# CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>18</td>
</tr>
<tr>
<td>III</td>
<td>32</td>
</tr>
</tbody>
</table>

## I. INTRODUCTION

## II. MATERIALS AND METHODS

1. Plant Material
2. Culture Media
3. Aseptic Techniques
4. Culture Techniques
5. Measurements of Growth
6. Chemical Analysis
7. Enzyme Assays
8. Photomicrography

## III. ESTABLISHMENT AND GROWTH OF DATURA, COTTON AND CASSIA ANther CALLUS AND SUSPENSION CULTURES IN COMPLETELY DEFINED MEDIA

Experiment 3-1: Establishment of *Datura* Anther Callus and Suspension Cultures on Completely Defined Medium.

Experiment 3-2: Growth Curve of *Datura* Cell Suspensions Cultured in Completely Defined Medium.

Experiment 3-3: Establishment of Cotton and Cassia Callus Cultures on Completely Defined Medium.

Experiment 3-4: Comparative Study of the Growth of Cassia and Cotton Tissue on Completely Defined Medium.

Discussion
CHAPTER IV
STUDIES ON POLYPHENOL SYNTHESIS IN TISSUE CULTURES OF DATURA AND CASSIA

Experiment 4-1 : Effect of Different Sugars on Growth and Polyphenol Production in Datura Cell Suspensions.

Experiment 4-2 : Effect of Sucrose Concentration on Total Phenol Production in Suspension Cultures of Datura

Experiment 4-3 : Effect of 2,4-dichlorophenoxyacetic acid on the Production of Polyphenols in Datura Cell Suspensions

Experiment 4-4 : Effect of kinetin on the Synthesis of Polyphenols in Datura Cell Suspension Cultures

Experiment 4-5 : Effect of Different Sources of Nitrogen on Growth and Polyphenol Synthesis in Suspension Cultures of Datura

Experiment 4-6 : Effect of L-Phenylalanine on Growth and Polyphenol Synthesis in Datura Cell Suspensions

Experiment 4-7 : Effect of L-Tyrosine on Growth and Total Phenol Production in Datura Cell Suspensions
Experiment 4-8: A Comparative Study on Growth and Production of Polyphenols in Datura Cells Grown on Solid and in Liquid Media

Experiment 4-9: Effect of Inoculum Size on Growth and Polyphenol Production in Callus Cultures of Datura

Experiment 4-10: Effect of Light and Dark on Growth and Production of Total Phenols in Datura Callus Cultures Grown on Two Auxin Concentrations

Experiment 4-11: Effect of Gibberellic Acid on Growth and Polyphenol Production in Callus Cultures of Datura in Presence and in Absence of Light

Experiment 4-12: Morphogenesis and Polyphenol Synthesis in Callus Cultures of Cassia Grown on Defined Medium

Discussion
STUDIES ON PEROXIDASE, INDOLEACETIC ACID OXIDASE AND PHENYLALANINE AMMONIA-LYASE (PAL) ENZYMES IN RELATION TO POLYPHENOL SYNTHESIS

Experiment 5-1: Effect of Sucrose Concentrations on Peroxidase and Indoleacetic Acid Oxidase (IAA Oxidase) Activities in Suspension Cultures of Datura

Experiment 5-2: Release of Peroxidase and Indoleacetic Acid Oxidase Enzymes into the Culture Medium as Influenced by Sucrose levels

Experiment 5-3: Changes in Peroxidase and Indoleacetic Acid Oxidase Activities in Relation to Polyphenol Synthesis as Influenced by 2,4-D Levels in Datura Cell Cultures

Experiment 5-4: Effect of 2,4-D on the Release of Peroxidase and Indoleacetic Acid Oxidase Enzymes into the Culture Medium

Experiment 5-5: Kinetin Effects on Peroxidase and Indoleacetic Acid Oxidase Activities in Datura Cell Cultures

Experiment 5-6: Release of Peroxidase and Indoleacetic Acid Oxidase Enzymes into the Culture Medium as Influenced by Kinetin Concentrations
Experiment 5-7: Comparison of Growth and Polyphenol Content in Cassia and Cotton Tissues

Experiment 5-8: Effect of Sucrose Concentrations on Polyphenol Accumulation and the Development of Phenylalanine Ammonia-Lyase (PAL) Activity in Cassia Callus Cultures

Experiment 5-9: 2,4-D Effects on Polyphenol Synthesis and the Development of Phenylalanine Ammonia-Lyase (PAL) Activity in Cassia Callus Cultures

Discussion

VI GENERAL DISCUSSION

SUMMARY

BIBLIOGRAPHY

---ooo00000---