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HERBAL DRUG TECHNOLOGY

UNIT 1

TOPIC :

- **Indian Systems of Medicine**

- a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy
- b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma.



Pharmacy
Learn and Educate

Indian Systems of Medicine

- Indian Systems of Medicine are traditional healthcare systems used in India since ancient times for prevention and treatment of diseases. These systems use:
 - Herbal medicines
 - Minerals
 - Natural products
 - Diet and lifestyle control
 - Physical and mental therapies
- These systems focus on:
 - Balance of body and mind
 - Prevention of disease
 - Natural healing
- The major Indian Systems of Medicine are:
 1. Ayurveda
 2. Siddha
 3. Unani
 4. Homeopathy
- These systems are officially recognized in India under the Ministry of AYUSH.

Objectives of Indian Systems of Medicine

1. Prevention of disease
2. Promotion of health
3. Treatment of illness
4. Maintenance of physical and mental balance
5. Improvement of immunity and longevity

Characteristics of Indian Systems of Medicine

- Based on natural principles
- Uses herbal and mineral medicines
- Holistic approach
- Focus on prevention
- Personalized treatment
- Fewer side effects (generally)

Ayurveda

- Ayurveda is one of the oldest systems of medicine in the world. It originated in India more than 5000 years ago and is based on natural methods for maintaining health and treating diseases.
- Ayurveda focuses on:
 - Prevention of disease
 - Promotion of health
 - Balance of body, mind, and soul
- It mainly uses:
 - Herbs
 - Minerals
 - Natural products
 - Diet control
 - Lifestyle modifications
- Ayurveda is the ancient Indian system of medicine that deals with healthy living and treatment of diseases through natural therapies.
- The word Ayurveda is derived from:
 - “Ayur” meaning Life
 - “Veda” meaning Knowledge
- Therefore: Ayurveda means “Science of Life”.



History of Ayurveda

- Ayurveda developed in ancient India and is associated with Vedic knowledge.
- Important Ayurvedic texts:
 1. Charaka Samhita
 2. Sushruta Samhita
 3. Ashtanga Hridaya

Important scholars:

- Charaka
- Sushruta

Objectives of Ayurveda

1. Prevention of disease
2. Promotion of health
3. Cure of diseases

4. Increase lifespan
5. Maintenance of physical and mental balance

Fundamental Principles of Ayurveda

1. Panchamahabhuta Theory (Five Basic Elements)

According to Ayurveda, the human body and universe are made up of five basic elements.

Element	Meaning	Function
Prithvi	Earth	Structure and strength
Jala	Water	Fluid balance
Agni	Fire	Digestion and metabolism
Vayu	Air	Movement
Akasha	Space	Body cavities

2. Tridosha Theory

This is the most important principle of Ayurveda.

According to this theory, the body contains three doshas (biological energies).

Dosha	Composition	Functions
Vata	Air + Space	Movement, nerve impulses, breathing
Pitta	Fire + Water	Digestion, metabolism, body temperature
Kapha	Earth + Water	Stability, lubrication, immunity

Functions of Doshas

A. Vata Dosha

Controls:

- Movement
- Respiration
- Nervous system
- Blood circulation

Imbalance causes:

- Anxiety
- Constipation
- Joint pain

B. Pitta Dosha

Controls:

- Digestion
- Metabolism
- Vision
- Body temperature

Imbalance causes:

- Acidity
- Fever
- Skin disorders

C. Kapha Dosha

Provides:

- Strength
- Stability
- Lubrication
- Immunity

Imbalance causes:

- Obesity
- Cough
- Congestion

3. Sapta Dhatu (Seven Body Tissues)

Ayurveda describes seven body tissues responsible for nourishment and growth.

Dhatu	Function
Rasa	Nutrition
Rakta	Blood circulation
Mamsa	Muscle formation
Meda	Fat storage
Asthi	Bone formation
Majja	Bone marrow and nerves
Shukra	Reproduction

4. Mala (Waste Products)

Malas are waste products formed in the body.

Main malas:

1. Urine
2. Sweat

3. Feces

Proper elimination is essential for health.

5. Agni (Digestive Fire)

Agni represents digestive and metabolic power.

