

Semester	Course	Hours	Credit	Sub. Code	Marks		
					Internal	External	Total
III	MBE 3	6	4	18KP3BELB3	25	75	100

PHARMACOGNOSY

UNIT I:

Introduction; History, definition and scope of Pharmacognosy, Traditional and Alternative system of medicine (Ayurvedha, Unani, Homeopathic, Siddha, Acupuncture and Yoga.) Collection and processing of Herbal drug.

PREPARED BY

UNIT-I:

Dr. R.SAGAYA GIRI

Assistant Professor in Botany

K.N. Government Arts College for Women (Autonomous),
Thanjavur -613 007.

UNIT-IV :

Dr. V.LATHA

Assistant Professor in Botany

K.N. Government Arts College for Women (Autonomous),
Thanjavur -613 007.

UNIT-I

PHARMACOGNOSY

DEFINITION

Pharmacognosy is systematic study of these crude drugs obtained from natural origin like plant, animal and minerals. Pharmacognosy can be defined as branch of science which involves detail study of drugs obtained from natural origin including name, habitat, collection, cultivation, macroscopy, microscopy, physical properties, chemical constituents, therapeutic actions, uses and adulterants. The word pharmacognosy is derived from two words, *pharmakon* means medicine (drug) and *gignosco* means to acquire knowledge of something.

Prof. John Schimidt coined the term pharmacognosy in his book *Lehrbuch der MateriaMedica*. Earlier subject was known as 'Materiamedica'. It includes systematic study of crude drugs from nature. Study of pharmacognosy includes the history, distribution, cultivation, collection, processing and preservation. It also includes the study of physical, chemical and structural characters and the safe uses of crude drugs. In short, pharmacognosy is study of drugs from natural origin. Drugs from natural origin can be obtained by plants, animals (terrestrial as well as marine) and minerals.

HISTORY AND DEVELOPMENT OF PHARMACOGNOSY

The history of pharmacognosy is as old as human existence. To know the future one should know the past. The word 'drug' is derived from Latin term *Droog* means dried, when dried plants were commonly used as medicine. Broadly, history of pharmacognosy can be classified into three major stages. First stage before eighteenth century, very few documents and recorded evidences are available showing use of natural products by human. Second stage involves nineteenth century, which is the time when basic subject has evolved. In this century, the name pharmacognosy came into practice. Initially the subject was more likely to descriptive botany of medicinal plants. But as the time progress, it changes the course and encompasses extraction, isolation and other advances techniques. In twentieth century, which may be considered as third stage of development, series of discoveries resulted in complete metamorphosis of the subject. From last two decades, pharmacognosy is studied in more systematic manner. As herbal wave continue to sweep the world, importance of natural product is at the pinnacle. People are expecting natural products to fit in modern framework. As a result of this there are series of new herbal formulations in the market.

The ancient Egyptians documented their knowledge about medicine on paper made from *Cyperusaquaticus* commonly called aquatic sage or papyrus. *Papyrus Ebers* (around 1500 BC), *Berlin Papyrus*, *Edwin Smith Paprus*, *KahunMedicak Papyrus* are some of the oldest handbooks which contain information of illness and treatments. In ancient Egypt and Mesopotamia clay tablets were used to document knowledge of drugs which are dating back to 3000 BC. Ancient India, information about drugs was documented in several Ayurvedic texts which still exist. Apart from *Atharvaveda* there are several books like *CharakSamhita*, *SushrutSamhita*, *AstangHridaya*, *MadhavNidan* and *BhavaPrakash*.

In eighteenth century, pharmacognosy was much closely related to botany. In old days, drugs from natural origin were used in crude form as powder or decoction. Later in nineteenth century, development in science has expanded arena of pharmacognosy. Now a day's pharmacognosy has become a kind of multidisciplinary subject which embraces phytochemistry, analytical pharmacognosy, pharmacotherapy, medicinal plant biotechnology, herbal formulations and nutraceuticals. **Zoopharmacognosy** is branch of pharmacognosy which involves observation of animal behavior for discovery and development of new drugs. Now a day's drug from natural origin are studied, formulated and regulated in the framework of modern medicine.

1.Sumerians and Akkadians (3rd millennium BC) 2.Egyptians (Ebers papyrus, 1550 BC) 3.Hippocrates (460-377 BC) "The Father of Medicine" 4.Dioscorides (40-80 AD) "De MateriaMedica" (600 medicinal plants) 5.The Islamic era IbnAltabari (770-850) "الحكمهفردوس" 6.Ibn Sina (980-1037) "الطبفيالقانون" 7.Ibn Albitar (1148-1197) "والأغذيةالأدويةلمفرداتالجامع" 8.The era of European exploration (16th and 17th century) 9.The 18th century, Pharmacognosy: oJohann Adam (1759-1809) :surgeon and ophthalmologist" 10.In 1811 his Lehrbuch der MateriaMedica was published, which was a work on medicinal plants and their properties.11. Linnaeus (naming and classifying plants) 12.At the end of the 18th century, crude drugs were still being used as powders, simple extracts, or tinctures 13.The era of pure compounds (In 1803, a new era in the history of medicine) 14.f Isolation of morphine from opium f Strychnine (1817) f Quinine and caffeine (1820) f Nicotine (1828) f Atropine (1833) f Cocaine (1855) 15.In the 19th century, the chemical structures of many of the isolated compounds were determined 16.In the 20th century, the discovery of important drugs from the animal kingdom, particularly hormones and vitamins. •microorganisms have become a very important source of drugs

