properties and inhibited rat liver mitochondrial monoamine oxidase[6] did not show any appreciable cardiovascular effect. The cardiovascular effects of compounds II, III, V and VI had been, however, similar. It is, therefore, difficult to explain in structure-activity relationship of chloramphenicol and its intermediates.

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INDUCED APOGAMY IN *ADIANTUM TRAPEZIFORME* L.

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ABSTRACT

In vitro grown prothalli of *Adiantum trapeziforme* L. were subjected to various sucrose concentrations. Gametophytic callus initiated from the prothalli produced apogamous shoots in the presence of sucrose. The results obtained showed, that exogenous supply of sugar especially sucrose, plays a key role in generating apogamous response.

INTRODUCTION

INDUCED apogamy has proved to be of great interest because it does not appear to involve any specific genetic change and its occurrence can to a degree at least be brought about under experimental control. From *in vitro* studies, the factor responsible for the induction of apogamy appears to be a high level of carbohydrate (Bopp[1]), as also undoubtedly is the prevention of fertilization because of unsuitable physical or physiological environment (Nair and Kaur[4]).

The present investigation deals with morphological changes that occurred in the *Adiantum* prothalli when subjected to various sucrose levels. Moreover, the morphogenic potentiality of the gametophytic callus was also examined.

MATERIALS AND METHODS

Mature spores of *Adiantum trapeziforme* L. were collected. The spores were sterilized with 5% sodium hypochlorite for 5 minutes. The sterilized spore suspension was inoculated on slants of Knudson's medium, as modified by Steeves *et al.*[5]. Cultures were incubated at 25 ± 2°C in continuous light in a culture room.

RESULTS

Effect of sucrose concentration on prothalli

Four week old prothalli were inoculated on Knudson's medium containing 1%, 2% and 4% sucrose respectively. Few prothalli were inoculated on Knudson's basal medium (sucrose free). After 4 weeks incubation, prothalli grown on 4% sucrose medium became quite thick and developed profuse hair (Fig. 1). The formation of hair and the prothalli becoming quite thick had been observed to be the external indication in apogamous shoot formation. On further incubation, well developed shoots were observed from these prothalli (Fig. 2). By this time, there was no apogamous response from prothalli grown in media containing low sucrose concentration (2% and 1%). Prothalli grown on basal medium remained quite thin.