Functions:

- Digestion of food
- Nutrient absorption
- Energy production

Weak Agni causes improper digestion and disease.

6. Prakriti (Body Constitution)

Each person has a natural body constitution depending on dominance of doshas.

Types:

- Vata type
- Pitta type
- Kapha type

Treatment and diet depend on Prakriti.

Advantages of Ayurveda

- Natural treatment
- Holistic approach
- Preventive healthcare
- Fewer side effects
- Useful for chronic diseases
- Improves overall wellness

Disadvantages of Ayurveda

- Slow action
- Long treatment duration
- Lack of standardization in some products
- Possible toxicity if improperly prepared

Siddha System

→ Siddha is one of the oldest traditional systems of medicine in India. It originated mainly in South India and is widely practiced in Tamil Nadu.

→ The Siddha system is based on:

- Natural healing
- Balance of body elements
- Spiritual principles
- Use of herbs, minerals, and metals

→ It focuses on:

- Prevention of disease
- Promotion of health
- Rejuvenation and longevity

→ Siddha is an ancient Indian system of medicine developed by Siddhars (saints or enlightened persons) for maintaining physical, mental, and spiritual health through natural methods.

→ The word “Siddha” means:

→ “Achievement” or “Perfection”



Objectives of Siddha

1. Prevention of diseases
2. Promotion of healthy life
3. Rejuvenation of body
4. Delay of aging
5. Attainment of spiritual wellness
6. Increase in lifespan

Basic Principles of Siddha

1. Five Element Theory (Panchabhutas)

According to Siddha, the human body is made up of five basic elements.

Element	Function
Earth	Structure and strength
Water	Fluid balance
Fire	Digestion and metabolism
Air	Movement
Ether (Space)	Body cavities

These elements maintain body functions and health.

2. Three Humors (Mukkutram)

The body contains three humors that control all physiological activities.

Humor	Tamil Name	Function
Vata	Vatham	Movement and nervous functions
Pitta	Pitham	Digestion and metabolism
Kapha	Kabham	Stability and lubrication

Functions of Humors

A. Vatham

Controls:

- Movement
- Breathing
- Blood circulation
- Nervous system

Imbalance causes:

- Joint pain
- Paralysis
- Nervous disorders

B. Pitham

Controls:

- Digestion
- Body temperature
- Hunger
- Metabolism

Imbalance causes:

- Fever
- Acidity
- Skin diseases

C. Kabham

Provides:

- Strength
- Lubrication
- Stability
- Immunity

Imbalance causes:

- Obesity
- Cough
- Respiratory disorders

Disease According to Siddha

Disease occurs due to:

- Imbalance of humors
- Improper diet
- Environmental changes
- Mental stress
- Poor lifestyle

3. 96 Tattvas

Siddha describes 96 principles called Tattvas which control body and mind.

These include:

- Sense organs
- Actions
- Mind
- Intelligence
- Emotions
- Physiological functions

They help in understanding:

- Human behavior
- Disease conditions
- Spiritual growth

4. Uyir Thathukkal

These are life forces responsible for body functions.

They include:

- Vatham
- Pitham
- Kabham

5. Udal Thathukkal (Body Tissues)

These are seven body tissues.

Tissue	Function
Saaram	Nutrition
Cheneer	Blood

Oon	Muscles
Kozhuppu	Fat
Enbu	Bones
Moolai	Bone marrow
Sukkilam/Suronitham	Reproductive tissue

6. Kayakalpa Therapy

Kayakalpa is a rejuvenation therapy used to:

- Delay aging
- Improve immunity
- Increase lifespan

It includes:

- Herbal medicines
- Special diets
- Yoga and meditation

Diagnosis in Siddha

Diagnosis is based on:

- Pulse examination
- Observation
- Urine examination
- Tongue examination
- Voice and skin examination

Eight Diagnostic Methods (Envagai Thervu)

Method	Observation
Naa	Tongue
Niram	Color
Mozhi	Speech
Vizhi	Eyes
Sparisam	Touch
Malam	Stool
Moothiram	Urine
Naadi	Pulse

Treatment Methods in Siddha

1. Internal Medicines

Medicines taken orally.