SCOPE OF PHARMACOGNOSY

Pharmacognosy is critical in development of different disciplines of science. A pharmacognosist should possess a sound knowledge of the terms used to describe the vegetable and animal drugs as covered under botany and zoology, respectively. The knowledge of plant taxonomy, plant breeding, plant pathology and plant genetics is helpful in the development of cultivation technology for medicinal and aromatic plants. Plant - chemistry (phytochemistry) has undergone significant development in recent years as a distinct discipline. It is concerned with the enormous variety of substances that are synthesized and accumulated by plants and the structural elucidation of these substances. Extraction, isolation, purification and characterization of phytochemicals from natural sources are important for advancement of medicine system. The knowledge of chemotaxonomy, biogenetic pathways for formation of medicinally active primary and secondary metabolites, plant tissue culture and other related fields is essential for complete understanding of Pharmacognosy. One should have the basic knowledge of biochemistry and chemical engineering is essential for development of collection, processing and storage technology of crude drugs.

1. Pharmacognosy is important branch of pharmacy which is playing key role in new drug discovery and development by using natural products. Pharmacognosy has given many leads for new drug discovery and development.

2. It is an important link between modern medicine systems (allopathy) and traditional system of medicine. It is part medicinal system which is affordable as well as accessible to common man. As part of integrative system of medicine, pharmacognosy can help to increase effectiveness of modern medicine system.
3. It is acting as bridge between pharmacology, medicinal chemistry and pharmacotherapeutics and also pharmaceutics. It also bridges pharmaceutics with other pharmacy subjects.
4. More than 60 percent of world population is still using natural product for their primary healthcare needs. Pharmacognosy can provide safe and effective drugs in combination with modern medicine system.
5. Pharmacognosy includes knowledge about safe use of herbal drugs including toxicity, side effects, drug interaction thereby increasing effectiveness of modern medicine.
6. Pharmacognosy is an important link between pharmacology and medicinal chemistry. As a result of rapid development of phytochemistry and pharmacological testing methods in recent years, new plant drugs are finding their way into medicine as purified phytochemicals, rather than in the form of traditional galenical preparations.
7. Pharmacognosy is the base for development of novel medicines. Most of the compounds obtained from natural product serve as prototype or base for development of new drug which are more active and less toxic.
8. By means of pharmacognosy, natural products can be dispensed, formulated and manufactured in dosage forms acceptable to modern system of medicine.
9. There are vast number of plant and animal species which are not studied systematically.
10. Development of pharmacognosy also leads to development of botany, taxonomy, plant biotechnology, plant genetics, plant pathology, pharmaceutics, pharmacology, phytochemistry and other branches of science.

TRADITIONAL AND ALTERNATIVE SYSTEM OF MEDICINES IN INDIA

Traditional medicine refers to health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based **medicines**, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, diagnose and prevent illnesses or maintain well-being.

Alternative medicine is a term that describes medical **treatments** that are used instead of traditional (mainstream) **therapies**. Some people also refer to it as “integrative,” or “complementary” **medicine**. More than half of adults in the United States say they use some form of **alternative medicine**

Different types of Alternative system of medicines in India

1. **Ayurveda:** The Ayurvedic System of Medicine evolved nearly 5000 years ago (3000 BC). The word Ayurveda means ‘Science of Life’ and employs treatment modalities, such as purification, palliation, prescription of various diets, exercises and the avoidance of disease causing factors.

2. **Unani Medicine:** Unani Medicine originated in the Arab world. Unani medicine treats a patient with diet, pharmacotherapy, exercise, massages and surgery. It was introduced in India around the 10th century AD.
3. **Homeopathy:** The word 'Homeopathy' is derived from the Greek words, 'Homois' meaning 'similar' and 'pathos' means 'suffering'. It originated in Germany and was introduced in India around 1810-1839. Homeopathy is based on the **law of healing- "similia Similibus Curantur"** which means 'likes are cured by likes'. It uses highly individualized remedies selected to address specific symptoms or symptom profiles.
4. **Siddha:** This system has originated in India and is amongst the oldest systems of medicine in the country. It takes into account the patient, his/her surroundings, age, sex, race, habitat, diet, appetite, physical condition etc. to arrive at the diagnosis. Siddha System **uses minerals, metals and alloys and drugs and inorganic** compounds to treat the patients. Unlike most T&CM, this system is largely therapeutic in nature. Siddha literature is in Tamilnadu.
5. **Sowa-Ripa:** The word combination means the 'science of healing' and is considered one of the oldest living and well-documented medical traditions of the world. It **originated from Tibet** and is widely practiced in India, Nepal, Bhutan, Mongolia and Russia.
6. **Acupuncture:** a system of complementary medicine in which fine needles are inserted in the skin at specific points along what are considered to be lines of energy (meridians), used in the treatment of various physical and mental conditions.
7. **Yoga & Naturopathy:** The concepts and practices of Yoga are reported to have originated in India. Naturopathy or the naturopathic medicine is a drugless, non-invasive system of medicine imparting treatments with natural elements based on the theories of vitality, toxemia and the self-healing capacity of the body as well as the principles of healthy living. The common naturopathy modalities include counseling, diet and fasting therapy, mud therapy, hydrotherapy, massage therapy, acupressure, acupuncture, magnet therapy and yoga therapy.

