LIST OF TOPICS

1 INTRODUCTION

I.A. Plant growth is modulated by growth regulators. 2

I.B. Plant growth regulators elicit second messengers. 3

I.C. A large number of new compounds have now been included in the family of plant growth regulators. 11

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I.H. Microviscosity of cell membranes can be determined with the values of fluorescence lifetime and fluorescence anisotropy.

II MATERIALS

II.A. Enzymes:

II.B. Chemicals:

II.C. Gifts:

II.D. Other materials:

III METHODS

III.A Triacontanol did induce changes in vegetative growth of cotton.

III.B. Leaf lipids of cotton were altered by growth regulators.

III.B.1. Cotton (Gossypium hirsutum L.) plants were grown under natural environmental conditions and the plants were treated with growth regulators.

III.B.2. Cotton plants were treated with triacontanol and its second messenger 9-$\beta$-L($\alpha$) adenosine.

III.B.3. Lipid analysis was carried out under stringent conditions.

III.B.3.a. Total lipids were extracted from the cotyledonary leaves of cotton.

III.B.3.b. Total glycolipids and phospholipids were separated by silicic acid column chromatography.

III.B.3.c. Individual glycolipids and phospholipids were separated by thin layer chromatography.
III.C. Growth regulator-induced changes in the physical properties of protoplast membranes and artificial bilayers were examined.

III.C.1. Protoplasts were isolated from cucumber (Cucumis sativus L.) fruits.

III.C.2. Fluorescent probes, DPH and pyrene were incorporated into the protoplast membranes.

III.C.3. Fluorescent probe incorporated protoplasts were treated with triacontanol and abscisic acid.

III.C.4. Fluorescence anisotropy of membrane-bound fluorophores was studied at different temperatures.

III.C.5. Fluorescence lifetime of membrane-bound pyrene was measured at different temperatures employing Nd-YAG laser of pico second pulses.

III.C.6. Microviscosities of the protoplast membranes at different temperatures were determined by two different methods.

III.C.7. Phospholipids were extracted from hen’s egg and purified.

III.C.8. Liposomes were prepared from purified egg phospholipids.

III.C.9. Fluorescence anisotropies of liposome-bound fluorophores, DPH and pyrene were studied at different temperatures.

III.D. Fatty acid analysis of the protoplast membrane lipids and liposomes were carried out by gas chromatographic method.

III.E. The results were subjected to statistical analysis.

IV RESULTS

IV.A. Growth regulators modulate growth and lipid composition in cotton.
IV.B. Triacontanol stimulates the vegetative growth of cotton plants.

IV.C. Triacontanol stimulates the accumulation of glycolipids and inhibits the levels of phospholipids.

IV.D. Triacontanol induced increase in total glycolipids is mainly due to the increased levels of monogalactosyldiacylglycerol (MGDG) and digalactosyldiacylglycerol (DGDG).

IV.E. Benzyladenine (BA) stimulates the accumulation of phosphatidylcholine (PC); BA and TRIA are independent in their action on the lipid composition in cotton.

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V.I. Increase in the protoplast membrane fluidity is also demonstrated by probing the membrane with two different fluorophores.

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V.N. The change in fatty acid composition by the growth regulators is not the only reason for change in microviscosity of the membrane: an evidence from fatty acid analysis of protoplasts.

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V.P. The change in membrane microviscosity appears to be due to change in both lipid:lipid and lipid:protein interactions.

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VI REFERENCES