Examples

- Churna
- Tablets
- Decoctions
- Oils

2. External Therapies

Includes:

- Massage
- Fomentation
- Medicated baths
- Poultices

Medicines Used in Siddha

Prepared from:

- Herbs
- Metals
- Minerals
- Animal products

Advantages of Siddha

1. Holistic treatment
2. Natural medicines
3. Rejuvenation effects
4. Useful for chronic diseases
5. Emphasis on prevention

Disadvantages of Siddha

1. Standardization problems
2. Slow therapeutic action
3. Toxicity risk if metals are improperly processed
4. Limited scientific validation in some therapies

Unani System

- Unani system of medicine is one of the oldest traditional systems of healthcare. It originated in Greece and was later developed by Arab and Persian physicians.
- The word “Unani” means:
 - “Greek”
- Unani medicine is based on:
 - Natural healing
 - Balance of body humors
 - Diet and lifestyle management
- It uses:
 - Herbal drugs
 - Mineral drugs
 - Animal products
 - Regimental therapies
- The system focuses on:
 - Prevention of disease
 - Maintenance of health
 - Restoration of body balance



History of Unani System

The Unani system originated in ancient Greece.

The principles were developed by:

- Hippocrates
- Galen

Later it was improved by Arab and Persian scholars such as:

- Avicenna

Avicenna wrote the famous book:

Canon of Medicine

Unani medicine was introduced into India by Arab and Persian physicians during medieval times.

Unani system of medicine is a traditional healing system based on the theory of balance of humors and natural body functions for prevention and treatment of diseases.

Objectives of Unani Medicine

1. Maintenance of health
2. Prevention of disease
3. Treatment of illness
4. Restoration of body balance
5. Promotion of healthy lifestyle

Basic Principles of Unani System

1. Four Elements Theory

According to Unani, the human body and universe are composed of four basic elements.

Element	Quality
Earth	Cold and dry
Water	Cold and moist
Air	Hot and moist
Fire	Hot and dry

These elements combine to form body structures and functions.

2. Four Humors Theory (Akhlat)

The body contains four humors that maintain health.

Humor	Arabic Name	Nature
Blood	Dam	Hot and moist
Phlegm	Balgham	Cold and moist
Yellow bile	Safra	Hot and dry
Black bile	Sauda	Cold and dry

Functions of Humors

A. Blood (Dam)

Functions:

- Nourishment
- Growth
- Vitality

Excess causes:

- High fever
- Bleeding disorders

B. Phlegm (Balgham)

Functions:

- Lubrication
- Cooling effect

Excess causes:

- Cold
- Cough
- Respiratory problems

C. Yellow Bile (Safra)

Functions:

- Digestion
- Metabolism

Excess causes:

- Acidity
- Irritability
- Fever

D. Black Bile (Sauda)

Functions:

- Stability
- Structure

Excess causes:

- Depression
- Constipation

Disease According to Unani

Disease occurs due to:

- Imbalance of humors
- Poor diet
- Environmental factors
- Mental stress
- Improper lifestyle

Health is restored by correcting humor imbalance.

3. Mizaj (Temperament)

Mizaj means the individual temperament or nature of a person.

Each person has a unique temperament based on humor dominance.

Types of Temperament

Type	Characteristics
Hot	Warm body, active
Cold	Low energy, sensitive to cold
Moist	Soft body tissues
Dry	Rough and dry body

Treatment is selected according to Mizaj.

4. Quwwat-e-Mudabbira-e-Badan

→ It is the natural healing power of the body.

→ According to Unani, the body can heal itself if proper conditions are provided.

5. Arkan and Aaza

Arkan

→ Basic elements of the body.

Aaza

→ Organs formed from these elements.

Diagnosis in Unani

Diagnosis is based on:

- Pulse examination
- Urine examination
- Stool examination
- Observation of symptoms
- Patient history

Treatment Methods in Unani

1. Ilaj-bit-Tadbeer (Regimental Therapy)

Treatment using physical methods.

Examples

- Exercise
- Massage
- Cupping
- Bath therapy
- Steam bath

2. Ilaj-bit-Ghiza (Dietotherapy)

Treatment through special diets.

Importance

Food is considered an important medicine.

3. Ilaj-bit-Dawa (Pharmacotherapy)

Treatment using medicines.

