Table 1 Survival percentage of Chlorella vulgaris Beijernick after zinc sulphate treatment, UV irradiation and combination of exposures to zinc sulphate and UV light. Values are Mean ± SD

<table>
<thead>
<tr>
<th>Concentration of ZnSO₄ (ppm)</th>
<th>0 min</th>
<th>10 min</th>
<th>15 min</th>
<th>20 min</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100.0</td>
<td>30.4 ± 1.7</td>
<td>16.3 ± 1.5</td>
<td>1.7 ± 0.3</td>
</tr>
<tr>
<td>2</td>
<td>100.0</td>
<td>81.3 ± 2.0</td>
<td>52.4 ± 2.9</td>
<td>26.2 ± 1.4</td>
</tr>
<tr>
<td>5</td>
<td>100.0</td>
<td>82.0 ± 0.8</td>
<td>43.2 ± 0.7</td>
<td>24.4 ± 1.6</td>
</tr>
<tr>
<td>50</td>
<td>91.0 ± 2.6</td>
<td>25.2 ± 0.9</td>
<td>7.3 ± 1.3</td>
<td>0.6 ± 0.1</td>
</tr>
<tr>
<td>100</td>
<td>67.0 ± 1.8</td>
<td>23.7 ± 2.1</td>
<td>1.6 ± 0.2</td>
<td>0.0</td>
</tr>
</tbody>
</table>

survival of Chlorella, however, 50 and 100 ppm of ZnSO₄ slightly decreases the percentage survival. The survival rate of the alga gradually declined, with increase in UV doses. It is evident from the present study that pretreatment of alga with ZnSO₄ at the concentrations of 2 and 5 ppm decreases the toxicity of UV light. However, 50 and 100 ppm of ZnSO₄ treatment increased the radiosensitivity of the alga.

Eichhorn² has observed that Zn²⁺ ions complexes with the genetic material, to stabilize the DNA structure toward radiation damage. It has been demonstrated that metal ions exert an effect on the cells redox potential, generally giving a protection against radiation³. It appears, therefore, that ZnSO₄ at lower concentrations of 2 and 5 ppm could result in a radioprotective action. However, 50 and 100 ppm of ZnSO₄ increases the radiosensitivity. This could be due to combination of toxic injuries induced by higher concentration of ZnSO₄ and by the radiation.

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INDUCED PARTHENOSPORES IN COSMARION LAEVE RABENH.

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The occurrence of haploid resting spores is a well-known phenomenon for the family Zygnemataceae. In the desmidiaeae it is a rare phenomenon, although there are a few reports with regard to the placoderm as well as saccoderm desmids¹⁴. Brandyam⁵ reported the occurrence of parthenospores in the desmids under three main types (emergent, non-emergent and semi-emergent). We now report the occurrence of the emergent type of parthenospore in a placoderm desmid, Cosmarion laeve, Rabenho under various culture conditions.

C. laeve was collected from a cistern, in the University Campus, Kakatiya University, Warangal and was maintained in unialgal culture in biphasic medium⁶ at 18–22°C with an illumination of 16/8 hr L/D cycle. The following culture conditions were tried: (i) alternate light/dark receiving 16L/8D hr at 18–22°C, (ii) daylight at North window at 27–29°C (iii) constant light at 27–29°C and (iv) refrigerated cabinet with constant dark at 8–9°C.

Four sets of test-tubes were taken and autoclaved with 10 ml of varied inorganic media, Chu's ¹⁰, Godward ⁸, Waris ⁹, Reynold ¹⁰ and Knop ¹¹ along with soil extract ⁶. The cell suspension (10 ml) was centrifuged in sterile centrifuge tubes at 2000 rpm for 5 min. The supernatant was poured off and the sedimented cells were inoculated in test-tubes under aseptic conditions, and kept for observations.

The formation of parthenospores in the culture started from the 12th day onwards in all the four culture conditions employed during the present inves-
tigation. But the frequency of parthenospore formation was greater in constant light at 27–29°C and in soil extract medium. During the process of spore formation the two semicells break open at the isthmus region and the contents emerge into a layer of mucilage (figures 1 & 2) secreted by the cell, round off and form a resistant wall (figures 3 & 4) which is exactly similar to the zygospore in its external appearance. A similar emergent type of parthenospores was reported earlier in Cosmarium botrytis5 and in C. bioculatum2. In the zygospore formation, two conjugants are involved and the contents emerging out of these two cells will fuse, round off and secrete mucilage. Thus, the process of zygospore formation is quite different from that of parthenospore formation. Moreover, the thick striated wall of the parthenospore is not seen in the zygospore.

The occurrence of these parthenospores in C. laeve along with zygospores might be due to the abortion of one of the gametes during the process of conjugation.

The authors are thankful to Prof. M. R. Suxena, Emeritus Professor, Osmania University for identifying the species. Thanks are also due to the Head, Department of Botany for facilities and the authorities of CSIR for financial support.

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**PROTEIN BODIES IN THE EMBRYO OF CROTALARIA RETUSA LINN—THEIR STRUCTURE AND DEVELOPMENT**

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The protein bodies are oval to spherical organelles, bound by a single, unit membrane and in seeds are repository of storage proteins. In the cereals, protein bodies occur largely in endosperm cells whereas in the legumes, these bodies are localized in the cells of the embryo axis and the cotyledons. Present investigation on Crotalaria retusa deals with the structure and development of protein bodies that occur in parenchyma cells of the embryo axis and the cotyledons.

The seeds, during various stages of development were fixed in 10% aqueous acrolein, dehydrated, infiltrated and embedded in glycol methacrylate. Two μm sections were cut using glass knives and stained with coomassie brilliant blue (BDH, C.I. No. 42660) for the localization of total proteins.

In *C. retusa* protein bodies are formed from vacuoles. The parenchyma cells of the embryo axis and