1. AYURVEDA SYSTEM OF MEDICINE

Definition

Ayurveda, is a natural system of medicine, originated in India more than 3,000 years ago. The term *Ayurveda* is derived from the Sanskrit words *ayur* (life) and *veda* (science or knowledge). Thus, Ayurveda translates to *knowledge of life*. Based on the idea that disease is due to an imbalance or stress in a person's consciousness, Ayurveda encourages certain lifestyle interventions and natural therapies to regain a balance between the body, mind, spirit, and the environment. Ayurveda treatment starts with an internal purification process, followed by a special diet, herbal remedies, massage therapy, yoga, and meditation.

The concept of Ayurveda

The basic foundation is the fundamental doctrine according to which whatever present in the Universe (macrocosm) should be present in the body (the microcosm). It has been conceptualized that the universe is composed of five basic elements named *Prithvi* (Earth), *Jala* (Water), *Teja* (Fire), *Vayu* (Air) and *Akash* (Space/Ether). The human body is derived from them

in which these basic elements join together to form what are known as ‘Tridoshas’ (humors) named as *Vata, Pitta and Kapha*. These humors govern and control the basic psycho-biological functions in the body. In addition to these three humors, there exist seven basic tissues (*sapthadhatus*)- *Rasa, Rakta, Mamsa, Meda, Asthi, Majja* and *Shukra*- and three waste products of the body (*mala*) such as faeces, urine and sweat. Healthy condition of the body represents the state of optimum equilibrium among the three doshas. Whenever this equilibrium is disturbed due to any reason- disease condition results. The growth and development of the body components depend on nutrition provided in the form of food. The food is conceptualized to be composed of the basic five elements mentioned above. Hence it is considered to be the basic source material to replenish or nourish the different components of the body after the action of bio-fire (*Agni*).

Diagnosis

The diagnosis is always done by considering the patient as a whole object to be examined. The physician takes a careful note of the patient's internal physiological characteristics and mental disposition. He also studies other factors like- the affected bodily tissues, humors, the site at which the disease is located, patient's resistance and vitality, his daily routine, dietary habits, the gravity of clinical conditions, condition of digestion and details of personal, social, economic and environmental situation of the patient. The general examination is known as ten-fold examination- through which a physician examines the following parameters in the patient- 1. Psychosomatic constitution, 2. Disease susceptibility, 3. Quality of tissues, 4. Body build, 5. Anthropometry, 6. Adaptability, 7. Mental health, 8. Digestive power, 9. Exercise endurance and 10. Age. In addition to this, examination of pulse, urine, stool, tongue, voice and speech, skin, eyes and overall appearance is also carried out (Kurup, 2002).

Treatment aspects

The treatment lies in restoring the balance of disturbed humors (doshas) through regulating diet, correcting life-routine and behavior, administration of drugs and resorting to preventive non-drug therapies known as ‘Panchkarma’ (Five process) and ‘*Rasayana*’ (rejuvenation) therapy. Before initiating treatment many factors like the status of tissue and end products, environment, vitality, time, digestion and metabolic power, body constitution, age, psyche, body compatibility, type of food consumed are taken in to consideration.

Dietics in Ayurveda

Ayurveda lays great emphasis on the diet regulation. According to Ayurvedic concepts food has great influence over physical, temperamental and mental development of an individual. The food is the basic material for the production of the body and life supporting vital matter known as *Rasa*. The *rasa* is converted to body components and supports all types of life activities.

2.SIDDHA SYSTEM OF MEDICINE

The term ‘Siddha’ is derived from the root word ‘Siddhi’ which means ‘an object to be attained’ or ‘perfection’. The Siddha system of medicine owes its origin to medicinal ideas and

practices of a class of Tamil sages called the Siddhars – ‘perfected’ or ‘holy immortals’. They had firm faith in the ‘deathless’ physical body being in tune with the spiritual immortal ‘soul’,_

Basic Human Principles – 96 Thathuvas Five Elements

- The primordial elements are called *panchamahabootham*, namely *mann*(earth), *neer*(water), *thee* (fire), *katru*(air) and *aagayam*(space)

I. Three Humours

1. To regulate the living body easily the five primordial elements were concised into three humours namely *vazhi*(vadham or air), *azhal* (pittam or heat) and *Iyyam* (kapha or cold), When humours are in natural equilibrium and harmony, a person enjoys the best of health.
2. The first one third of one’s life is considered as *vazhi*period where a person grows physically, psychologically, emotionally, spiritually, etc.
3. The second one third of ones life is considered as *azhal*period where life is considered to be in the maintenance phase in physiological condition.
4. Finally, the last one third of one’s life is physiologically attributed to *Iyyam*period or the destructive/senile phase of one life.