Medicines may contain:

- Herbs
- Minerals
- Animal products

4. Ilaj-bit-Yad (Surgery)

Minor surgical procedures when necessary.

Unani Medicines

Unani medicines are mainly natural in origin.

Common Dosage Forms

Dosage Form	Description
Safoof	Powder
Sharbat	Syrup
Majoon	Semisolid preparation
Hab	Pills/tablets
Roghan	Medicated oil
Joshanda	Decoction

Examples of Unani Medicines

Medicine	Uses
Sharbat-e-Unnab	Cough
Majoon-e-Falasifa	Weakness
Roghan-e-Badam	Brain tonic

Advantages of Unani Medicine

1. Natural treatment
2. Holistic approach
3. Personalized therapy
4. Focus on prevention

Disadvantages of Unani Medicine

1. Slow therapeutic action
2. Lack of scientific validation in some therapies
3. Standardization difficulties

Homeopathy

- Homeopathy is a system of medicine based on the principle:
- “Like cures like”
- It uses very small doses of medicines prepared from natural substances to stimulate the body’s healing power.
- Homeopathy focuses on:
 - Holistic treatment
 - Individualized therapy
 - Natural healing
- Medicines are prepared from:
 - Plants
 - Minerals
 - Animal substances
- Homeopathy is a therapeutic system of medicine in which diseases are treated using small doses of substances that produce similar symptoms in healthy individuals.
- The word Homeopathy is derived from:
 - “Homoios” meaning Similar
 - “Pathos” meaning Suffering
- Homeopathy means “Similar suffering”.



Founder of Homeopathy

- Homeopathy was developed by:
 - Samuel Hahnemann
- He was a German physician who introduced this system in the late 18th century.

Objectives of Homeopathy

1. Cure diseases naturally
2. Stimulate body’s self-healing power
3. Treat the patient as a whole
4. Provide safe treatment with minimal side effects

Fundamental Principles of Homeopathy

1. Law of Similars

A substance that produces symptoms in a healthy person can cure similar symptoms in a diseased person.

This principle is called:
"Similia Similibus Curentur"
meaning:
"Let likes be cured by likes."

Example

- Onion causes watery eyes and nasal discharge in healthy people.
- Therefore, homeopathic onion preparation is used for common cold with similar symptoms.

Importance

This is the basic foundation of homeopathic treatment.

2. Law of Minimum Dose

Homeopathic medicines are given in very small doses.

Purpose

- Reduce toxicity
- Avoid side effects
- Stimulate healing gently

According to homeopathy:

Smaller doses produce better therapeutic effects.

3. Potentization

Potentization is the process of:

- Repeated dilution
- Vigorous shaking (succussion)

to increase medicinal power.

Steps in Potentization

1. Drug substance is diluted
2. The solution is shaken vigorously
3. The process is repeated many times

Types of Potencies

Type	Description
Decimal potency	1:10 dilution
Centesimal potency	1:100 dilution
LM potency	Special dilution system

Importance of Potentization

- Reduces toxicity
- Enhances therapeutic action according to homeopathic theory

4. Individualization

Treatment is based on the individual patient rather than only the disease.

The physician considers:

- Physical symptoms
- Mental condition
- Emotional state
- Personality

Example

Two patients with the same disease may receive different medicines depending on symptoms.

5. Drug Proving

Drug proving is the testing of medicines on healthy individuals to identify symptoms produced by the drug.

These symptoms help determine therapeutic uses.

Procedure

1. Healthy volunteers take medicine
2. Symptoms produced are recorded
3. These symptoms guide clinical use

6. Vital Force Theory

According to homeopathy, the body contains a vital force that maintains health.

Disease occurs when this vital force becomes disturbed.

Homeopathic medicines help restore balance.