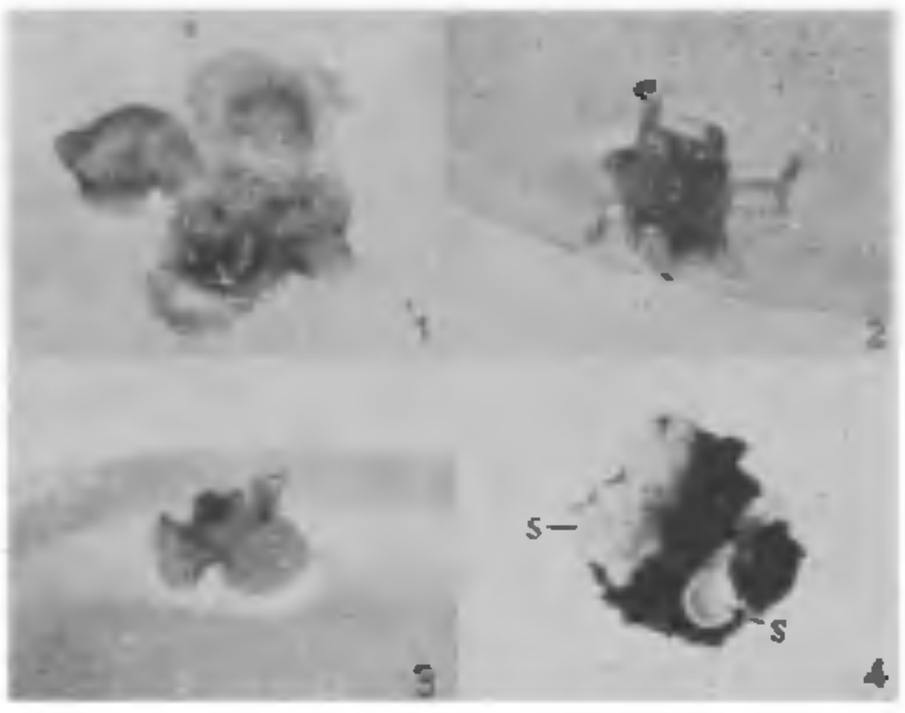
Initiation of callus on prothalli

Knudson's medium containing 2% sucrose, 10% coconut milk and supplemented with 1·0 mg/l and 2·0 mg/l 2,4-D were inoculated with 2, 4, 6 and 8 weeks old prothalli. After 4 weeks incubation 6 and 8 weeks old prothalli grown on medium containing 2% sucrose, 10% coconut milk and 2·0 mg/l 2,4-D

showed callus initiation (Fig. 3). Callus was deep green in colour and friable in texture. During corresponding period, no callus initation occurred from prothalli grown on Knudson's medium containing 2% sucrose, 10% coconut milk and 1·0 mg/l 2,4-D. No callus initiation occurred from 2 or 4 week old prothalli on any of the media tested.

Differentiation of callus

Callus pieces were inoculated on Knudson's basal medium (no sucrose) and media containing 2% and 4% sucrose respectively. Culture flasks were incubated in continuous light and in dark for 4 weeks at 25 ± 2°C. After 4 weeks incubation in light well developed apogamous shoots were produced from callus grown on 4% sucrose medium (Fig. 4), while apogamous shoots produced from callus incubated in dark were mere cylindrical structures. By this time callus grown on 2% sucrose medium in presence of light showed the formation of nodules over it without any definite organogenesis. No morphogenetic change was observed in the callus grown on 2% sucrose medium in absence of light. Gametophytes were regenerated from the callus grown on basal medium and incubated in light. No gametophytes were regenerated from the callus incubated in dark. Thus, light seemed to be necessary for gametophyte regeneration.



FIGS. 1–4. Fig. 1. *Adiantum trapeziforme* L. prothalli grown on Knudson's medium containing 4% sucrose, profuse hair developed from the thickened portion of prothalli. Incubation : 4 weeks at 25 ± 2° C in continuous light. Fig. 2. Apogamous shoots produced from the above prothalli on further incubation on the same medium. Incubation : 8 weeks at 25 ± 2°C in continuous light. Fig. 3. Callus (C) initiation from 8 week old prothallus grown on 2% sucrose, 10% coconut milk and 2·0 mg/l 2,4-D containing medium. Incubation : 4 weeks at 25 ± 2°C in continuous light. Fig. 4. Apogamous shoots (S) differentiated from callus grown on 4% sucrose medium in light. Incubation : 4 weeks at 25 ± 2°C in continuous light.

Discussion

Adiantum trapezfiorme prothalli grown on 4% sucrose showed the apogamous shoot formation. Whittier[6,7] and Mehra and Sulklyan[2] observed the acceleration of apogamy with increase in sugar concentration of the medium.

Callus was initiated from well developed prothalli but not from younger prothalli. This different behaviour of the gametophyte cells result from a change in responsiveness of cells on account of their varying endogenous auxin level. Miller and Miller[3] had proposed relationship of the developmental stage of a cell and its response to auxin.

The gametophytic callus differentiated into sporophytic structures such as leaves in the presence of sucrose; while autotrophic gametophytic forms were regenerated from the callus in the absence of sucrose. Hence, it appears that differentiation of two morphological forms either the sporophyte or the gametophyte from the callus was a direct response of the callus to the cultural conditions provided, namely sugar. Similar results were reported by Mehra and Sulklyan[2] in *Ampleopteris prolifera* callus tissue.

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