

PHARMACOGNOSY

# MODEL PAPER – 3

## Syllabus to be covered in this module are-

- ❖ Chapter-6 Plant Fibres Used as Surgical
- ❖ Chapter-7 Basic Principles Involved in Traditional Systems of Medicines
- ❖ Chapter-8 Role of Medicinal and Aromatic Drugs
- ❖ Chapter-9 Herbs as Health Food
- ❖ Chapter-10 Herbal Cosmetics
- ❖ Chapter-11 Phytochemical Investigation on Drugs

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# Questions

## Long Questions-

Ques.1 Explain in detailed about sutures.

Ques.2 Discuss in detailed about methods of preparation of ayurvedic formulations.

Ques.3 Write in detailed about ayurveda.

Ques.4 Discuss the role of medicinal plants on national economy in detail.

## Short Questions

Ques.1 Write a short note on the following-

- a) Cotton/ Raw Cotton
- b) Silk
- c) Wool
- d) Glass Wool

Ques.2 Enlist the main types of treatment of Unani medicines.

Ques.3 Give the principle & concept of Unani medicines.

Ques.4 Write a short note on future economic growth on role of medicinal and aromatic plants.

Ques.5 Give the classification of anti-oxidants.

Ques.6 What are the most common types of probiotic bacteria?

Ques.7 Mention the mode of action of prebiotics.

Ques.8 Explain dietary fibres.

Ques.9 What are the benefits of a high-fibre diet?

Ques.10 Give the health benefits of omega-3-fatty acids.

Ques.11 Write a short note on garlic.

Ques.12 Give the therapeutic and cosmetic uses of the following-

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- a) Sandalwood Oil
- b) Rosemary Oil
- c) Lavender Oil
- d) Almond Oil
- e) Aloe Vera Gel

Ques.13 Give the qualitative analysis of the phytochemicals of the wood sample.

Ques.14 What are the materials used for the various methods for the investigation of phytochemicals?



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## Long Answers

### **Ques.1 Explain in detailed about sutures.**

#### **Ans- Sutures**

##### **Surgical Suture**

A surgical suture is one of the most common medical devices used by doctors during surgeries. The suture helps in holding body tissues together after a surgery or an injury. The application of a suture essentially involves the use of a needle along with an attached thread. Today, doctors have access to a wide variety and types of surgical sutures of different sizes, shapes and thread materials.

Most people often confuse the word suture with stitches. However, a suture is simply the name of the medical device used by the doctor to repair the wound, whereas stitching is merely the technique the doctor uses to close the wound.

##### **Classification of Surgical Sutures**

Surgical sutures may be classified in several different ways. Firstly, the material of the suture material is categorised as either absorbable suture or non-absorbable suture. The enzymes in the body tissues can naturally digest the absorbable suture, which is why doctors do not need to remove them. However, the non-absorbable sutures are usually removed after a few days of the surgery. They may also be left in the body permanently, based on the type of surgery that the patient has undergone.

A suture is also classified based on the actual structure of the suture material. For instance, a monofilament suture comprises a single thread that allows the suture to pass through the tissues easily. In contrast, a braided suture consists of many small threads which are braided together. While it is more secure, a braided suture also increases the potential for infections.

Finally, sutures are also categorised as being made of synthetic or natural material, but it doesn't make much difference since all suture materials are sterilised. Now let us look at the types of sutures in detail.

##### **Absorbable Sutures**

Here's how absorbable sutures are classified:

##### **Catgut Sutures**

A catgut suture is a natural, monofilament absorbable suture which has good tensile strength. The suture retains optimal strength in order to hold tissues together. Catgut is a smooth and flexible suture with good knotting and based on its size, it completely disappears between 60 to 120 days. The eventual disintegration of this suture makes it good to use in healing tissues rapidly.

##### **Polydioxanone Sutures**

A type of synthetic monofilament suture, the polydioxanone suture or is used to repair various kinds of soft-tissue wounds, abdominal closures Surgeons also use this suture during paediatric cardiac procedures.

##### **Poliglecaprone Sutures**

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The Poliglecarone suture is a synthetic monofilament suture, generally used to repair soft tissues. It is commonly used for the purpose of subcuticular dermis closures on a patient's face, and as a ligature. These sutures promote scar-free, aesthetic healing. The suture material is used in case of vascular anastomosis procedures that connect blood vessels.

### Polyglactin Sutures

The Polyglactin Suture comprises a synthetic braid, which is good to repair lacerations on the face and hands and is the most preferred option for general soft tissue approximation. Like the Poliglecapone suture, this suture too is used in of vascular anastomosis procedures. Polyglactin sutures typically have a mild tissue reaction, for the duration of the absorption process but are a better alternative to catgut sutures as the absorption level of this suture is more predictable. Also, this suture exhibits little to no tissue reaction.

### Non-absorbable Sutures

- While speaking about the types and uses of surgical sutures, we must also mention non-absorbable sutures. These sutures are made up of special silk, or synthetics like polyester, poly propylene or nylon. Non-absorbable sutures may or may not include coatings that enhance their performance characteristics and are typically used to close skin wounds. The suture is removed after a few weeks.
- These sutures are typically used in heart surgeries like vascular anastomosis procedures (due to the constant movement and pressure on the heart). Non-absorbable sutures usually cause less scarring since they provoke a much lower level of immune response, which is why they are also used in surgeries where the cosmetic outcome is significant. These sutures may be left in permanently or removed after a while, depending on the intensity of the wound.
- With Meril Endosurgery, surgeons can provide patients with a one-stop solution to an extensive portfolio of products comprising various absorbable and non-absorbable sutures. We also provide tissue sealants, absorbable haemostats, hernia repair and other state-of-the-art devices.

### The Process and Techniques Involved in Suture Selection

The suture materials used by surgeons and physicians are essentially graded as per the suture strand and diameter. The material is then attached to a suture needle. Doctors use different types of suture needles of varying sizes and shapes, and the needles are chosen as per the surgery being performed. For instance, a suture can have a cutting edge or a non-cutting edge. A large suture needle closes more tissues with every stitch, while smaller needles help to reduce scarring. Let us understand the varying suture techniques and the different types of suture needles.

### Types of Suture Techniques

The following are the different types of surgical suture techniques:

- ❖ **Continuous Suture:** A continuous Suture is a surgical technique which involves several stitches wherein the doctor uses a single strand of the suture thread material. This technique is applied rapidly while placing a suture. It is also strong as it allows the tension to be evenly distributed throughout the suture strand.
- ❖ **Interrupted Sutures:** The interrupted suture is a technique that uses many strands of the suture material in order to close a wound. Once the stitch is made, the doctor cuts off and ties the material. The interrupted suture technique enables the doctor to close the wound so securely that even if one stitch breaks, the remaining ones can still hold the wound together.

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- ❖ **Deep Sutures:** Yet another type of surgical suture technique is the deep suture technique, Here, the doctor places the suture under the tissue layers, which are deep below the skin. The sutures can be either interrupted or continuous and are often used in procedures in which the facial layer has to be closed.
- ❖ **Buried Sutures:** The buried suture technique is applied by doctors such that the suture knot is found inside, i.e., within or under the area that has to be closed off. This type of surgical suture is not removed typically. It is often useful when large sutures are used in the deeper corners of the body.
- ❖ **Purse String sutures:** A type of continuous suture, the purse-string suture is placed around the infected area. It is typically tightened in a pattern that resembles a drawstring attached to a bag. This suturing technique is used to reduce the surface area of a circular wound, with the aim of obtaining minimal scarring.
- ❖ **A Subcuticular Suture:** The suture that is usually placed in the patient's dermis, i.e., the layer of tissue which lies below the skin's upper layer, is known as the subcutaneous suture. In this type of suture, the doctor places short stitches in a line, parallel to the wound. The doctor also anchors the stitches on either end of the wound.
- ❖ Sutures, commonly called stitches, are sterile surgical threads that are used to repair cuts (lacerations). They also are used to close incisions from surgery. Some wounds (from trauma or from surgery) are closed with metal staples instead of sutures.
- ❖ Suture materials play an important role in wound repair by providing support to healing tissues. Closure of skin wounds is only one application of suture material.
- ❖ Sutures are used for closure of fascia, haemostasis, intestinal anastomosis and enterotomy, urogenital trach surgery, surgery of the musculoskeletal system, vascular surgery, plastic surgery, and neurosurgery, amongst other applications.

### Absorbable and Non-absorbable suture materials

We can basically classify sutures into two types- those which are absorbable and will break down harmlessly in the body over time without intervention and those which are non-absorbable and must be manually removed if they are not left indefinitely. The type of suture used varies on the operation, the patient particulars and depends on the discretion and professional experience of the Surgeons.