Sources of Homeopathic Medicines

Medicines are prepared from:

- Plants
- Minerals
- Animal products
- Biological materials

Examples

Source	Example
Plant	Belladonna
Mineral	Sulphur
Animal	Sepia

Dosage Forms in Homeopathy

Dosage Form	Description
Globules	Small sugar pills
Dilutions	Liquid preparations
Tablets	Solid dosage forms
Tinctures	Alcoholic extracts
Ointments	External preparations

Common Homeopathic Medicines

Medicine	Uses
Arnica	Injury and bruises
Belladonna	Fever and inflammation
Nux vomica	Digestive disorders
Rhus toxicodendron	Joint pain
Aconite	Fever and anxiety

Diagnosis in Homeopathy

Diagnosis is based on:

- Symptoms
- Mental state
- Physical condition
- Patient behavior
- Medical history

Advantages of Homeopathy

1. Small doses used
2. Generally fewer side effects
3. Non-invasive treatment
4. Suitable for chronic diseases
5. Individualized treatment

Disadvantages of Homeopathy

1. Slow therapeutic action
2. Scientific controversy regarding mechanism
3. Limited usefulness in emergencies alone
4. Requires detailed case analysis

Preparation and Standardization of Ayurvedic Formulations

Ayurvedic formulations are traditional medicinal preparations prepared from:

- Herbs
- Minerals
- Metals
- Natural substances

These formulations are used for:

- Prevention of diseases
- Treatment of disorders
- Health promotion

Standardization is very important to ensure:

- Quality
- Purity
- Safety
- Therapeutic effectiveness

Common Ayurvedic formulations include:

1. Aristas and Asavas
2. Ghutika (Vati)
3. Churna
4. Lehya (Avaleha)
5. Bhasma

1. Aristas and Asavas

Aristas and Asavas are Ayurvedic fermented liquid preparations containing self-generated alcohol produced during fermentation.

The alcohol formed acts as:

- Preservative
- Solvent for active constituents

These formulations improve:

- Drug absorption
- Shelf life

Difference Between Arista and Asava

Arista	Asava
Prepared from decoction	Prepared from fresh juice
Requires boiling	No boiling required
More heating involved	Less heating involved

A. Arista

→ Arista is a fermented Ayurvedic liquid preparation prepared from herbal decoctions.

Preparation of Arista

Step 1: Preparation of Decoction

Herbal drugs are:

- Cleaned
- Dried
- Coarsely powdered

The powder is boiled with water until reduced to required volume.

Step 2: Filtration

The decoction is filtered to remove solid particles.

Step 3: Addition of Sweetening Agents

Sugar, jaggery, or honey is added.

Purpose:

- Fermentation medium
- Improves taste

Step 4: Addition of Fermenting Agent

Fermenting agents like:

- Dhataki flowers (*Woodfordia fruticosa*) are added.

Step 5: Fermentation

The mixture is stored in airtight containers for several days.

During fermentation:

- Alcohol is naturally produced.

Step 6: Filtration and Storage

The final product is:

- Filtered
- Stored in airtight containers

Examples of Arista

Formulation	Uses
Ashokarishta	Gynecological disorders
Dashmoolarishta	Weakness and inflammation

B. Asava

→ Asava is a fermented liquid Ayurvedic preparation prepared from fresh herbal juice or cold infusion without boiling.

Preparation of Asava

Step 1: Preparation of Juice/Infusion

Fresh herbs are crushed and juice is extracted.

Step 2: Addition of Sugar or Jaggery

Provides medium for fermentation.

Step 3: Addition of Fermenting Agents

Dhataki flowers are added.

Step 4: Fermentation

Stored in airtight containers until fermentation completes.

Step 5: Filtration and Packaging

Filtered and stored properly.

Examples of Asava

Formulation	Uses
Kumaryasava	Digestive disorders
Lohasava	Anemia

Standardization of Aristas and Asavas

Parameters Evaluated

Organoleptic Properties

- Color
- Odor
- Taste

Physicochemical Tests

- Alcohol content
- pH
- Specific gravity
- Total solids

Microbial Tests

- Absence of harmful microorganisms

Chemical Analysis

- Marker compounds
- TLC/HPLC fingerprinting

Advantages

- Long shelf life
- Easy absorption
- Improved stability

2. Ghutika (Vati)

→ Ghutika or Vati are Ayurvedic solid dosage forms prepared in the form of tablets or pills.

Preparation of Ghutika

Step 1: Powdering

All herbal ingredients are dried and powdered separately.

Step 2: Sieving

Powders are sieved to obtain uniform particle size.

Step 3: Mixing

All powders are mixed uniformly.