II. Five Sheaths (Kosham)

- The nature of being human encompasses physical and psychological aspects that functions as one holistic system.
- The *kosham system* refers to different aspects as layers of subjective experience. They are *paruvaudambu* – *annamayakaosham*(food- apparent-physical sheath), *valiudmambupranaamayakosham* (air-apparent-sheath), **manaudambu-manomayakosham** (mind-apparent sheath), *arivudambu* – *vijnanamayakosham* (wisdom-apparent-Intellectual sheath) and *inbaudambu* –*anandamayakosham* (bliss-arent sheath).

III. Ten Pranic Air (Vayus)

- These ancillary vayus are not just responsible for physiological function but also contribute to the psychological and spiritual component.
- **Siddha Therapy** :The foremost substance given for an imbalance of three humours or illness is of herbal origin.

3.HOMEOPATHY SYSTEM OF MEDICINE

Homeopathy is an age-old system of healing, with its discovery dating back to 1796. It was discovered by a German doctor, Dr. Samuel Hahnemann, in his discontentment with the then medical practices and lack of cures. Homeopathy is a nature-based system that treats holistically as well as individually, by way of stimulating one’s own immunity capable to fight an illness.

Homeopathy In India

- The World Health Organization (WHO) data suggested that *Homeopathy is currently the second largest system of medicine in the world.*
- Homeopathy in India Homeopathy came to India in 1810 when Dr. John Martin Honigberger, a French traveler who learnt homeopathy from Dr. Hahnemann, visited India and treated patients.
- He treated Maharaja Ranjit Singh, the-then-ruler-of Punjab, with a homeopathic remedy Dulcamara while he suffered from paralysis of the vocal cords.
- BabuRajendraLalDutt (1818-1889) may be called the Father of Indian Homeopathy.

Benefits of Homeopathy

- The principles that Homeopathy works on include such nature-based, pragmatic facts, like treating a person holistically, through a single, simple medicine,
- problems like piles, tonsillitis, sinusitis, menstrual disorders, life style diseases and common mental and emotional disorders. prepared in a dynamic manner, and prescribed in a dosage that is just enough to stir up the self-healing mechanism of your own body.
- One of the potential aspects of Homeopathy is that it addresses these conditions in a patient successfully, that too with single, or at the most with two medicines.
- Homeopathy treats the multi-morbid person as a whole, which works on bringing back the biological functions in order, thereby addressing them all, and thus helping the patient holistically and simultaneously improving his/her general well-being.
- Homeopathy has been covered under AYUSH Mission. Homeopathy medicine system due to its low cost is a better alternative medication system. Homeopathy has proven strength in the treatment of allergic disorders, skin diseases, children's problems, several so-called surgical

4.UNANI SYSTEM OF MEDICINE:

Unani medicine, also called Unanittibb, Arabian medicine, or Islamic medicine, a traditional system of healing and health maintenance observed in South Asia. The origins of Unani medicine are found in the doctrines of the ancient Greek physicians Hippocrates and Galen. It is a comprehensive medical system, which meticulously deals with the various states of health and disease.

Principles of Unani Medicine

- Temperament (Mizaj) of a patient is given great importance in diagnosis and treatment of disease with natural remedies derived mostly from plants.
- Temperament is also taken into consideration for identifying the most suitable diet and lifestyle for promoting the health of particular individual.
- Unani system of Medicine considers the entire universe including human beings, disease, drugs, environmental factors etc. to be intrinsically defined by four primary qualities – Hot, Cold, Dry and Wet.

- These qualities are reflected in all the basic concepts of Unani System of Medicine such as elements, temperament and four humours, which are used for describing and correlating human health and disease with promotive and curative factors e.g. diet and drugs.
- While diagnosing and treating a disease, Unani System of Medicine looks holistically into the overall physical, mental and spiritual aspects of a person.
- Unani System of Medicine has the importance of psychiatric treatment in the management of various diseases. Central Council for Research in Unani Medicine (CCRUM) under the Ministry of AYUSH, Government of India has, over the past three and a half decades, emerged as the leading research organization in Unani Medicine. India has emerged as the world leader in Unani System of Medicine.

5.NATUROPATHY SYSTEM OF MEDICINE

Naturopathy is a traditional system of healing based upon natural principles that govern life, living and health. The references of such principles can be found in the scriptures like Vedas, Upanishads and Epics like Ramayana and Mahabharata. Naturopathy is called a drugless system of healthcare based on well-founded philosophy and practices. Its main emphasis is on holistic approach to health, covering not only physical but also the mental, moral and spiritual aspects.

Salient Feature Of Naturopathy

- Naturopathy practice educates the patient in health matters. Naturopathic practices are easy to follow and can be integrated systematically in the daily routine of people.
- Naturopathy believes that all living beings in nature stay healthy as long as they are tuned with the natural laws.
- Naturopathy is recognized and promoted as an independent system of healthcare under the ambit of AYUSH.
- Naturopathy believes that entire universe is composed of five basic elements Panchamahabhutas (Ether (akasha), Air (vayu), Fire (Agni), water (jala) and Earth (prithvi) and so is the human body.
- Imbalance of these elements creates disease. The diseases can, therefore be treated by the appropriate use of these elements and such treatments are called PrakritikChikitsa or Naturopathy.