We can place surgical sutures internally and they need to be re-opened if they were to be removed. Suture materials which lie on the exterior of the body can be removed within minutes, and without re-opening the wound. As a result, absorbable sutures are often used internally; non-absorbable externally.

**Types of Absorbable sutures include:** Polyglycolic Acid sutures, Polyglactin 910, Catgut, Poliglecaprone 25 and Polydioxanone sutures.

**Types of Non-Absorbable sutures include:** Polypropylene sutures, Nylon (polyamide), Polyester, PVDF, silk and stainless-steel sutures.

### Catgut

Catgut, another protein fibre of biological origin is derived from the small intestines of animals, mostly sheep or oxen. In order to obtain catgut, the intestinal tracts of cattle, after removing soft tissue and other residues by mechanical and chemical stripping processes, are treated with chromic salt solution. Several ribbons are obtained and these are twisted into bonded strands. Chromic salts are then leached out by a suitable method. The chromic catgut is normally kept in aqueous alcohol or glycerine to prevent it

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from drying out, since catgut becomes stiff when dry and this poses problems in handling products made from it.

- ❖ Catgut is extracted from the intestines of sheep or goats.
- ❖ There are two types used for sutures: **plain and chromic**.

### Ligatures

It means suture that is tied around a blood vessel to occlude the lumen.

Here are 2 types of ligatures-elastic and metal.

Elastic gum stretches quickly enough, lose their fixing ability, and can also break before a planned visit to the doctor. Because of these features, the frequency of visits to the orthodontist and their duration is significantly increased.

### Classification of Ligature Ties (Based on material used)

**Metal Ligature:** Most fixed orthodontic appliances have stored tooth-moving forces in arch wire, which are deformed within their elastic limit. For this force to be transmitted to a tooth, wires need a form of connection to the bracket.

1. Stainless steel alloy wires of varying gauge (.009 to .014 inch) are used.
2. Tips are twisted together to ensure firmness.
3. Twisted end is folded back under the arch wire.

### Elastic ligature:

1. Substitute for metal ligatures.
2. Easier to apply
- 3 Lesser strengths
4. Available in different colours
5. As fluoride releasing agent
6. To reduce the white spot lesions.

## Ques.2 Discuss in detailed about methods of preparation of ayurvedic formulations.

### Ans- Method of Preparation:

#### 1. Preparation of Arista's:

The drug is coarsely powdered and Kasaya is prepared. The Kasaya is strained and kept in fermentation vessel Sugar, jaggery or honey, as required, is dissolved, boiled, and added. The mouth of the vessel is covered with an earthen lid and the edges sealed with clay smeared cloth wound in seven consecutive layers.

A constant temperature is maintained for fermentation by keeping the container either in a special room, in an underground cellar or in a heap of paddy. After a specified period, the lid is removed and the

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contents examined to ascertain whether fermentation has been completed. The fluid is decanted and then strained after two or three days. When the fine suspended particles settle down, it is strained and bottled.

### Preparation of Asavas:

The Jaggery or sugar is dissolved in the required quantity of water, boiled, and cooled. This is poured into the fermentation vessel. Fine powder of the drugs is added in the container which is covered with a lid and the edges are sealed with clay smeared cloth wound in seven consecutive layers.

A constant temperature is maintained for fermentation by keeping the container either in a special room, in an underground cellar or in a heap of paddy. After a specified period the lid is removed and the contents examined to ascertain whether fermentation has been completed. The fluid is first decanted and then strained after two or three days. When the fine suspended particles settle down, it is strained and bottled.

### Precaution:

1. The filtered Asavas or Aristas should be clear without froth at the top.
2. It should not become sour.
3. The preparation has the characteristic aromatic alcoholic odour.

### Marketed Preparation:

#### 1. Asavas:

- (i) Arvindasava
- (ii) Kumaryasava
- (iii) Vasakasava

#### Aristas:

- (i) Abhyarista
- (ii) Balarista.
- (iii) Dasmularista.
- (iv) Vidangarista.

Gutika

**Vati** is a preparation where different medicinal substances are used to make tablets (vati) and pills (gutika). This is done either by cooking the powdered herbs with jaggery or guggulu or without cooking by macerating the powder with any liquid like honey and guggulu and then rolled into pills. They are made of one or more drugs of a plant, animal, or mineral origin.

Medicaments in the form of pills are known as Gutika, they are made by using single or combination of vegetable, minerals, or animals' drugs.

These preparations can be used up to 2 years pills with minerals can be used indefinitely.

This formulation should not lose their original, colour, odour, taste and form on standing.

They should be kept away from moisture if they contain, salt, ksara or sugar.

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Example- lasundai Gutika, pranda Gutika, khadiradi gutika

## Taila

They are called sneha kalpa/paka and prepared by cooking oil with the juice or the decoction and paste of drugs.

*Thaila (Thailam)* or sesame oil medicated with herbal mixes, is an extremely useful category of Ayurvedic medicine. Its potency can be increased during preparation through the addition of specific ingredients.

Unless otherwise specified, paste of drugs should be 1/4th part of the oil and the liquid (drava) should be 4 times of oil.

If no liquid is specified in recipe, water should be used.

For preparing medicated taila, get the oil properly cooked, large amount of foam appears at the surface of the oil.

Therefore, the formulation should be strained prior to packing.

If salt of any alkali preparation is added to the recipe, it should be after the oil is strained and mixed thoroughly.

- Tailas can be used internally and topically.
- They retain potency for about 16 months.
- They are taken internally with warm water or warm milk.

- ❖ *Amruthadi Thaila* is recommended for the treatment of conditions ranging from the common cold to rheumatic pains and jaundice.
- ❖ *Asanavilwadi Thaila* helps cure oedema (fluid retention), and all ear, nose and throat disorders.
- ❖ *Chandanadi Thaila* has a cooling effect and is given for the treatment of neural disorders, haemorrhoids, rheumatoid arthritis and burning sensations in the body.
- ❖ *Karpasasthyadi Thaila* is used to alleviate joint aches, pains and the effects of hemiplegia (total or partial paralysis).
- ❖ *Nagaradi Thaila* is used for curing mouth and nose related disorders and oedema.
- ❖ *Sahacharadi Thaila* relieves pain and numbness, especially in the lower limbs afflicted by rheumatic ailment.

**Example:** Bhrinraj talia, Mahanarayan talia, Anu talia etc.

## Churna

Churnas are medicinal powders used for a wide range of treatments. They are prepared by the repeated crushing and sifting of herbs and minerals to achieve a specific consistency.

- ❖ **Ashna Churna** is administered to children who suffer from infections and stomach pains. It ensures the smooth functioning of the digestive tract and remedies indigestion issues.
- ❖ **Avipathy Churna** helps patients regain control over their bowel movements. It is also recommended for people suffering from anaemia (iron deficiency) and gastric disorders.
- ❖ **Dadimashtaka Churna** soothes acidic imbalance in the body, helps with digestion and regulates bowel movement.
- ❖ **Eladigana Churna** is used for treating skin ailments such as blemishes and irritations.

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- ❖ **Hinguvachadi Churna** is effective in the treatment of a variety of gastric disorders, malfunctions, obesity problems, stomach bile issues, as well as urinary and sinus infections.
- ❖ **Karpooradi Churna** remedies mucus problems related to cough and common cold.
- ❖ **Rajanyadi Churna** cures gastric issues and revitalises the body.

### Lehya

Leha is a semisolid preparation of drugs. *Lehyas* or *Lehyam* are electuaries or jam-like medicines, sweetened using jaggery or sugar. Some of the popular Lehyas used in Ayurveda are:

- ❖ **Chyavanaprasa** is a popular lehya consumed to reduce fatigue, improve health and immunity, and revitalize the body.
- ❖ **Agastya Rasayana** is administered during the treatment of tuberculosis and cough. It improves stamina and complexion, and is effective against digestive ailments such as sprue and constipation.
- ❖ **Chinchadi Lehya** is an effective remedy for anaemia (iron deficiency), haemorrhoids, jaundice, heart-burn and acidity issues.

