

A TEXTBOOK OF

# Pharmacology I



- ◆ Dr. Somnath De
- ◆ Dr. Lakshmi Kanta Kanthal
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A TEXT BOOK OF

# PHARMACOLOGY-I

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( SEMESTER IV )

- The demand for a simple and standard book on Pharmacology-I for undergraduate students has been felt for a long time. I hope that this book will cater to their needs on this subject.
- The salient feat of the present book are
- Language and style has been kept lucid and simple for easy grasp for subject matter.
- Required details are provided wherever necessary.
- Diagrams are neatly drawn and illustrated for better understanding of the subject matter.
- Exhaustive revision questions have been given at the end of each chapter so that students can test the comprehension of the subject themselves.

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# SYLLABUS

## Course content

### UNIT - I

10 hours

- Introduction to pharmacology
- Historical landmarks and scope of pharmacology
- Nature and source of drugs
- Essential drugs concept.
- Routes of drug administration
- Agonists, antagonists (competitive and non-competitive), spare receptors, addiction, tolerance
- Dependence, tachyphylaxis, idiosyncrasy, allergy
- Pharmacokinetics: membrane transport,
- Pharmacokinetics: Absorption, distribution, metabolism and Excretion of drugs
- Enzyme induction, enzyme inhibition, kinetics of elimination.

### UNIT -II

10 hours

- Pharmacodynamics- principles and mechanisms of drug action.
- Receptor theories and classification of receptors, regulation of receptors.
- Drug receptors interactions signal transduction mechanisms,
- G-protein-coupled receptors, ion channel receptor, transmembrane enzyme linked receptors,
- Transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors.
- Dose response relationship, therapeutic index.
- Combined effects of drugs and factors modifying drug action.
- Adverse drug reactions, drug interactions.
- Drug discovery and clinical evaluation of new drugs -drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials.
- Pharmacovigilance.



### **UNIT -III**

**10 hours**

- Pharmacology of Drugs Acting On Peripheral Nervous System
- Organization and function of ANS.
- Neurohumoral transmission, co-transmission and classification of neurotransmitters.
- Parasympathomimetics
- Parasympatholytics
- Sympathomimetic
- Sympatholytics

### **UNIT -IV**

**08 hours**

#### **Pharmacology of Drugs Acting On Central Nervous System (CNS)**

- Neurohumoral transmission in the C.N.S.  
special emphasis on importance of various neurotransmitters like GABA, Glutamate, Glycine, serotonin, dopamine.
- General anaesthetics' and pre-anaesthetics.
- Sedatives and hypnotics
- Centrally acting muscle relaxants
- Anti-epileptics
- Alcohols and disulfiram.
- Drugs used in myasthenia gravis and glaucoma

### **UNIT - V**

**07 hours**

#### **Pharmacology of drugs acting on central nervous system**

- Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens.
- Drugs used in Parkinson's disease and Alzheimer's disease.
- CNS stimulants and nootropics.
- Opioid analgesics and antagonists.
- Drug addiction, drug abuse, tolerance and dependence

# **Novel Aspects on Chemistry and Biochemistry**

**Vol. 7**

*Edited by Prof. Begum Rokeya*



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# Analytical Method Development and Validation of Simultaneous Estimation of Ivermectin and Albendazole Byusing RP-HPLC

**Meruva Sathish Kumar<sup>a\*</sup>, Phani Deepika Polampalli<sup>a</sup>,  
Bandi Narendar<sup>a</sup>, S. Siva Prasad<sup>a</sup>  
and Rasapally Ramesh Kumar<sup>b</sup>**

