovary wall persist in the mature caryopsis. The cells of the outer integument elongate vertically and become tightly appressed to the ovary wall. Owing to the activity of the endosperm, the ovule increases in size resulting in the total obliteration of the outer integument. The outer layer of the inner integument also gets crushed and absorbed while the inner layer of the inner integument becomes filled with tannin like substances and forms a tight jacket (figure 1D).

The fruit wall and seed coat are at first adnate but in a fully developed caryopsis the remaining layers of the ovary wall persist forming the pericarp that surrounds the seed which remains free from the pericarp and appears loose in the fruit.

The nucellar tissue all around the embryo sac disorganises in consequence of the development of the endosperm but in the chalazal region it persists in the mature fruit as a cushion like body (figure 1E).

Cronquist[4] observes that "the fruit of *Sporobolus* does not appear to be primitive within the family. Instead it is a reversion to an ancestral type in this one character of loose seed within the pericarp. In many other respects *Sporobolus* is advanced within the family and it is most unlikely that one primitive character persisted while so many others are changing."

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RuDP AND PEP CARBOXYLASES ACTIVITY IN SUBAERIAL BLUE-GREEN ALGAE

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SUBAERIAL blue-green algae form an important constituent of algal flora in tropics on their special habitats, surfaces of buildings, asbestos-cement sheets,

bark of trees, soil and others. These algae also grow under extreme environment and are able to survive even at 60–69° C temperature and complete dryness on terraces[1]. Such algae are reported to fix free atmospheric nitrogen[2]. Investigations on these algae, specially from natural habitats, can help in understanding the biology of blue-green algae. The present study attempts to assay the carboxylases in the cell-free extracts of two subaerial blue-green algae, *Lyngbya arboricola* and *Tolypothrix crassa*, collected from their natural habitats bark of *Mangifera indica* and terrace of a building from the campus of the university. *T. crassa* grows under harsh environment bearing high light intensity (259–355 cal/cm^2/day), low water status and 30–40° C temperature, while *L. arboricola* grows at 28 to 32° C temperature and comparatively low light intensity and high water status, on their habitats[1].

The algae harvested from their natural habitats were washed with distilled water and brushed off to remove all possible soil particles without damaging filaments of the mats. The mats (2 cm^2) were incubated on filter paper under flourescent light of 1600 lux illumination intensity for 72 hr at 0 bar osmotic water potential.

The mats were then transferred to 5 ml ice-cold *tris*-HCl buffer 10 μM, pH 8.2 and sonicated with ultrasonic disintegrator (Vibronics) with current strength of 200 mA for 15 min in an ice bath. The crude homogenate was centrifuged at 5000 rpm for 15 min and the supernatant was used for enzyme assays.

The methods proposed earlier[3,4] were followed with some modifications to assay the enzymes PEPCase PuDPCase, respectively. The reaction mixture of 0.425 ml (final volume) for PEPCase estimation contained 10 μM *tris*-HCl buffer, pH 8.2; 1.0 μM 2-mercaptoethanol; 0.5 μM $MgCl_2 7H_2O$; 0.5 μM sodium glutamate; 0.2 μM phosphoenol pyruvate salt; 0.1 ml algal extract; 0.025 ml $NaH^{14}CO_3$, 25 μCi. The total volume of 0.45 ml reaction mixture for RuDPCase constituted 10 μM *tris*-HCl buffer, pH 8.2; 2.5 μM $MgCl_2 7H_2O$; 0.5 μM reduced glutathione; 0.5 μM RuDP sodium salt; 0.1 ml algal extract; 0.025 ml $NaH^{14}CO_3$ solution, 25 μCi. The mixture was incubated at the required temperature for 5 min prior to starting the reaction by addition of $NaH^{14}CO_3$ solution. The reaction was stopped by adding 0.1 ml of 4% HCl after incubation of the mixture in a water bath maintained at 30 or 40° C for 5, 10 or 15 min as required. The aliquots of the reaction mixture were counted for ^{14}C incorporation using Bray's solution as scintillant with Beckman LC 100 counter. Protein was estimated by the method of Lowry *et al*[5].

The increase in ^{14}C incorporation on incubation from 5 to 15 min reflected the presence of PEPCase and PuDPCase activity in the cell-free extracts of both the algae. The ratio of RuDPCase and PEPCase activity at 30° C for 15 min was found higher in *L. arboricola* than *T. crassa*. The activity of both the enzymes was reduced on increase in temperature from 30 to 40° C, where PEPCase was less affected than RuDPCase, specially in *T. crassa*. The variations in the activity of the enzymes may be attributed to the physiological adaptations of the algae to their respective environments. The reaction mixture without substrates, RuDP and PEP, also showed considerable radioactivity which may be due to the ^{14}C incorporation by endogenous substrates in the algal extracts.