**Ajamamsa Rasayana** improves strength and stamina and is used to treat Vata imbalances.

**Aswagandhaadi Lehya** rejuvenates the body and helps combat anxiety and stress.

**Brahma Rasayana** builds immunity and neural strength and revitalizes the body.

**Chiruvilwadi Lehya** helps remedy Vata and Kapha imbalances. It is highly effective in the treatment of haemorrhoids.

**Dashamoola Haritaki Rasayana** helps in the treatment of persistent fever, anaemia, issues and rheumatic disorders.

**Narasimha Rasayana** is a popular remedy for premature greying.

**Example:** Kutjavaleha, Draksavaleha, Vasavaleha, Bilvadileha

### Bhasma

The powder form of the substance, obtained by calcinations of metal, minerals or animals products by special process in closed crucibles or in pits covered by cow dungs cake, is known as bhasma.

Bhasma, is 21 ayurvedic metallic/mineral preparation, treated with herbal juices or decoction and exposed for certain quantum of heat as per puta system of Ayurveda, which itself is well known in Indian subcontinent since 7th century A.D. and widely: recommended for the treatment of many disease conditions.

### Physical characteristic

- 1. Color (Verna):** A specific color is mentioned for each Bhasma. Bhasmas are generally white, pale, or red. The color of the preparation primarily depends on the parent material
- 2. Lusterless (Nishchandratvam):** Bhasma must be lusterless before therapeutic application. For this test, Bhasma is observed under bright sunlight whether luster is present are not, if luster is still present, it indicates further incineration

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3. **Lightness and Fineness (Varitara):** Bhasma floats on stagnant water surface. This test is based on law of surface tension. Properly incinerated Bhasma needs to float on water surface
4. **Tactile sensation:** Tactile sensation can be absorbed and assimilated in the body without producing any irritation to mucous membrane of gastrointestinal tract
5. **Particle size:** Prepared Bhasma should be in powder form. Particle of Bhasma should be like pollen grains of *Pondanus odoratissimus* flower (*ketaki rajah*).

### Ques.3 Write in detailed about ayurveda.

#### Ans- Ayurveda

- ❖ Ayurveda, a natural system of medicine, originated in India more than 3,000 years ago.
- ❖ Ayurveda, also called Ayurvedic medicine, traditional western of Indian medicine. Ayurvedic medicine is an example of a well-organized system of traditional health care, both preventive and curative, that is widely practiced in parts of Asia.
- ❖ Ayurveda is generally understood as 'Science of life' translating "Ayuh (r)'as life and "Veda' as science. Ayurveda is an ancient system of life and the oldest surviving medical system in the world. Dating back almost 5000 years, it is also considered to be an ancient science of healing that enhances longevity. It has evolved from the quest to have a happy life, through a deep understanding of creation and its maintenance, perceived and conceived by the rishis or seers of ancient India. Ayurveda emphasizes upon life in general with bit more emphasis on human life.

#### Ayurvedic Body Types

- ❖ According to Ayurveda, each one of us has a unique mix of three body principals that constitutes our mental, physical, and spiritual well-being.
- ❖ These three principals are known as doshas, which are further classified as Vata (air-ether), Kapha (water-earth) and Pitta (water) But everyone has its own unique constitution that is usually governed by one or two of the doshas predominantly It means that that our Ayurvedic constitution is mainly be either of these doshas or a mixed constitution of two doshas like Vata& Kapa, Kapa & Pitta or Vata& Pitta.

#### Kapha

Kaphadosha governs all structure and lubrication in the mind and body. It is the principle that holds the cells together and forms the muscle, fat, bone, and sinew It controls weight, growth, lubrication for the joints and lungs, and formation of all the seven tissues nutritive fluids, blood, fat, muscles, bones, marrow, and reproductive tissues. It helps build excellent stamina but when it goes out of balance it can also cause a person to become overweight, sleep excessively, and suffer from the problem of diabetes, asthma, and depression. Learn How to Remove Kapha from Body

#### Pitta

The pitta Dosha controls digestion, metabolism, and energy production. The primary function of Pitta is transformation. Those with a predominance of the Pitta principle have a fiery nature that manifests in both body and mind. Pittas has a lustrous complexion, digestion, energy, and a strong appetite. When out of balance, Pittas may suffer from skin rashes, burning sensations, peptic ulcers, excessive body heat, heartburn, and indigestion. Learn How to Reduce Pitta Immediately.

#### Vata

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- ❖ The vatadosha is known to govern all the movements of mind and body. From controlling the blood flow to elimination of the waste and harmful toxins to breathing and the flow of thoughts in the mind: the vatadosha is like a predominant force that minimizes stress and feeds the creativity within you. If the vatadosha is in balance, you will feel energetic, enthusiastic, and lively, but the moment it becomes imbalanced, it manifests in the body problems like constipation, hypertension, fatigue, digestive challenges and restlessness among others.
- ❖ Ayurvedic science is not merely a traditional Indian form of medicine but a perennial naturopathic system of healthcare that has survived the test of time as well as onslaught of modern science and methods of treatments. Based on wisdom acquired through the centuries, the main aim of Ayurvedic science is to achieve perfect health by creating an equilibrium of perfect harmony between human body and the environment its habitats.
- ❖ 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 concepts of universal interconnectedness, the body's constitution (*prakriti*) and life forces (*doshas*) we the primary basis of ayurvedic medicine. Goals of treatment aid the person by eliminating impurities, reducing symptoms, increasing resistance to disease, reducing worry, and increasing harmony in life. Herbs and other plants, including oils and common spices, are d extensively in Ayurvedic treatment.
- ❖ In India, Ayurveda is considered a form of medical care, equal to conventional Western medicine, traditional Chinese medicine, naturopathic medicine, and homeopathic medicine. Practitioners of Ayurveda a India undergo state-recognized, institutionalized raining Currently, Ayurvedic practitioners are not licensed in the United States, and there is no national standard for Ayurvedic training or certification. However, Ayurvedic schools have gained approval as educational institutions in some states.
- ❖ Ayurveda can have positive effects when used as a complementary therapy in combination with standard, conventional medical care.
- ❖ Many Ayurvedic materials have not been thoroughly studied in either Western or Indian research. Some of the products used in Ayurvedic medicine contain herbs, metals, minerals, or other materials that may be harmful if used improperly or without the direction of a trained practitioner Ayurvedic medicines are regulated as dietary supplements rather than as drugs in the United States, so they are not required to meet the safety and efficacy standards for conventional medicines. These medicines can interact, or work against the effects of Western medicines. Investigate the training and background of Ayurvedic practitioners whom you intend to use.
- ❖ It is important to discuss any Ayurvedic treatments that you use with your doctor. Women who are pregnant or nursing, or people who are thinking of using Ayurvedic therapy to treat a child, should consult their healthcare provider. It is important to make sure that any diagnosis of a disease or condition has been made by a provider who has substantial conventional medical training and experience with managing that disease or condition. While Ayurveda can have positive effects when used as a complementary therapy in combination with standard, conventional medical care, it should not replace standard, conventional medical care, especially when treating serious conditions.
- ❖ Ayurvedic Medicines are fast gaining popularity across the world. One of the major reasons for it being that Ayurveda seeks to normalize body functions with varied techniques including advice on

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food and activity, internal herbal preparations, purification treatments (panchakarma), and surgical methods (shalyachikitsa).

- ❖ Ayurveda is based on the belief that the delicate balance of mind, body and spirit determines health and wellness of the body. The goal of Ayurveda is prevention as well as promotion of the body's own capacity for maintenance and balance. Ayurvedic medicines are non-invasive and non-toxic in nature and therefore are free from any side effects.
- ❖ Using Ayurvedic medicines in your daily life enables you to re-establish balance and harmony in body's system, aids in detoxification and cleansing of the body by removing accumulated toxins and normalize body's functions. Read more on how to remove toxins from body Products made using Ayurvedic plants have a stronger action on the body as they help in stabilizing the doshas. The medicines are formulated with thorough research and expertise in the field of ayurvedic medicine.
- ❖ Tulsi, Guduchi, Ajwain, Brahmi, Shilajit and Ashwagandha etc., are some of the most used herbs in Ayurvedic preparations. Each of these herbs or spices hold a multitude of benefits for the mind, body, and spirit and can be easily used internally or externally, depending on the need. Dabur, the best Ayurvedic Company has a wide range of natural and Ayurvedic products which are formulated to not only help you maintain a healthy lifestyle but also promote the holistic well-being of mind and body.