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## ABSTRACT

A new method was established for simultaneous estimation of Ivermectin and Albendazole by RP-HPLC method. The chromatographic conditions were successfully developed for the separation of Ivermectin and Albendazole by using ACE C18 column (4.6×150 mm) 5μ, flow rate was 1.2 ml/min, mobile phase ratio was (70:30 v/v) methanol: Phosphate buffer pH 3 (pH was adjusted with ortho phosphoric acid), detection wavelength was 240 nm. The instrument used was WATERS HPLC Auto Sampler, Separation module 2690, photodiode array detector 996, Empower-software version-2. The retention times were found to be 2.344 mins and 3.284 mins. The % purity of Ivermectin and Albendazole was found to be 101.27% and 99.97% respectively. The system suitability parameters for Ivermectin and Albendazole such as theoretical plates and tailing factor were found to be 4668, 1.3 and 6089 and 1.2, the resolution was found to be 6.0. The analytical method was validated according to ICH guidelines (ICH, Q2 (R1)). The linearity study n Ivermectin and Albendazole was found in concentration range of 50 μg-250 μg and 5μg-50μg and correlation coefficient ( $r^2$ ) was found to be 0.999 and 0.999, % recovery was found to be 99.56% and 99.48%, % RSD for repeatability was 0.2 and 0.2, % RSD for intermediate precision was 0.2 and 0.1 respectively. The precision study was precise, robust, and repeatable. LOD value was 3.17 and 5.68, and LOQ value was 0.0172 and 0.2125 respectively. Hence the suggested RP-HPLC method can be used for routine analysis of Ivermectin and Albendazole in API and Pharmaceutical dosage form.

**Keywords:** *Ivermectin; albendazole; RP-HPLC.*

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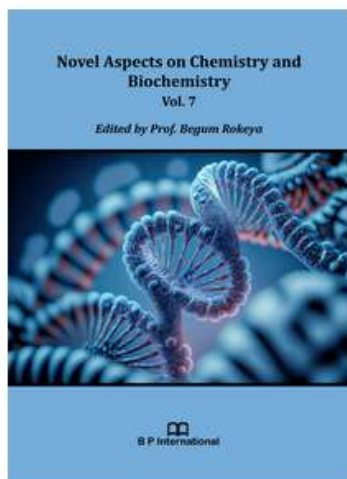
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## Analytical Method Development and Validation of Simultaneous Estimation of Ivermectin and Albendazole Byusing RP-HPLC

Meruva Sathish Kumar ; Phani Deepika Polampalli ; Bandi Narendar ; S. Siva Prasad ; Rasapally Ramesh Kumar

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### Abstract

A new method was established for simultaneous estimation of Ivermectin and Albendazole by RP-HPLC method. The chromatographic conditions were successfully developed for the separation of Ivermectin and Albendazole by using ACE C18 column (4.6×150 mm) 5μ, flow rate was 1.2 ml/min, mobile phase



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## CHAPTER 11

## Role of Andrographolide and its Analogues in Colon Cancer

Vinod Kumar Nelson<sup>1,\*</sup>, Chitikela P Pullaiah<sup>2,#</sup>, Subhash Chandra Bose Penjuri<sup>3</sup>, Geetha Birudala<sup>4</sup>, Swarnalatha Gundlapalli<sup>5</sup>, Saijyothi Ausali<sup>3</sup>, Sasikala Chinnappan<sup>6</sup>, Sandeep Kanna<sup>7</sup>, Venkataramana Kanuma<sup>8</sup> and Mohamed Omar Mahmoud Idriss<sup>1</sup>

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**Abstract:** Colon cancer is the third most frequently occurring and second most death-causing disease in the entire world. Even though there is rapid development in the treatment, there is a high increase in the death rate of colon cancer. The current treatments available for colon cancer are not specific and are mainly associated with numerous toxic effects. Hence, developing novel drug treatments with desired characteristics to treat colon cancer patients **is in huge demand**. In the case of novel drug discovery for various kinds of dreadful diseases like cancer and neurodegenerative diseases, medicinal and plant-derived components also play a significant role. Here, in this review, we have chosen andrographolide, a potent bioactive compound that shows multiple pharmacological actions such as anti-inflammatory, antiviral, antioxidant, hepatoprotective and neuroprotective effects. In addition, it also shows anticancer effects against various types of tumours along with colon cancer. In this review, we

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# Vinod Kumar Nelson and Chitikela P Pullaiah have equal contribution

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### Abstract

Colon cancer is the third most frequently occurring and second most deathcausing disease in the entire world. Even though there is rapid development in the treatment there is a high increase in the death rate of colon

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