Therapeutic Modalities Used in Naturopathy:

The main therapeutic modalities of Naturopathy employed for preventive promotive and curative purpose are following

- UpvasChikitsa (Fasting Therapy)
- AaharChikitsa (Diet Therapy)
- MittiChikitsa (Mud Therapy)
- JalaChikitsa (Hydro Therapy)
- MalishChikitsa (Massage Therapy)

- Surya KiranChikitsa (Helio Therapy)
- VayusChikitsa (Air Therapy)
- Yoga Chikitsa (Yoga Therapy)

6.ACUPUNCTURE SYSTEM OF MEDICINE

Acupuncture is an ancient Chinese medicine-based approach to treating a variety of conditions by triggering specific points on the skin with needles. [Paul Kempisty](#), licensed acupuncturist with a MS in traditional Oriental medicine, explains, “[Acupuncture is] a minimally invasive method to stimulate nerve-rich areas of the skin surface in order to influence tissues, gland, organs, and various functions of the body.”

“Each acupuncture needle produces a tiny injury at the insertion site, and although it’s slight enough to cause little to no discomfort, it’s enough of a signal to let the body know it needs to respond,” Kempisty says. “This response involves stimulation of the immune system, promoting circulation to the area, wound healing, and pain modulation.” Contemporary research on acupuncture relies mainly on this theory.

What’s the philosophy behind acupuncture?

The Chinese philosophy behind acupuncture is a bit more complicated, as the ancient practice isn’t traditionally based in science and medicine. “They believed that the human body was filled with and animated by an invisible life-giving force which they called ‘qi’ (pronounced ‘chee’) and when the qi was flowing well and going to all the right places, then a person would experience good mental and physical health. When the qi was flowing incorrectly (blocked or deficient) that would result in illness,” says Kempisty.

The [concept of qi](#) isn’t too out there — think of it as your body’s natural inner workings. Sometimes you’re more prone to illness when feeling stressed or anxious. When you’re relaxed and healthy, your body physically reflects that too. After all, your mood, mental health, and general well-being *do* affect your physical health. Thus, acupuncture aims to assist people in achieving balance, or qi, and, as a result, provide relief for many ailments.

Acupressure points

- a. For menstrual cramps, massage the hollow of your inner ankle with a little pressure.
- b. For insomnia, rub clockwise, then counter-clockwise circles in the spot between your eyebrows.
- c. For lower back pain, press the space between the middle of your nose and upper lip.
- d. For general headaches, try pressure on the muscle between your thumb and index finger.

What is acupuncture used to treat?

Acupuncture involves the insertion of very thin needles through your skin at strategic points on your body. A key component of **traditional Chinese medicine**, acupuncture is most commonly used to treat **pain**. Increasingly, it is being used for overall wellness, including stress

What should you not do after acupuncture?

Stay Away from Alcohol and Coffee. After acupuncture, the body will release toxins that need to be flushed out. Hence, drinking water is the key to eliminate toxins from the body. Both alcohol and coffee dehydrate the body, and **they will not** help in removing the toxins.

What are the side effects of acupuncture?

The most common side effects of acupuncture include **bleeding, soreness, or bruising** at the site of needle insertion. Other risks of acupuncture include **dizziness**, fainting, local internal **bleeding**, convulsions, hepatitis B, dermatitis, nerve damage, increased **pain**, and very rarely injury to an internal organ.

7. YOGA SYSTEM OF MEDICINE

Yoga is a healing system of theory and practice, its a combination of breathing exercises, physical postures, and meditation, practiced for over 5,000 years. A survey released in May 2004 by the National Center for Complementary and Alternative Medicine focused on who used complementary and alternative medicine (CAM), what was used, and why it was used in the United States by adults age 18 years and over during 2002.

According to this survey, Yoga was the 5th most commonly used CAM therapy (2.8%) in the United States during 2002. Yoga is considered a mind-body intervention that is used to reduce the health effects of generalized stress. Yoga is believed to calm the nervous system and balance the body, mind, and spirit. It is thought by its practitioners to prevent specific diseases and maladies by keeping the energy meridians open and life energy (Parana) flowing.

Yoga is usually performed in classes, sessions are conducted at least once a week and for approximately 45 minutes. Yoga has been used to lower blood pressure, reduce stress, and improve coordination, flexibility, concentration, sleep, and digestion.

What is yoga used to treat?

Because of its concentration on **mind and body** integration, yoga therapy is also used to address many physical health issues. It has been effectively used to treat back pain, heart conditions, asthma, chronic fatigue, hypertension, multiple sclerosis, and side effects of chemotherapy.

Benefits of practising yoga. ...

- ✓ Improves your **flexibility**. ...
- ✓ Builds muscle **strength**. ...
- ✓ Perfects your **posture**. ...
- ✓ Prevents cartilage and joint breakdown. ...

- ✓ Protects your spine. ...
- ✓ Better your bone health. ...
- ✓ Increases your blood flow. ...
- ✓ Drains your lymphs and boosts immunity.
- ✓ To keep your joints healthy. ...
- ✓ powerful mindfulness practice. ...
- ✓ reduces stress. ...
- ✓ lowers blood pressure. ..
- ✓ to make healthier life choices.