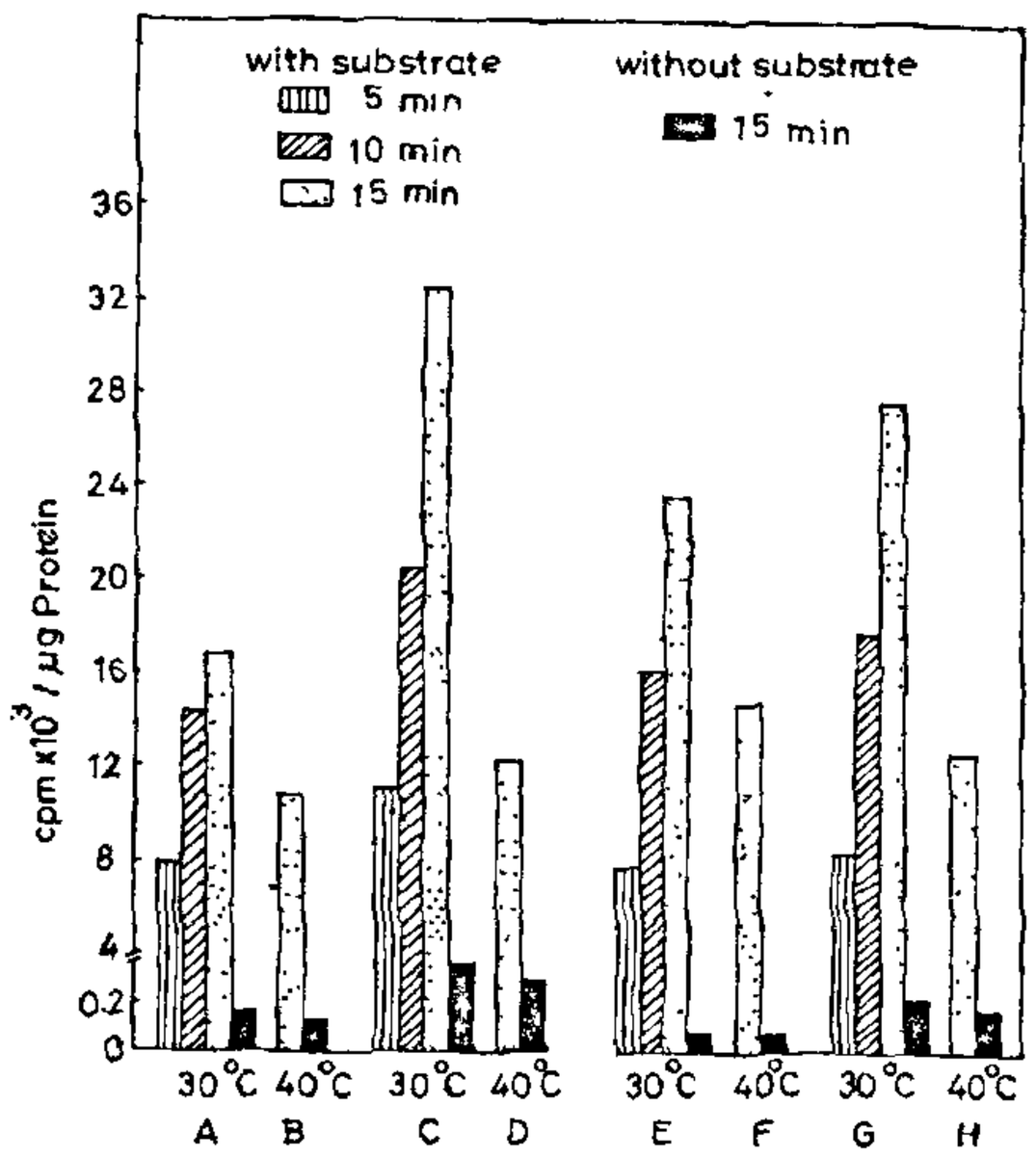

Figure 1. Activity of the Carboxylases in the natural mats of *L. arboricola* (A–D) and *T. crassa* (E–H). A,B,E,F–PEPCase; C,D,G,H–RuDPCase.

It is generally considered that photosynthetically fixed carbon follows the Calvin type pathway in blue-green algae[6]. Polyhedral bodies (carboxysomes) in the vegetative cells of blue-green algae show the sites for the activity of PuDPCase, the principle enzyme of the cycle[7]. The activity of PEPCase in cell-free extracts of the algae has been reported by many workers[8]. The presence of both the carboxylating enzymes and their varying activity in subaerial blue-green algae most probably help in maintaining growth potential of these algae under quick changing micro-climatic conditions at their habitats.