**Ques.4 Discuss the role of medicinal plants on national economy in detail.**

**Ans- Role of Medicinal Plants on National Economy**

- ❖ Since ancient times, mankind all over the world mainly depended upon plant kingdom to meet all their needs of medicines for alleviating ailments, search for eternal health, longevity and to seek remedy to relieve pain and discomfort, fragrance, favours, and foods. It had prompted the early man to explore his immediate natural surrounding and try many plants, animal products, mineral and develop a variety of therapeutic agents.
- ❖ Medicinal plants still play an important role in emerging and developing countries of Asia both in preventive and curative treatments, despite advances in modern Western medicine They also generate income to the people of many Asian countries, who came their livelihood from selling collected materials from the forest or by cultivating on their farms. Thus, the medicinal plants constitute a very important national resource People in India and China a known to have used plants in organized health care regime for over 5.000 years. European herbal medicines bloomed in the Graeco-Roman era and remained in mainstream until six decades ago. The ancient civilization of India, China, Greece, Arab and other countries of the world developed their own systems of medicine independent of each other, but all of them were predominantly plant based. But the theoretical foundation and the insights or in depth understanding on the practice of medicine was much superior in ayurveda among organized system of medicine. It is perhaps the oldest (6,000 BC) among the organized traditional medicine, People from other countries of the world as China Cambodia, Indonesia and Baghdad used to come to the ancient universities of India, like Takshila (700 B.C) and Nalanda (500 B.C) to learn health sciences of India particularly ayurveda. From history, we learn that since ancient times, plants remained major natural resource in the world.

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- ❖ One of the oldest repositories of human knowledge, the Rig Veda (4500-4600 BC) mentioned the use of medicinal plants for the treatment of one or other disease. In the long struggle to overcome the powerful forces of nature, the human beings have always turned to plants. There are reports available about the local communities in the Asian, African, and Latin American countries having a long history of dependence on traditional remedies, largely based on plants, for immediate access to relatively safe, cost-effective, efficacious and culturally acceptable solutions to primary health care.
- ❖ The World Health Organization (WHO) estimated that 80% of the population of developing countries relies on traditional medicines, mostly plant drugs for their primary health care needs. Even the modern pharmacopoeia still contains at least 25% drugs derived from plants and many others, which are semisynthetic, built on prototype compounds isolated from plants. Medicinal plants are the major components of all indigenous or alternative systems of medicine. For example, they are common elements in ayurveda, homoeopathy, naturopathy, Oriental, and Native American Indian medicine. Demand for herbal drugs is increasing throughout the world due to growing recognition of natural plant-based products, being nontoxic, having no side effects, easily available at affordable prices and some-times the only source of health care available to the poor. Hence, medicinal plant sector has traditionally occupied an important position in the socio-cultural, spiritual, eco-nomic values of rural and tribal lives of both developing and developed countries. Millions of rural households are using medicinal plants in self-help mode.
- ❖ About 90% of medicinal plants used by the industries are collected from the wild source. While over 800 species are used by industries, not more than 20 species of plant are under the commercial cultivation. Hence, more than 70% plant collection involved destructive harvesting because of the use of parts like root, bark, stem, wood, and whole plant (in the case of herbs). This process is a definite threat to the genetic stock and diversity of medicinal plant resources, and ultimately to the economy of the country if the biodiversity is not sustainably used.
- ❖ The other main source of medicinal plants is from cultivation. The cultivated material is definitely more appropriate for use in the production of drugs: Indeed, standardization, whether for pure products, extracts or crude drugs, is critical and becomes easier. Hence, higher cost for cultivated material and cultivation are often done under contract. More recently growers have set up cooperative or collaborative ventures to improve their negotiating power and achieve higher prices, and thus medicinal plants in a wider context generate income to the people of many Asian countries who earn their livelihood from selling collected materials from the wild forest, or by cultivating on their farms.
- ❖ International trade in medicinal plants both within South Asian countries and East Asia. Europe and North America is growing in economic importance, e.g., Nepal is earning an estimated US\$ 8.6 million annually from the export of medicinal plants, thus, the medicinal plants and other forest products influence local, national and international economics.
- ❖ There is widespread belief that "green" drugs are healthier than synthetic product. Recent reports have witnessed an upsurge in the popularity of herbal medicines. In most industrialized countries, use of medicinal plants has increased dramatically in the last decade; there has been a rising trend in Ayurvedic (herbal) products an area where India's expertise dates back centuries. But it is not only in the last decade that the country has truly seen the commercialization on the herbal concept. Herbal has now become full-fledged wave composing of both in beauty care and health care products. As well as herbal over-the-counter (OTC) drugs have gained substantial ground. Currently, according to industry estimate, total pharmaceutical market is around Rs. 5,000 crores,

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the total herbal market share is Rs. 1.200 crores, of which the OTC market constitutes around Rs. 400 crores.

- ❖ The importance and value of traditional and indigenous herbal medicine was the subject of campaign of the WHO. Its effort, in the 1970s, led an appeal to all member countries to do their utmost to preserve their national heritage in the form of ethno-medicine and ethno-pharmacology and to bring back the use of known and tested medicinal plants and derivatives into primary health care in rural areas as alternatives when modern medicines are not available.
- ❖ In India, plants have been traditionally used for human and veterinary health care and, in the food and textile industry. Ninety percent of the local food resources known to indigenous people were undocumented to nutritional literature, trade, cosmetics, and perfumes; but India has a special position in area of herbal medicines, since it is one of the few countries which are capable of cultivating most of the important plants used both in modern and traditional systems of medicine. This is because India has vast area with wide variation in climate, soil, altitude/latitude, and rich flora.
- ❖ The herbal drug market itself is growing at a rate of between 20% and 30% annually, with individual company registering different growth rates. The healthy growth rate of this market can also be attributed to the government policy of encouraging the manufacturers of purely herbal products. This coupled with absence of any pricing guide-lines. Unlike 'Drug Price Control Order (DPCO), pricing guidelines for ethical drugs has resulted in this segment being perceived as a highly lucrative alternative source of revenue. The new patent policy under "GATT", which came into effective by the year 2005, has encouraged the herbal market.
- ❖ While the domestic market (about US\$ 1 billion of Ayurvedic medicine) is opening up to the herbal phenomenon, the export market is also showing promise Many pharmaceutical companies are targeting export as the prime source in the coming years World trade in plant medicines is of billions of dollars. In 1994, China exported US\$ 5 billion of plant drugs, Germany imported about US\$ 105 million of plant drugs. The number of medicinal plants trade too is astonishing Now Germany export market is about Rs. 600 crores, and is expected to expand to Rs. 20,000 crores in the next decade. The present export volume of crude drugs from India stands at 36,200 tonnes valued around US\$ 24 million. China and India are two great producers of medicinal plants having more than 40% of global diversity.
- ❖ In developing countries, plants are the main source of alternative medicine. According to the WHO, as many as 80% of the world's people rely on traditional medicines for their primary health care, most types of which use remedies from plants. The use of traditional medicine in developing countries is increasing because population is increasing. Government wants to encourage indigenous forms of medicine rather than to rely on imported drugs, and there are strong moves to revive traditional cultures, being easy access and cost effectiveness ultimately affect the national economy.
- ❖ For example, traditional medicine is an important part of African culture. It varies with cultural group and region. The Western pharmaceuticals are inaccessible especially to rural-based population. Therefore, more than 80% of Africans rely on plant-based medicine. About 70-90% of the population in South Africa, Zambia, Nigeria, Mozambique. Ethiopia and Democratic Republic of Congo, among others, relies on traditional medicine for their health care. In South Africa, at national level, 20,000 tonnes of medicinal plant materials are traded, corresponding to a value of about US\$ 60 million. In Zambia, trade in traditional medicine is worth over US\$ 43

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million per annum. Traditional systems of medicine are also predominant medical systems in practice in Malawian rural areas.

- ❖ Medicinal plants-based medicine also has significant role in most Latin American countries. About 70-80% of the Latin American population relies on traditional medicines for their health care needs. For example, about 80% of Ecuadorians rely on medicinal plants or products derived from plants. There is lack of access to modern drugs in a significant part of Latin America In India, annual turnover of herbal industry was estimated around US\$ 250 million in 1995 According to Chemexcil report, export value of Ayurvedic and Unani medicine was about US\$ 4) 6 million during 1999 2000, the major OTC products contribute around US\$ 305 million.