COLLECTION AND PROCESSING OF HERBAL DRUGS

COLLECTION OF HERBAL DRUGS

Collection is the most important step which comes after cultivation. Drugs are collected from wild or cultivated plants and the tasks for collection depends upon the collector, whether he is a skilled or unskilled labour. Drugs should be collected when they contain maximum amount of constituents in a highly scientific manner. The season at which each drug is collected is so important, as the amount, and sometimes the nature, of the active constituents could be changed throughout the year. For example, Rhubarb is collected only in summer seasons because no anthraquinone derivatives would be present in winter season but anthranols are converted to anthraquinones during summer. Not only the season but also the age of the plant should be taken in to great consideration since it governs not only the total amount of active constituents produced in the plants but also the proportions of the constituents of the active mixture. High proportion of pulegone in young plants of peppermint will be replaced by Mentone and menthol and reduction in the percentage of alkaloids in datura as the plant ages are examples of the effect of aging in plants.

Moreover the composition of a number of secondary plant metabolites varies throughout the day and night, and it is believed that some inter conversion would happen during day and night.

Generally the leaves are collected just before the flowering season, e.g. *vasaka*, *digitalis*, etc., at this time it is assumed that the whole plant has come to a healthy state and contain an optimum amount of metabolites, flowers are collected before they expand fully, e.g. clove, saffron, etc., and underground organs as the aerial parts of plant cells die, e.g. liquorice, *rauwolfia*, etc. Since it is very difficult to collect the exact medicinally valuable parts, the official pharmacopoeia's has fixed certain amount of foreign matter that is permissible with drug. Some fruits are collected after their full maturity while the

others are collected after the fruits are ripe. Barks are usually collected in spring season, as they are easy to separate from the wood during this season. The barks are collected using three techniques, felling (bark is peeled off after cutting the tree at base), uprooting (the underground roots are dug out and barks are collected from branches and roots) and coppicing (plant is cut one metre above the ground level and barks are removed).

Underground parts should be collected and shaken, dusted in order to remove the adhered soil; water washing could be done if the adhered particles are too sticky with plant parts. The unorganized drugs should be collected from plants as soon as they ooze out, e.g. resins, latex, gums, etc. Discoloured drugs or drugs which were affected by insects should be rejected.

HARVESTING OF HERBAL DRUGS

Harvesting is an important operation in cultivation technology, as it reflects upon economic aspects of the crude drugs. An important point which needs attention over here is the type of drug to be harvested and the pharmacopoeial standards which it needs to achieve. Harvesting can be done efficiently in every respect by the skilled workers. Selectivity is of advantage in that the drugs other than genuine, but similar in appearance can be rejected at the site of collection. It is, however, a laborious job and may not be economical. In certain cases, it cannot be replaced by any mechanical means, e.g. digitalis, tea, vinca and senna leaves. The underground drugs like roots, rhizomes, tubers, etc. are harvested by mechanical devices, such as diggers or lifters. The tubers or roots are thoroughly washed in water to get rid of earthy-matter. Drugs which constitute all aerial parts are harvested by binders for economic reasons. Many a times, flowers, seeds and small fruits are harvested by a special device known as seed stripper. The technique of beating plant with bamboos is used in case of cloves. The cochineal insects are collected from branches of cacti by brushing. The seaweeds producing agar are harvested by long handled forks. Peppermint and spearmint are harvested by normal method with mowers, whereas fennel, coriander and caraway plants are uprooted and dried. After drying, either they are thrashed or beaten and the fruits are separated by winnowing. Sometimes, reaping machines are also used for their harvesting.

DRYING OF CRUDE DRUGS

Before marketing a crude drug, it is necessary to process it properly, so as to preserve it for a longer time and also to acquire better pharmaceutical elegance. This processing includes several operations or treatments, depending upon the source of the crude drug (animal or plant) and its chemical nature. Drying consists of removal of sufficient moisture content of crude drug, so as to improve its quality and make it resistant to the growth of microorganisms. Drying inhibits partially enzymatic reactions. Drying also facilitates pulverizing or grinding of a crude drug. In certain drugs, some special methods are required to be followed to attain specific standards, e.g. fermentation in case of *Cinnamomum zeylanicum* bark and gentian roots. The

slicing and cutting into smaller pieces is done to enhance drying, as in case of glycyrrhiza, squill and calumba. The flowers are dried in shade so as to retain their colour and volatile oil content. Depending upon the type of chemical constituents, a method of drying can be used for a crude drug. Drying can be of two types - (1) natural (sun drying) and (2) artificial.

1. Natural Drying (Sun-Drying)

In case of natural drying, it may be either direct sun-drying or in the shed. If the natural colour of the drug (digitalis, clove, senna) and the volatile principles of the drug (peppermint) are to be retained, drying in shed is preferred. If the contents of the drugs are quite stable to the temperature and sunlight, the drugs can be dried directly in sunshine (gum acacia, seeds and fruits).

2. Artificial Drying

Drying by artificial means includes drying the drugs in (a) an oven; i.e. tray-dryers; (b) vacuum dryers and (c) spray dryers.

a. Tray dryers

The drugs which do not contain volatile oils and are quite stable to heat or which need deactivation of enzymes are dried in tray dryers. In this process, hot air of the desired temperature is circulated through the dryers and this facilitates the removal of water content of the drugs (belladonna roots, cinchona bark, tea and raspberry leaves and gums are dried by this method).

b. Vacuum dryers

The drugs which are sensitive to higher temperature are dried by this process, e.g. Tannic acid and digitalis leaves.

c. Spray dryers

Few drugs which are highly sensitive to atmospheric conditions and also to temperature of vacuum-drying are dried by spray-drying method. The technique is followed for quick drying of economically important plant or animal constituents, rather than the crude drugs. Examples of spray drying are papaya latex, pectin, tannins, etc.