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LEVEL OF SERUM SIALIC ACID IN DIFFERENT STAGES OF CERVICAL CANCER BEFORE AND AFTER THERAPY

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AMONG the different sugar residues present in mammalian glycoprotein, sialic acid has a particular role in biological function as it is located on the cell membrane[1-3]. Several reports have revealed that increased glycosylation is associated with certain type of malignancy resulting in the increase of serum sialic acid[4-8].

But reports are lacking regarding the level of serum sialic acid in patients having carcinoma of cervix and whether effective treatment could be assessed by such monitoring. The present report furnishes information with respect to the serum sialic acid level of patients having carcinoma of cervix with different clinical stages. Histopathological study of the biopsy material of these cases revealed epidermoid carcinoma. Furthermore, studies were also carried out to explore whether the serum sialic acid has any relationship with regression of tumor following radical surgery or radiotherapy.

Blood was obtained by venous arm punture and serum separated. The prepared serum was stored frozen at −20° C until assayed. Sialic acid determination was carried out using thiobarbituric acid method by Warren[9]. Fiftysix cervical carcinoma patients with evaluable tumor burden were studied. Twenty one patients were followed up after radiotherapy and surgery. Twenty normal matched control were similarly studied.

The relationship of serum sialic acid level according to tumor burden in cervical carcinoma with age matched normal sera is illustrated in the figure 1. The serum level of sialic acid tends to increase with the increasing tumor burden ($p = < .005$) in all four

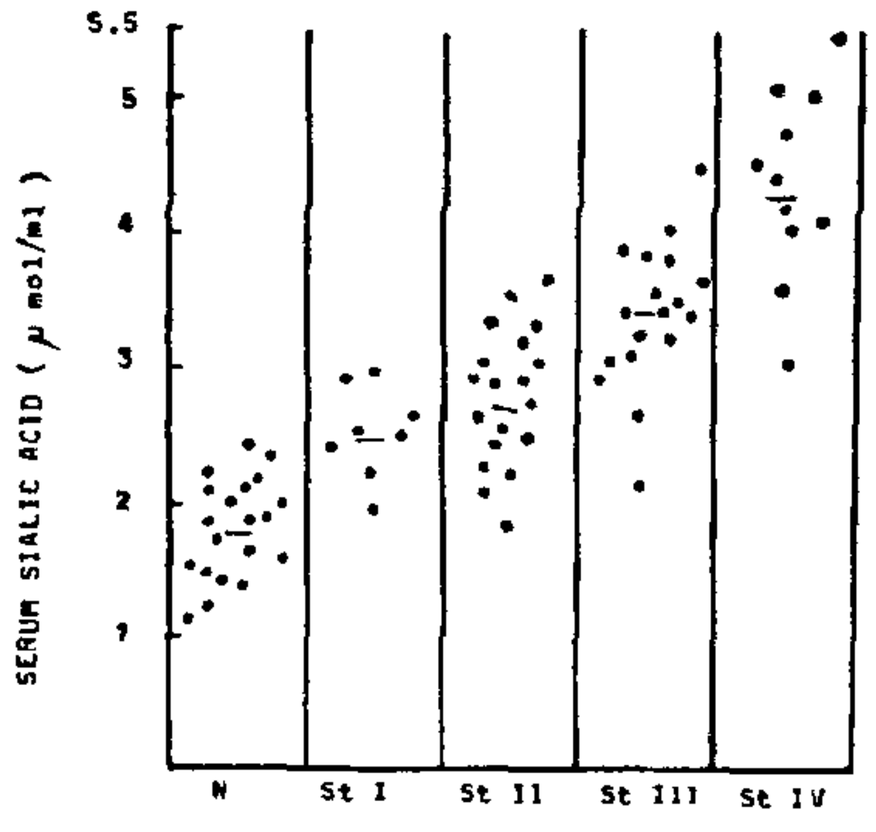

Figure 1. Serum sialic acid in normal (N) and Carcinoma of cervix patients grouped according to clinical staging (st) Bar indicates mean in each case.

stages when compared with normal. While the value of 1.85 ± 0.56 μ mol/ml sera was the arithmetic mean in normal control person. The relative increase in cerivcal cancer cases of stages I, II, III and IV were 54%, 62%, 101% and 169% respectively.

Figure 2 reveals the serum sialic acid level after treatment of cervical cancer by surgery and radiotherapy. It is evident from the figure that in eight patients of Stages I and II after surgery there was a marked drop in serum sialic acid level. Thirteen patients having cervical cancer with initial clinical stage III were followed up after radiotherapy. The responsiveness of