Item	Demand value (million US\$)		
	1989	1993	1998
Aloe extract	38	46	63
Botanical extract	180	230	345
Others	22	34	67
Plant acids/enzymes	19	37	65
Essential oils	101	113	150
Other natural products	85	115	180
<b>Total</b>	<b>445</b>	<b>575</b>	<b>870</b>

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# Short Answers

**Ques.1 Write a short note on the following-**

- a) Cotton/ Raw Cotton**
- b) Silk**
- c) Wool**
- d) Glass Wool**

**Ans-**

**a) Cotton/ Raw Cotton**

**Biological Source**

- ❖ Trichomes of seeds of cultivated species of *Gossypium herbaceum*
- ❖ Family: Malvaceae

**Geographical Source:** India, Egypt

**Collection**

- ❖ The capsule of cotton consists contains large number of seeds covered with trichomes
- ❖ The trichomes are separated
- ❖ Long trichomes are used in preparation of fabric & short ones are used in preparation of surgical dressings.
- ❖ This non-absorbent cotton, when treated with dilute soda solution for 10 to 15 hours at a higher pressure, gets free of fats.
- ❖ The resulting absorbent cotton is dried, sterilized with gamma radiation

**Description**

- ❖ White, soft to touch

**Chemical Tests:**

**Absorbent Cotton:**

1. Fibre when treated with N/50 iodine solution & 80% 12504 gives a blue stain
2. Fibre when treated with Cuoxam reagent, swells & dissolves
3. Fibre gives a blue stain with chlorine iodide.

**Non-Absorbent Cotton:**

1. Fibre when treated with Cuoxam reagent, swells & dissolves with ballooning
2. Fibre gives a violet stain with chlorzinc iodide

**Uses:**

- ❖ Fabrics, surgical dressings

**b) Silk**

**Biological Source:** obtained from secretion/cocoon of *Bombyx mori*

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**Family:** Bombycidae

**Description:**

- ❖ Yellow, smooth to touch

**Uses:**

Sutures & ligatures

**Collection:**

- ❖ The larvae produce fibroin from the mouth glands which gets united with a gum-like secretion known as sericin to form a cocoon.
- ❖ These cocoons are exposed to steam & finally plunged in boiling water to separate the gum & the fibres.

**Chemical:**

- ❖ Proteins & subunits made of alanine & glycine.

**Chemical Tests:**

1. Fibre does not blacken on treatment with lead acetate
2. On treatment with Millon's reagent, it gives a brick red colour

**c) Wool**

**Biological Source:** obtained from fleece of sheep *Ovis aries*

**Family:** Bovidae

**Description:** Soft, lustrous

**Preparation:**

- ❖ Raw wool is washed with water followed by a second washing with soap solution & then treated with sulphuric acid.
- ❖ The wool fat is separated by extracting with acetone.
- ❖ Thus, wool fibre is obtained.

**Chemical Test:**

- ❖ Fibre blackens with lead acetate (Contains sulphur containing amino acids)

**Uses:**

- ❖ Fabrication, ligatures & sutures

**d) Glass Wool**

**Source:** made up of silica, mixture of silica & oxides of aluminum, calcium, boron & magnesium.

**Uses:**

- ❖ Insulating material & in the manufacture of filters.

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## Chemical Tests

1. Fibre is partly soluble in 60% sulphuric acid
2. Fibre on ignition forms a hard bead

## **Ques.2 Enlist the main types of treatment of Unani medicines.**

### **Ans-** Regimental therapy (Ilaj-bil-Tadbir)

Regimental therapy is special technique/ physical methods of treatment to improve the constitution of body by removing waste materials and improving the defence mechanism of the body and protect health. In other words, these are the best known "detoxification methods"

Important techniques in regimental therapy along with the ailments for which they are considered effective are briefly described below:

### **Venesectio (Fasd)**

This method of treatment has been found very effective for

1. Correction of blood related problems and relieve high blood pressure.
2. Prevention of toxicity and accumulation of waste matter in the blood.
3. Excretion of waste matters from various parts of the body
4. Stimulation of metabolic processes.
5. Cure of ailments due to certain menstrual disorders.
6. Correction of hot material in temperament.

### **Cupping (Al-hijama)**

This method of treatment is used for:

1. Cleaning the skin of waste matters.
2. To stop excessive menses or epistaxis.
3. To correct liver diseases.
4. To treat malaria and spleen disorders.
5. To treat piles, inflammation of testes and uterus, scabies, boils etc.

### **Sweating (Tareeq)**

Waste matter from skin, blood and from other parts of the body is excreted through the normal process of sweating. It helps in reducing excessive heat. Dry or wet fomentation, bath with warm water, massage and keeping the patient in a room having hot air are some of the methods of diaphoresis.

### **Diuresis (Idrar-e- baul)**

Poisonous matters, waste products and the excess of humours is excreted through urine. It is applied as a cure for diseases of the heart, liver and lungs. Sometimes diuresis is effected by keeping the patient in a cold room and applying cold water.

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## **Turkish bath (Hamam)**

This is recommended for

1. Resolving the waste matter and increasing sweating
2. Providing light heat
3. Increasing nutrition
4. Decreasing fat
5. Increasing fat

Cold bath is preferable in normal health. Hot bath is generally applied for the cure of diseases like paralysis and muscular wasting etc after massage.

## **Massage (Dalk, Malish)**

Soft massage is sedative and relaxant, dry and hard massage is deobstruent and increases the blood supply while the massage with oil relaxes the muscles and softens the skin.

## **Counter irritation**

This technique provides relief in pain, burning sensation and irritation. It helps to reduce inflammation and heals tumours.

## **Cauterization (Amal-e-Kae)**

It prevents the poison malignancy of one organ from transferring it to other organs. In case of pain of hip joint, this technique is found very useful. By this technique the pathogenic matters, which are attached to some structures, are removed or resolved.

## **Purging (Ishal)**

Unani medicine widely uses purgatives for intestinal evacuation. There are written rules for using this method. This method influences normal metabolic process.

## **Vomiting (Qai)**

Emetics are used to cure headache, migraine, tonsillitis, bronchopneumonia, and also bronchial asthma. This also cures mental diseases like mania and melancholia.

## **Exercise (Riyazat)**

Physical exercise has great importance for maintenance of good health and for treating certain diseases. It is said to be good for stomach and for strengthening digestion. There are laid down rules, timings, and conditions for various types of exercises.

## **Leeching (Taleeq-e-Alaq)**

This method is used for removing bad matter from the blood. This is useful in skin diseases and ringworms etc. The system describes specific conditions for applying it.

**Ques.3 Give the principle & concept of Unani medicines.**

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**Ans-** The basic theory of Unani system is based upon the well-known four humour theory of Hippocrates. This presupposes the presence, in the body, of four humours viz., blood, phlegm yellow hole and black bile

The human body is made up of the following seven components

## Arkan (Elements)

The human body contains four elements. Each of the four elements has its own temperament as follows:

Element	Temperament
Air	Hot & Moist
Earth	Cold & Dry
Fire	Hot & Dry
Water	Cold & Moist

## Mizaj (Temperament)

In the Unani system, the temperament of the individual is very important as it is considered to be unique. The individuals temperament is believed to be the result of the interaction of the elements. The temperament can be real equitable where the four elements used are in equal quantities. This does not exist. The temperament may be equitable. This means presence of just and required amount of compatible temperament. Lastly, temperament can be inequitable. In this case there is absence of just distribution of temperament according to their requirements for healthy functioning of the human body.

## Aaza (Organs)

These are the various organs of the human body. The health or disease of each individual organ affects the state of health of the whole body.

## Arwah (Spirits)

Ruh (Spirit) is a gaseous substance, obtained from the inspired air, it helps in all the metabolic activities of the body. It burns the akhlailatifah to produce all kinds of quwa (powers) and hararatghariziyah, it is the source of vitality for all the organs of the body. These are considered to be the life force and are, therefore, important in the diagnosis and treatment of disease. These are the carriers of powers, which make the whole body system and its parts functional.

## Quwa (Faculties)

These are three kinds of power

**1. Quwa Tabiyah or Natural power** is the power of metabolism and reproduction. Liver is the seat of this power and the process is carried on in every tissue of the body. Metabolism is concerned with the processes of nutrition and growth of human body. Nutrition comes from the food and is carried to all parts of the body, while growth power is responsible for the construction and growth of human organism.

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**2. Quwa Nafsanlyah or Psychic power** refers to nervous and psychic power. It is located inside the brain and is responsible for perceptive and motive power. Perceptive power conveys impressions or sensation and motive power brings about movements as a response to sensation.

**3. Quwa Haywaniyah or Vital power** is responsible for maintaining life and enables all the organs to accept the effect of psychic power. This power is in the heart. It keeps life running in the tissues.