GARBLING (DRESSING)

The next step in preparation of crude drug for market after drying is garbling. This process is desired when sand, dirt and foreign organic parts of the same plant, not constituting drug are required to be removed. This foreign organic matter (extraneous matter) is removed by several ways and means available and practicable at the site of the preparation of the drugs. If the extraneous matter is permitted in crude drugs, the quality of drug suffers and at times, it does not pass pharmacopoeia limits. Excessive stems in case of lobelia and stramonium need to be

removed, while the stalks, in case of cloves are to be deleted. Drugs constituting rhizomes need to be separated carefully from roots and rootlets and also stem bases. Pieces of iron must be removed with the magnet in case of castor seeds before crushing and by shifting in case of vinca and senna leaves. Pieces of bark should be removed by peeling as in gum acacia.

PACKING OF CRUDE DRUGS

The morphological and chemical nature of drug, its ultimate use and effects of climatic conditions during transportation and storage should be taken into consideration while packing the drugs. Aloe is packed in goat skin. Colophony and balsam of tolu are packed in kerosene tins, while asafoetida is stored in well closed containers to prevent loss of volatile oil. Cod liver oil, being sensitive to sun-light, should be stored in such containers, which will not have effect of sunlight, whereas, the leaf drugs like senna, vinca and others are pressed and baled. The drugs which are very sensitive to moisture and also costly at the same time need special attention, e.g. digitalis, ergot and squill. Squill becomes flexible; ergot becomes susceptible to the microbial growth, while digitalis loses its potency due to decomposition of glycosides, if brought in contact with excess of moisture during storage. Hence, the chemicals which absorb excessive moisture (desiccating agents) from the drug are incorporated in the containers. Colophony needs to be packed in big masses to control autooxidation. Cinnamon bark, which is available in the form of quills, is packed one inside the other quill, so as to facilitate transport and to prevent volatilization of oil from the drug.

The crude drugs like roots, seeds and others do not need special attention and are packed in gunny bags, while in some cases bags are coated with polythene internally. The weight of certain drugs in lots is also kept constant e.g. Indian opium.

STORAGE OF CRUDE DRUGS

Preservation of crude drugs needs sound knowledge of their physical and chemical properties. A good quality of the drugs can be maintained, if they are preserved properly. All the drugs should be preserved in well closed and, possibly in the filled containers. They should be stored in the premises which are water-proof, fire proof and rodent-proof. A number of drugs absorb moisture during their storage and become susceptible to the microbial growth. Some drugs absorb moisture to the extent of 25% of their weight. The moisture, not only increases the bulk of the drug, but also causes impairment in the quality of crude drug. The excessive moisture facilitates enzymatic reactions resulting in decomposition of active constituents e.g. digitalis leaves and wild cherry bark. Gentian and ergot receive mould infestation due to excessive moisture. Radiation due to direct sun-light also causes destruction of active chemical constituents, e.g. ergot, cod liver oil and digitalis. Form or shape of the drug also plays very important role in preserving the crude drugs. Colophony in the entire form (big masses) is preserved nicely, but if stored in powdered form, it gets oxidized or loses solubility in petroleum ether. Squill, when stored in powdered form becomes hygroscopic and forms rubbery

mass on prolonged exposure to air. The fixed oil in the powdered ergot becomes rancid on storage. In order to maintain a good quality of ergot, it is required that the drug should be defatted with lipid solvent prior to storage. Lard, the purified internal fat of the abdomen of the hog, is to be preserved against rancidity by adding siam benzoin. Atmospheric oxygen is also destructive to several drugs and hence, they are filled completely in well closed containers, or the air in the container is replaced by an inert gas like nitrogen; e.g. shark liver oil, papain, etc.

Apart from protection against adverse physical and chemical changes, the preservation against insect or mould attacks is also important. Different types of insects, nematodes, worms, moulds and mites infest the crude drugs during storage. Some of the more important pests found in drugs are Coleoptera (*Stegobium paniceum* and *Calandrum granarium*), Lepidoptera (*Ephestia kuehniella* and *Tinea pellionella*), and Archnida or mites (*Tyroglyphus farinae* and *Glyophagus domesticus*). They can be prevented by drying the drug thoroughly before storage and also by giving treatment of fumigants. The common fumigants used for storage of crude drugs are methyl bromide, carbon disulphide and hydrocyanic acid. At times, drugs are given special treatment, such as liming of the ginger and coating of nutmeg. Temperature is also very important factor in preservation of the drugs, as it accelerates several chemical reactions leading to decomposition of the constituents. Hence, most of the drugs need to be preserved at a very low temperature. The costly phytopharmaceuticals are required to be preserved at refrigerated temperature in well closed containers. Small quantities of crude drugs could be readily stored in air-tight, moisture proof and light proof containers such as tin, cans, covered metal tins, or amber glass containers. Wooden boxes and paper bags should not be used for storage of crude drugs.

