

COTTON PLANT CELL CULTURE

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The objective of this project is to make an in-depth study of cells and tissue culture of the cotton plants for plant breeding purposes. After nutritional needs for growth and differentiation are determined, an attempt will be made to fuse cotton plant cells with plant cells from different species, genera, and families. Research on manipulation of the hybrid cells with hormones and growth regulators to cause them to proliferate and differentiate into plantlets will be carried out. If successful, this approach will add a new tool to plant breeding which will bypass the normal sexual stage in plant reproduction.

Reliable techniques in aseptic cultures of plant tissues have been developed which give us good growth of callus tissues from cotton plant parts. The technique involves first soaking the explant materials in a 25% solution of commercial chlorox for an hour and then placing them in a modified White's media containing coconut milk. Chloromycetin is added to prevent bacterial growth. Callus tissues from cotton plants have been kept alive for over six months.

Attempts to induce differentiation are being made with the use of Murashige-Skoog's media with coconut milk and kinetin. Success to date has been limited.

One significant finding to date has been the phenomena of wound compound formation. Callus tissues from cotton plants when excised from the explant forms a phenolic compound which gives the cells a brown discoloration, and prevents further growth. In comparison, the excised callus tissues from Hibiscus does not form the compounds which give the brown discoloration. This response is similar to the type of reaction cotton and Hibiscus roots undergo when challenged by the root rot organism, Phymatotrichum omnivorum. The Hibiscus is known to be resistant to the root rot organism.