### **Ques.4 Write a short note on future economic growth on role of medicinal and aromatic plants.**

#### **Ans- Future Economic Growth**

Throughout the world, about 35,000-70,000 species of plants have been used at one time or another for medicinal, nutraceuticals and cosmeceuticals purposes. In India, about 1,000 plant species, in Nepal about 700 species, about 700 species in Peninsular Malaysia and its neighbouring Islands and in Chinese medicine about 9,905 plant materials are used but only a relatively very small number of them are used in any significant volume. According to the International Trade Centre (ITC) report, there is generally upward trend except for 1990, when it dipped slightly before rising again to US\$ 1.08 billion in 1991. The world trade in medicinal plants and raw material from plants parts averaged US\$ 1.28 billion during 1995-1999. Thus, there is lot of scope in future for new plant-based drugs that are still to be introduced, and the economic significance of these plant-based pharmaceuticals is considerable which is based on the following two aspects:

1. The value of the current plant-based pharmaceuticals, and
2. The value of potential plant-based pharmaceuticals, which are yet to be introduced.

The relationship between the economic value of a medicinal plant species and market price of the drugs derived from it, is not a direct one. It is true that the prices are minimum valuations assuming that

- ❖ The demand for the drug is inelastic,
- ❖ That it is appropriate to value an essential input as its own cost plants, and
- ❖ The economic rent obtained from it plus the associated consumer's surplus.

For example, the market value of a stand of forest could be measured by translating the wood volume there in into an equivalent quantity of paper and then taking the market value of the paper. In contrast, economic value to society includes not only the value of the paper (or whatever the other commodity is selected), but also what may be referred to as the in situ benefit of trees as forest that is the contribution as:

- ❖ The forest checks the soil erosion, stabilizing the water table, converting carbon dioxide into oxygen (environmental effects);
- ❖ Providing protection to wild life, and;
- ❖ Providing recreational opportunities, hence, the economic value is much larger in magnitude but also much more difficult to quantify.

### **Ques.5 Give the classification of anti-oxidants.**

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## **Ans-** Classification of Antioxidants

Antioxidants can be classified into two groups on the basis of enzymatic nature:

**1. Enzymatic antioxidants:** They are further classified into two types-

- ❖ Primary antioxidants e.g.-SOD, Catalase, Glutathione peroxidase.
- ❖ Secondary enzymes e.g.-Glutathione reductase, Glucose 6-phosphate dehydrogenase

**2. non-Enzymatic antioxidants:** They are classified into 2 groups:

- ❖ Endogenous Antioxidant
- ❖ Exogenous Antioxidant

The following are nutrients with antioxidant activity and the foods in which they are found:

**Vitamin C:** Broccoli, Brussels cantaloupe, cauliflower, grapefruit, leafy greens (turnip, mustard, beet, collards), honeydew, kale, kiwi, lemon, orange, papaya, snow peas, strawberries, sweet potato, tomatoes and bell peppers (all colors)

**Vitamin E:** Almonds, avocado, Swiss chard, leafy greens (beet, mustard, turnip), peanuts, red peppers, spinach (boiled), and sunflower seeds

**Carotenoids including beta-carotene and lycopene:** Apricots, asparagus, beets, broccoli, cantaloupe, carrots, bell peppers, kale, mangos, turnip and collard greens, oranges, peaches, pink grapefruit, pumpkin, winter squash, spinach, sweet potato, tangerines, tomatoes, and watermelon

**Selenium:** Brazil nuts, fish, shellfish, beef, poultry, barley, brown rice

**Zinc:** Beef, poultry, oysters, shrimp, sesame seeds, pumpkin seeds, chickpeas, lentils, cashews fortified cereals

**Phenolic compounds:** Quercetin (apples, red wine, onions), catechins (tea, cocoa, berries) resveratrol (red and white wine, grapes, peanuts, berries), coumaric acid (spices, berries), anthocyanins (blueberries, strawberries)

## **Ques.6 What are the most common types of probiotic bacteria?**

**Ans-** The most common types of probiotic bacteria

Though there are many types of bacteria that can be considered probiotics, there are two specific types of bacteria that are common probiotics found in stores. These include:

- ❖ Lactobacillus
- ❖ Bifidobacterium

Probiotics are also made up of good yeast. The most common type of yeast found in probiotics is:

- ❖ *Saccharomyces boulardii*

The screening process of probiotics which has been explained by the following mechanism:

- ❖ **Exertion for nutrients:** Within the gut valuable and pathogenic micro-organisms will be utilising the equivalent types of nutrients. This results in a general competition between various types of

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bacteria for these nutrients. When a probiotic is taken there is an overall decline in nutrients available competition of nutrients for pathogenic bacteria and as a result this minimises or decreases the levels of pathogenic/ infectious micro-organisms effectively.

- ❖ **Competition for adhesion sites:** Beneficial bacteria can affix to the gut wall and form colonies at various places throughout the gut. This ruin pathogenic infectious bacterium from gaining a foothold, ensuing in their eviction from the body.
- ❖ **Augmentation in digestion:** Probiotics have been exposed to increase the efficacy of digestion and therefore provide a step up in digestion.
- ❖ **Lactic acid fabrication:** Probiotics produce lactic acid which take action to reduce the gut pH, inhibiting the growth of pathogenic bacteria, which prefer a additional alkaline environment.
- ❖ **Effect on immunity:** Probiotics have been shown to boost the levels of cell-signalling chemicals and the efficacy of infection fighting cells (white blood cells).

### Ques.7 Mention the mode of action of prebiotics.

**Ans-** Important modes of action of prebiotics are:

- ❖ These are non-digestible carbohydrates that are not digested by the upper gastrointestinal tract and travel in the ileum and colon where fermented by the resident microbes
- ❖ Prebiotics do cause intestinal homeostasis.
- ❖ Host surface receptors are coated by prebiotics.
- ❖ They produce bacteriocins.
- ❖ Favorable bacteria produce short chain fatty acids with the help of non-digestible carbohydrates.
- ❖ Short-chain fatty acids are the energy source of epithelial cells.
- ❖ They regulate metabolic function and modulate immune system.

While most kinds of bacteria in the gut have a role to play in the body, many are less useful to us, or benign. Selective fermentation means that prebiotics can promote growth of these beneficial bacteria, without also feeding other types.

Benefits associated with a well-supported gut microbiome include:

- ❖ Boosting overall digestive health
- ❖ Improving the barrier function of the gut
- ❖ Supporting the immune system
- ❖ Reducing the inflammation and symptoms associated with a sensitive stomach
- ❖ Minimising the risk of developing diarrhoea
- ❖ Enhancing the body's mineral and nutrient uptake
- ❖ Contributing positively to your mental health, including stress, anxiety and sleep health
- ❖ Increasing absorption of calcium to improve bone density
- ❖ Lowering some potential risk factors for cardiovascular disease

### Ques.8 Explain dietary fibres.

**Ans-** Dietary Fibres

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Dietary fiber, also known as roughage, is the indigestible part of plant foods. Fiber has a host of health benefits, including reducing the risk of heart disease and type 2 diabetes.

Fiber is mostly in vegetables, fruits, whole grains, and legumes. There are two types of fiber soluble and insoluble and both play important roles in health:

- ❖ Insoluble fiber does not dissolve in water and adds bulk to the stool, preventing constipation.
- ❖ Soluble fiber absorbs water, forming a gel-like substance in the digestive system. Soluble fiber may help lower cholesterol levels and help regulate blood sugar levels.

This article looks at the different types of fiber, why they are important, and suggests some healthful fiber-rich foods.

## Types of dietary fiber

Fiber includes nonstarch polysaccharides, such as cellulose, dextrans, inulin, lignin, chitins, pectins, beta-glucans, waxes, and oligosaccharides.

Soluble and insoluble are the two types of dietary fiber.

Most high fiber containing foods have both insoluble and soluble fiber, so people do not need to think much about the difference. Instead, they can focus on overall fiber intake.

## Soluble fiber

Soluble fiber dissolves in water and forms a gel-like substance in the stomach. Bacteria later break the gel down in the large intestine. Soluble fiber provides some calories to the individual.

Soluble fiber provides the following benefits:

- ❖ lowering LDL cholesterol in the blood by affecting how the body absorbs dietary fat and cholesterol
- ❖ slowing absorption of other carbohydrates through digestion, which can help regulate blood sugar levels

## Good sources of soluble fiber include:

- ❖ Beans
- ❖ Oats
- ❖ Fruits
- ❖ Nuts
- ❖ vegetables

## Insoluble fiber

Insoluble fiber does not dissolve in water and passes through the gastrointestinal tract, mostly intact. It does not provide calories.

Insoluble fiber helps build bulk in the stool, helping a person pass stool more quickly. It can also help prevent constipation.