UNIT-IV

PHARMACOGNOSY- 18KP3BELB3

UNIT - 4

BY LATHA

ANTICANCER DRUG-VINCAROSEA

- **FAMILY:** APOCYLNACEAE
- **CHEMICAL CONSTITUENTS:** vinca contains large number of indole or dihydroindole type alkaloids.
- Out of them about 20 dimeric indole dihydroindole alkaloids possess anticancer activity
- Vincristine and vinblastine are most significant
- **USES:** cure diabetes
- Vinblastine sulphate is an antitumor alkaloid used to cure disease.
- Vincristine sulphate used to treat leukemia

HEPATOPROTECTIVE-PHYLLANTHUSNIRURI

- **FAMILY:** Euphorbia
- **CHEMICAL CONSTITUENTS:** It contains alkaloids phyllanthin and hypophyllanthin.
- **USES :** Juice of roots and leaf cures jaundice
- It is used in liver tonic.
- It has antiviral and antibacterial actions , it cure leprosy and bronchitis.
- It is diuretic used for kidney stones and gall bladder stones.
- It is an astringent , leaf paste is applied on ulcer and wounds
- Plant extract cures stomach problems such as diarrhoea, dysentery and colic.
- Leaf extract is applied to sores.

CARDIOTONIC DRUG - DIGITALIS PURPUREA

- **FAMILY** : Scrophulariaceae
- **CHEMICAL CONSTITUENTS** : it contains both primary and secondary cardiac glycosides.
- Purpurea glycosides A and B and glucogitaloxin are the primary and non hydrolyzed glycosides all possessing at c-3 the aglycone.
- The primary glycosides are less stable and less absorbed than the secondary glycosides
- The secondary glycosides include digitoxin , gitoxin and gitaloxin, all possessing at C-03 of the aglycone a linear chain of 3 deoxy sugars
- The purpurea glycoside-A and purpurea glycoside-B constitute a principal active constituents of the fresh leaves
- The main cardio active principle for the drug are digitoxin and gitoxin

- **USES:** It is used as cardiac stimulant and tonic
- The drug stimulates cardiac muscles to increase the systole of heart ventricle and normalizes the heart frequency
- In this way the drug is useful in congestive heart failures , atrial flutter and atrial fibrillation

ANTIMALARIAL DRUG- CHINCHONA

- **FAMILY –RUBIACEAE**
- **CHEMICAL CONSTITUENTS :**
- Cinchona bark contains about 25 alkaloids , with belongs to the quinoline type
- The important alkaloids are quinine(70%) quinidine, cinchoindine and cinchoindine
- C.succirubra contains 5-7 % total alkaloids , of which 30% is quinine.C. Ledgerinana contains 6-10 % and in some cases it may be up to 14% total alkaloids , of which up to 75 % is quinine.C
- .calisaya has 68% total alkaloids having about 50% quanine.

- **USES :**
- Cinchona bark is antimalarial in nature. Its main alkaloid quinine is used in the treatment of malarial fever
- Cinchona is used as a bitter tonic , stomachic antipyretic and analgesic .
- Quinidine is used for the prophylaxis of cardiac arrhythmias and atrial fibrillation
- Cinchona bark and all preparations are variable in intermittent fever and they have been prescribed as tonic in dyspepsia , gastric catarrh adynamia and convalescence from fever

HYPERTENSIVE –RAUWOLFIA SERPENTINA

- FAMILY : APOCYNACEAE
- CHEMICAL CONSTITUENTS :
- THE DRUGS CONTAIN ABOUT 0.7-1.4 % DEPENDING UPON THE SOURCE AN INDOLE TYPE
- ALKALOIDS ARE PRESENT ONLY MOSTLY IN BARK OF ROOTS AND RHIZOMES THE IMPORTANT ALKALOIDS ISOLATED FROM THE DRUG ARE RESERPINE , RESCINNAMINE NAD DESERPIDINE , WHICH HAVE THERAPEUTIUC SIGNIFICANCE
- THE OTHER ALKALOID COMPONENTS ARE AJMALICINE SERPENTINE , SERPENTININE RESPIRINE, RAUWOFININE ETC.

- OTHER CONSTITUENTS OF THE DRUG ARE FATTY ACIDS PHYTOSTEROLS ,UNSATURATED ALCOHOLS, SUGARS AND STARCH
- **USES :**
- RAUWOLFIA IS USED AS HYPOTNESIVE IN MANAGEMENT OF ESSENTIAL HYPERTENSION AND IN CERTAIN CASES AS A TRANQUILIZER
- THE ALKALOIDS RESPIRINE AND RESCINAMINE SRE USED AS ANTIHYPERTENSIVE AND SEDATIVE DRUGS
- IT IS SPECIFIC FOR INSANITY , REDUCES THE BLOOD PRESSURE AND CURES PAIN DUE TO AFFECTIONS AND BOWELS
- AJMALINE IS USED IN TREATMENT OF CARDIAC ARRYTHIMAS
- IT IS ALSO EMPLOYED IN LABOURS TO INCREASE UTERINE CONTRACTIONS AND IN CIRCULATORY DISEASES