Step 4: Addition of Binding Agent

Binders like:

- Honey
- Ghee
- Plant juices are added.

Step 5: Preparation of Dough

A soft mass or dough is prepared.

Step 6: Rolling and Cutting

The dough is rolled into pills or compressed into tablets.

Step 7: Drying

The pills are dried under shade or controlled temperature.

Examples of Ghutika

Formulation	Uses
Chandraprabha Vati	Urinary disorders
Sanjivani Vati	Fever and indigestion

Standardization of Ghutika

Physical Tests

- Weight variation
- Hardness
- Friability
- Disintegration time

Chemical Tests

- Assay of active constituents

Microbial Tests

- Microbial load evaluation

Advantages

- Easy administration
- Accurate dose
- Better stability

3. Churna

→ Churna is a fine powder prepared from dried herbal drugs.

→ It is one of the simplest Ayurvedic dosage forms.

Preparation of Churna

Step 1: Collection and Cleaning

Herbs are:

- Collected
- Cleaned
- Freed from impurities

Step 2: Drying

The materials are dried properly to remove moisture.

Step 3: Pulverization

The dried drugs are powdered using grinders or pulverizers.

Step 4: Sieving

Powder is passed through sieves to obtain uniform particle size.

Step 5: Mixing

Different powders are mixed uniformly.

Step 6: Packaging

Stored in airtight containers.

Examples of Churna

Formulation	Uses
Triphala Churna	Constipation
Hingvashtak Churna	Digestive disorders

Standardization of Churna

Organoleptic Evaluation

- Color
- Taste
- Odor

Physicochemical Tests

- Moisture content
- Ash value
- Extractive value
- Particle size

Microbial Testing

- Bacterial and fungal count

Advantages

- Easy preparation
- Rapid absorption
- Economical

Disadvantages

- Bitter taste
- Moisture sensitivity

4. Lehya (Avaleha)

→ Lehya or Avaleha is a semisolid Ayurvedic preparation prepared using:

- Herbal drugs
- Sugar
- Honey
- Jaggery

→ It is meant to be licked.

Preparation of Lehya

Step 1: Preparation of Decoction

Herbs are boiled with water.

Step 2: Filtration

The decoction is filtered.

Step 3: Addition of Sweetening Agents

Sugar or jaggery is added.

Step 4: Heating

The mixture is heated until semisolid consistency develops.

Step 5: Addition of Honey and Flavoring Agents

Added after cooling.

Step 6: Packaging

Stored in airtight containers.

Examples of Lehya

Formulation	Uses
Chyawanprash	Immunity booster
Vasavaleha	Respiratory disorders

Standardization of Lehya

Physical Tests

- Consistency, Viscosity

Chemical Tests

- Sugar content
- Moisture content

Microbial Testing

- Absence of contamination

Advantages

- Palatable
- Nutritive

5. Bhasma

- Bhasma are Ayurvedic calcined preparations obtained from purified metals and minerals through repeated incineration.
- Bhasmas are extremely fine powders intended for internal use.

Preparation of Bhasma

Step 1: Shodhana (Purification)

Impurities are removed from metals/minerals using:

- Herbal juices
- Oils
- Heating and quenching

Step 2: Bhavana (Trituration)

The purified material is triturated with herbal juices to make a fine paste.

Purpose:

- Increase fineness
- Improve medicinal properties

Step 3: Marana (Calcination)

The material is heated repeatedly in closed containers.

This converts metals into fine ash.

Step 4: Pulverization

The final calcined material is powdered finely.

Examples of Bhasma

Bhasma	Uses
Swarna Bhasma	Immunity and weakness
Lauha Bhasma	Anemia
Abhraka Bhasma	Respiratory disorders

Standardization of Bhasma

Traditional Tests

Test	Purpose
Rekhapurnata	Fineness test
Varitaratva	Floating test
Nishchandratva	Absence of metallic shine

Modern Analytical Tests

Physicochemical Tests

- Particle size analysis
- Ash value

Instrumental Analysis

- XRD (X-ray diffraction)
- SEM (Scanning electron microscopy)
- AAS (Atomic absorption spectroscopy)

Toxicity Testing

- Heavy metal analysis
- Safety evaluation