## Good sources of insoluble fiber include

- ❖ Fruits
- ❖ nuts

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- ❖ vegetables
- ❖ whole grain foods

### Ques.9 What are the benefits of a high-fibre diet?

#### Ans- Benefits of a High-fiber Diet

##### A high-fiber diet

- ❖ **Normalizes bowel movements:** Dietary fiber increases the weight and size of your stool and softens it. A bulky stool is easier to pass, decreasing your chance of constipation. If you have loose, watery stools, fiber may help to solidify the stool because it absorbs water and adds bulk to stool.
- ❖ **Helps maintain bowel health:** A high-fiber diet may lower your risk of developing hemorrhoids and small pouches in your colon (diverticular disease). Studies have also found that a high-fiber diet likely lowers the risk of colorectal cancer. Some fiber is fermented in the colon. Researchers are looking at how this may play a role in preventing diseases of the colon.
- ❖ **Lowers cholesterol levels:** Soluble fiber found in beans, oats, flaxseed, and oat bran may help lower total blood cholesterol levels by lowering low-density lipoprotein, or "bad," cholesterol levels. Studies also have shown that high-fiber foods may have other heart-health benefits, such as reducing blood pressure and inflammation.
- ❖ **Helps control blood sugar levels:** In people with diabetes, fiber particularly soluble fiber -can slow the absorption of sugar and help improve blood sugar levels. A healthy diet that includes insoluble fiber may also reduce the risk of developing type 2 diabetes.
- ❖ **Aids in achieving healthy weight:** High-fiber foods tend to be more filling than low-fiber foods, so you are likely to eat less and stay satisfied longer. And high-fiber foods tend to take longer to eat and to be less "energy dense," which means they have fewer calories for the same volume of food.
- ❖ **Helps you live longer:** Studies suggest that increasing your dietary fiber intake especially cereal fiber is associated with a reduced risk of dying from cardiovascular disease and all cancers

### Ques.10 Give the health benefits of omega-3-fatty acids.

#### Ans- Health Benefits of Omega-3 Fatty Acids

##### Blood fat (triglycerides).

**Fish oil** can lower elevated **triglyceride levels**. Having high levels of this **blood fat** puts you at **risk for heart disease and stroke**.

##### Rheumatoid arthritis

**Fish oil supplements** (EPA+DHA) may curb stiffness and **joint pain**. Omega-3 supplements also seem to boost the effectiveness of anti-inflammatory drugs.

##### Depression

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## PHARMACOGNOSY

Some researchers have found that cultures that eat foods with high levels of omega-3s have lower levels of **depression**. The effects of **fish oil** supplements on depression has been mixed. More research is needed to see if it can make a difference

### Baby Development

DHA appears to be important for visual and neurological development in infants

### Asthma

Diet high in omega-3s lowers **inflammation**, a key component in **asthma**. But more studies are needed to show if fish oil supplements improve **lung** function or cut the amount of **medication** a person needs to control the condition.

### Spirulina

Spirulina is a type of blue-green algae that contains a number of nutrients, including B vitamins beta-carotene and vitamin E. Spirulina also contains antioxidants, minerals, chlorophyll and phycocyanobilin and is commonly used as a source of vegan protein.

### Allergies

Spirulina holds some promise in the treatment of allergic rhinitis (nasal allergies), according to a review published in 2009. Indeed, a previously published study of people with allergic rhinitis found several benefits for spirulina consumption, including improvement in symptoms like nasal discharge sneezing, congestion and itching

### Diabetes

In a 2008 study involving 37 people with type 2 diabetes, researchers found that those assigned to 12 weeks of spirulina supplementation experienced a significant reduction in blood-fat levels Spirulina benefits also included a decrease in inflammation and, for some people, a decrease in blood pressure and cholesterol.

### Oral Cancer

Spirulina may offer some protection against oral cancer, according to one small study of tobacco chewers with precancerous oral lesions. For 12 months, study members took either a daily dose of spirulina or a **placebo**. By the study's end, the lesions cleared up in 20 of the 44 participants who had consumed spirulina (compared to three of the 43 participants who had been assigned to the placebo group)

## Ques.11 Write a short note on garlic.

### Ans- Garlic

Throughout history, many different cultures have recognized the potential use of garlic for prevention and treatment of different diseases. Recent studies support the effects of garlic and its extracts in a wide range of applications. These studies raised the possibility of revival of garlic therapeutic values in different diseases. Different compounds in garlic are thought to reduce the risk for cardiovascular diseases, have anti-tumour and anti-microbial effects, and show benefit on high blood glucose concentration.

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Garlic (*Allium sativum*) is a source of medicine in many ways in human beings in routine life as well as in animals and its leaves, flowers, and cloves have been used in traditional medicine for a long time. Research in recent decades has shown widespread pharmacological and therapeutic effects of *A. sativum* and its organosulfur compounds especially allicin. The most important chemical constituents of this plant are organosulfur compounds such as allicin, diallyl disulphide, S-allyl cysteine, and diallyl trisulfide. These chemicals were used for the treatment of inflammation, cancer, blood pressure, atherosclerosis, and hyperlipidaemia as praised by several authors. Additionally, extracts of garlic have been used to treat various diseases and have shown anti-viral, anti-bacterial, anti-fungal, anticoagulative and antioxidant effects.

### Therapeutics Applications

- ❖ Antimicrobial Activity
- ❖ Anti-bacterial activity
- ❖ Anti-viral activity
- ❖ Anti-fungal activity
- ❖ Anti-Cancer Activity
- ❖ Anti-Helminthic Activity
- ❖ Anti-Inflammatory Activity
- ❖ Anti-Coagulant/Fibrinolytic Activity
- ❖ Anti-Oxidative Activity

**Ques.12 Give the therapeutic and cosmetic uses of the following-**

- a) Sandalwood Oil**
- b) Rosemary Oil**
- c) Lavender Oil**
- d) Almond Oil**
- e) Aloe Vera Gel**

**Ans-**

**a) Sandalwood Oil**

**Therapeutics and cosmetic Uses**

- ❖ This relaxing oil has a harmonizing and calming effect which reduces tension and confusion and is ideal for use in depression, hectic daily lifestyles and states of fear, stress, nervous exhaustion, chronic illness, and anxiety.
- ❖ It is very useful for any chest complaints as it has a pronounced effect on the mucus membranes of both the pulmonary as well as genito-urinary tract- making it very effective for complaints of the urinary tract as well.
- ❖ Chronic chest infections, sore throats, and dry coughs as well as bronchitis and asthma can benefit greatly from this oil, as well as cystitis and bladder infections, also helpful with sexual problems such as frigidity and impotence.
- ❖ On the skin, sandalwood oil relieves itching and inflammation of the skin, and is most effective in relieving dehydrated skin making it great for anti-ageing skincare and the astringent action has a

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great toning effect and is also used with great results in oily skin conditions and to prevent the skin from forming ugly scars and for fighting dry eczema.

### b) Rosemary Oil

#### Therapeutics and Cosmetics Uses

- ❖ Rosemary oil has a pronounced action on the brain and the central nervous system and is wonderful for clearing the mind and mental awareness, while having excellent brain stimulant properties, as well as improving memory.
- ❖ It helps with headaches, migraines, neuralgia, mental fatigue and nervous exhaustion and the antiseptic action of rosemary oil is especially suitable for intestinal infections and diarrhoea, easing colitis, dyspepsia, flatulence, hepatic disorders and jaundice and relieving pain associated with rheumatism, arthritis, muscular pain and gout. It also helps for arteriosclerosis, palpitations, poor circulation, and varicose veins.

### c) Lavender Oil

#### Therapeutic and cosmetic Uses

- ❖ Lavender oil has a soothing and calming effect on the nerves, relieving tension, depression, panic, hysteria, and nervous exhaustion in general and is effective for headaches, migraines and insomnia.
- ❖ It is also very beneficial for problems such as bronchitis, asthma, colds, laryngitis, halitosis, throat infections and whooping cough and helps the digestive system deal with colic, nausea, vomiting and flatulence.
- ❖ Lavender oil relieves pain when used for rheumatism, arthritis, lumbago and muscular aches and pains, especially those associated with sport.
- ❖ On the skin, lavender oil tones and revitalizes and it is useful for all types of skin problems such as abscesses, acne, oily skin, boils, burns, sunburn, wounds, psoriasis, lice, insect bites, stings and acts as an insect repellent.
- ❖ Lavender oil is one of the few essential oils that can be used neat on the skin, and this is especially useful when treating a minor burn wound.

### d) Almond Oil

#### Therapeutics and Cosmetics Uses

Expressed almond oil is an emollient and an ingredient in cosmetics. Almond oil is used as a laxative, emollient, in the preparation of toilet articles and as a vehicle for oily injections. The volatile almond oils are used as flavouring agents.

### e) Aloe Vera Gel

#### Therapeutics & Current Uses

- ❖ **Beauty treatment:** Aloe Vera is perhaps one of the most widely used herbal remedies for topical skin conditions. This is because the gel-like components of the plant are known to heal the skin from a variety of minor ailments.

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- ❖ **First aid:** Aloe vera is an excellent first aid remedy for burns, scrapes, scalds, and sunburn. A leaf, broken off, releases soothing gel, which may be applied to the affected part
- ❖ **Skin conditions:** The gel is useful for almost any skin condition that needs soothing and astringing and will help varicose veins to some degree.
- ❖ **Ulcers:** The protective and healing effect of aloe vera also works internally, and the gel can be used for peptic ulcers and irritable bowel syndrome.

### **Ques.13 Give the qualitative analysis of the phytochemicals of the wood sample.**

#### **Ans- Qualitative Analysis of the Phytochemicals of the Wood Sample**

##### **Test for Tannins**

Analysis used was the method reported by Ejikeme et al.. Each wood powder sample (0.30 g) was weighed into a test tube and boiled for 10 minutes in a water bath containing 30 cm<sup>3</sup> of water. Filtration was carried out after boiling using number 42 (125 mm) Whatman filter paper. To 5 cm<sup>3</sup> of the filtrate was added 3 drops of 0.1% ferric chloride. A brownish green or a blue black colouration showed positive test.

##### **Test for Phlobatannins**

Analytical method is according to Ejikeme et al. To each sample (0.30 g) weighed into a beaker was added 30 cm of distilled water. After 24 hours of extraction, aqueous extract (10 cm) of each wood sample was boiled with 5 cm<sup>3</sup> of 1% aqueous hydrochloric acid. Deposit of red precipitate showed positive test.

##### **Test for Saponin**

Methodology is as reported by Ejikeme et al. Distilled water (30 cm<sup>3</sup>) was added to wood powder samples (0.30 g) and boiled for 10 minutes in water bath and filtered using Whatman filter paper number 42 (125 mm). A mixture of distilled water (5 cm<sup>3</sup>) and filtrate (10 cm<sup>3</sup>) was agitated vigorously for a stable persistent froth. The formation of emulsion on addition of three drops of olive oil showed positive result.

##### **Test for Steroid**

Analytical method used is according to Ejikeme et al. Each sample (0.30 g) weighed into a beaker was mixed with 20 cm of ethanol; the component was extracted for 2 hours. To the ethanolic extract of each sample (5 cm<sup>3</sup>) was added 2 cm<sup>3</sup> acetic anhydride followed with 2 cm<sup>3</sup> of concentrated tetraoxosulphate (VI) acid. A violet to blue or green colour change in sample(s) indicates the presence of steroids.

##### **Test for Terpenoids**

Methodology is as reported by Ejikeme et al. Each wood powder sample (0.30 g) was weighed into a beaker and extracted with 30 cm<sup>3</sup> and component extracted for 2 hours. A mixture of chloroform (2 cm<sup>3</sup>) and concentrated tetraoxo sulphate (VI) acid (3 cm<sup>3</sup>) was added to 5 cm of each extract to form a layer. The presence of a reddish-brown colouration at the interface shows positive results for the presence of terpenoids.

##### **Test for Flavonoids**

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The test for flavonoid adopted is as reported by Software and Harborne. Each sample (0.30 g) weighed into a beaker was extracted with 30 cm of distilled water for 2 hours and filtered with Whatman filter paper number 42 (125 mm). To 107cm<sup>3</sup> of the aqueous filtrate of each wood extract was added 5 cm<sup>3</sup> of 10 M dilute ammonia solution followed by the addition of 5 cm<sup>3</sup> of concentrated tetraoxo sulphate (VI) acid. Appearance of yellow colouration which disappeared on standing shows the presence of flavonoids.

### Test for Alkaloids

Test for flavonoid used is as reported by Hikino et al. Extraction of component from 2 grams of each wood powder sample was carried out using 5% tetraoxosulphate (VI) acid (H<sub>2</sub>SO<sub>4</sub>) (20 cm<sup>3</sup>) in 50% ethanol by boiling for 2 minutes and filtered through Whatman filter paper number 42 (125 mm). The filtrate was made alkaline using 5 cm<sup>3</sup> of 28% ammonia solution (NH<sub>3</sub>) in a separating funnel. Equal volume of chloroform (5.0 cm<sup>3</sup>) was used in further solution extraction in which chloroform solution was extracted with two 5 cm<sup>3</sup> portions of 1.0 M dilute tetraoxosulphate (VI) acid. This final acid extract was then used to carry out the following test: 0.5 cm<sup>3</sup> of Dragendorff's reagent (Bismuth potassium iodide solution) was mixed with 2 cm<sup>3</sup> of acid extract and precipitated orange colour infers the presence of alkaloid.

### Test for Glycoside

Glycoside test was conducted according to the method reported by Hikino et al. To 2.00 g of each sample was added 20 cm of water, heated for 5 minutes on a water bath and filtered through Gem filter paper (12.5 cm). The following tests were carried out with the filtrate (a) 0.2 cm<sup>3</sup> of Fehling's solutions A and B was mixed with 5 cm<sup>3</sup> of the filtrate until it became alkaline (tested with litmus paper). A brick-red colouration on heating showed a positive result. (b) Instead of water, 15 cm<sup>3</sup> of 1.0 M sulphuric acid was used to repeat the above test and the quantity of precipitate obtained compared with that of (a) above. High precipitate content indicates the presence of glycoside while low content shows the absence of glycoside.

## Ques.14 What are the materials used for the various methods for the investigation of phytochemicals?

**Ans- Phytochemical screening:** The prepared extract of all the ten plants was used to test various phytoconstituents present in them.

Different chemical reagents were prepared and specific test, for specific phytochemicals was done. These various tests were qualitative and hence termed phytochemical screening.

**Test for tannin/polyphenol:** To the diluted extract, 3-4 drops of 10% FeCl<sub>3</sub>, were added, blue color was seen for gallic tannins and the presence of catechol tannin turned the solution green.

**Test for reducing sugar:** To 0.5 ml of plant extract, 1mL of water, and 5-8 drops of Fehling's solution were added and heated. The presence of reducing sugar was indicated by the appearance of brick red precipitation.

**Test for quinine:** To the extract, freshly prepared FeSO<sub>4</sub>, solution (1 ml.) and ammonium thiocyanate were added then conc. H<sub>2</sub>SO<sub>4</sub>, was added drop by drop. The deep red color indicated the presence of quinine.

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**Test for glycosides:** Molisch's Reagent Test To the extract, 5 ml. Molisch's reagent and concentrated  $H_2SO_4$ , were added. Violet colour indicated glycosides.

**Test for flavonoids:** Shinoda test: 4 mL of extract solution, 1.5 mL of 50% methanol solution a small magnesium chunk was warmed. 5-6 drops of concentrated HCl were added, red color was observed for flavonoids. Dil.  $NH_3$ , test: 5 mL of dilute  $NH_3$ , solution in the extract was taken with the addition of conc.  $H_2SO_4$ , the appearance of yellow-coloured precipitation indicated flavonoids.

**Test for terpenoids** (Alamzed, et al. 2013) 0.2 g of each sample was mixed with 2 mL chloroform. 3 ml, conc.  $H_2SO_4$ , Reddish-brown coloration indicated the presence of terpenoids.

**Test for alkaloids:** Meyer's test (Talukdar & Chaudhary, 2010): To 2 ml of extract, 1 mL of Meyer's reagent was added. The presence of pale-yellow precipitate indicated the presence of alkaloids.

**Dragendroff's reagent test** (Alamed et al. 2013): 2 mL of extract was warmed with 2%  $H_2SO_4$ , Few drops of Dragendroff's reagent were added Orange-red precipitate indicated the presence of alkaloids.

**Test for saponins** (Alamzed et al. 2013): 2 g of powdered sample was boiled in 20 ml of distilled water 10 ml of filtrate; 5 ml. of distilled water were quivered vigorously. The appearance of frothing indicated the presence of saponins.

**Test for volatile oils:** 2 ml extract was shaken with 0.1 mL of NaOH and a small quantity of dilute HCl White precipitate indicated the presence of volatile oil.

**Test for cardiac glycosides:** 5 ml. of plant extract was treated with 2 ml. of glacial acetic acid with one drop of  $FeCl_3$ , solution. A violet ring may appear or a greenish ring may form just which showed the presence of cardiac glycosides.

**Test for steroids:** 1 g of plant extract was dissolved in a few drops of acetic acid and a drop of conc.  $H_2SO_4$ , was added. The appearance of green colour indicated the presence of steroids.