

HERBAL DRUG TECHNOLOGY

UNIT 5 NOTES

HERBAL DRUG INDUSTRY

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HERBAL INDUSTRY

- The Herbal Industry deals with cultivation, processing, formulation & marketing of medicines obtained from plants.
- Herbal drugs are mainly derived from medicinal & aromatic plants & are widely used in traditional systems of medicine such as Ayurveda, Siddha, Unani, Yoga & Naturopathy.
- India has long history of using herbal medicines since ancient civilization.
- Even today, herbal drugs are preferred because they are natural, comparatively safe, less toxic, easily available & affordable.

PRESENT SCOPE OF HERBAL DRUG HISTORY

INCREASING POPULARITY

- Herbal drugs are gaining popularity worldwide.
- People prefer herbal medicines due to fewer side effects compared to synthetic drugs.
- There is increasing demand for Natural & preventive healthcare.

USE IN INDIAN HEALTHCARE SYSTEM

- In India, herbal medicines form a major part of recognized systems like:
 - Ayurveda
 - Siddha
 - Unani
 - Yoga & Naturopathy
- A large percentage of the Indian population still depends on non-allopathic systems for primary healthcare.

MARKET GROWTH

- India has rich biodiversity & raw drugs are obtained from thousand of plant species.
- The herbal industry is one of fastest growing sectors.
- India exports herbal raw materials & finished products to many countries.

INTERNATIONAL SCOPE

- According to WHO, a significant number of modern drugs are derived from plants.
- Many plant based active compounds are used in modern medicine.
- Traditional herbal knowledge has helped in the development of new therapeutic agents.
- Herbal medicines are now included in modern pharmacopoeias.

GOVERNMENT SUPPORT

- Establishment of Ministry of AYUSH.
- Promotion of Ayurveda & Herbal products in India and abroad.
- Support for research, cultivation & standardization.

FUTURE PROSPECTS

RAPID GROWTH

- The global herbal medicine market was valued at over USD 100 - 105 billion in 2024 - 2025 and is expected to grow significantly in the coming decade.
- The Indian herbal medicine market earned around USD 5.9 billion in 2024 and is forecast to expand rapidly, possibly reaching USD ~ 26.8 billion by 2030 at a CAGR close to 8%.

INCREASING GLOBAL ACCEPTANCE

- Herbal drugs are considered safer for long-term use
- Increased use in preventive & lifestyle-related healthcare

SCIENTIFIC VALIDATION

- Standardization of herbal raw materials & formulations
- Conduction of preclinical & clinical studies
- Improvement in quality, safety & efficacy of herbal drugs

INTEGRATION WITH MODERN HEALTHCARE SYSTEM

- In coming years herbal drugs will be used as adjuvant therapy with allopathic medicines
- This will be helpful in management of chronic & lifestyle diseases.

DEVELOPMENT OF MODERN HERBAL FORMULATIONS

- Formulation of standardized extracts in tablets & capsules
- Development of sustained-release & novel drug delivery systems
- Improved bioavailability & stability of herbal drugs
- Better patient convenience & dosing accuracy

INCREASING EXPORT POTENTIAL

- High global demand for Indian herbal products
- Export opportunities to USA, Europe & Asian countries growth in foreign exchange earnings
- Strengthening of India's global position in herbal medicine

EMPLOYMENT & RESEARCH OPPORTUNITIES

- Increased demand for skilled professionals
- Opportunities in R&D, quality control, & manufacturing
- Scope for entrepreneurship in herbal sector

PLANT BASED INDUSTRIES IN INDIA

- Plant-based industries in India mainly focuses on the manufacture of herbal medicines, Ayurvedic formulations, nutraceuticals & personal care products derived from medicinal plants.
- India has a strong base of traditional medicine systems like Ayurveda, & Unani, which supports the growth of these industries.

MAJOR PLANT-BASED (HERBAL) INDUSTRIES IN INDIA

① HIMALAYA HERBALS

- One of the most well-known herbal companies in India.
- Produces a wide range of herbal medicines, personal care & healthcare products.
- Known for research-based herbal formulations.

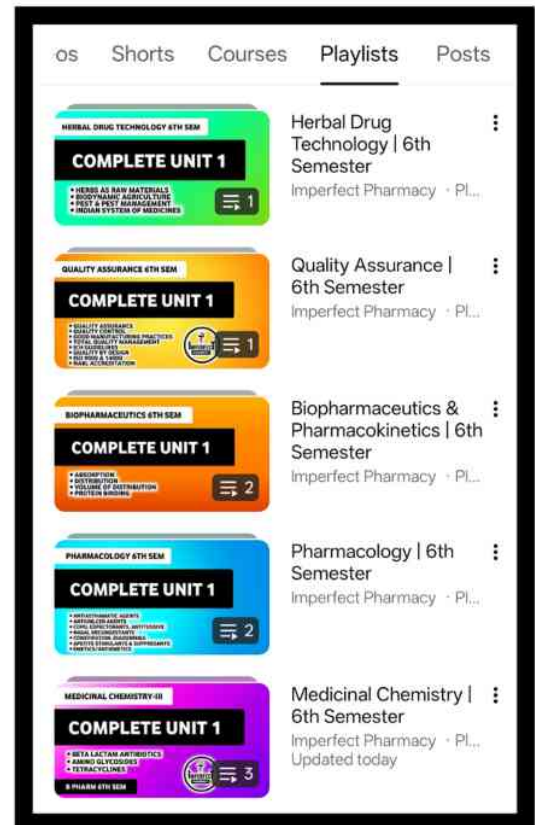
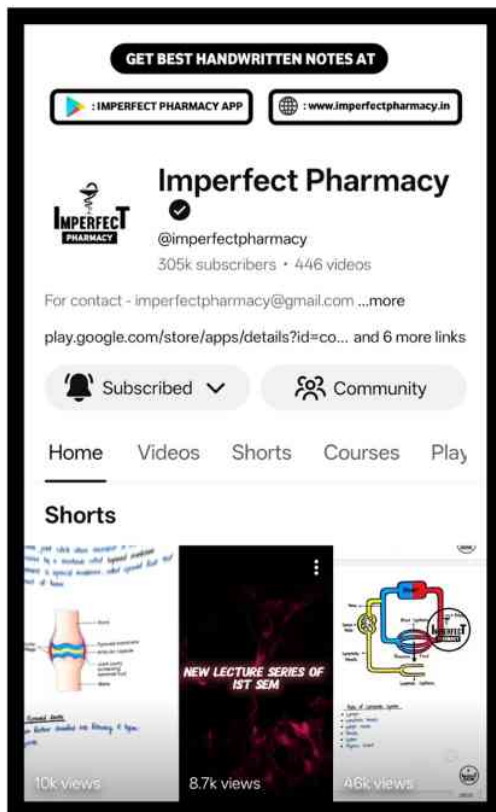
② DABUR INDIA

- A leading producer of Ayurvedic medicines & natural healthcare products.
- Has a legacy of more than 100 years.
- Known for research-based herbal formulations.

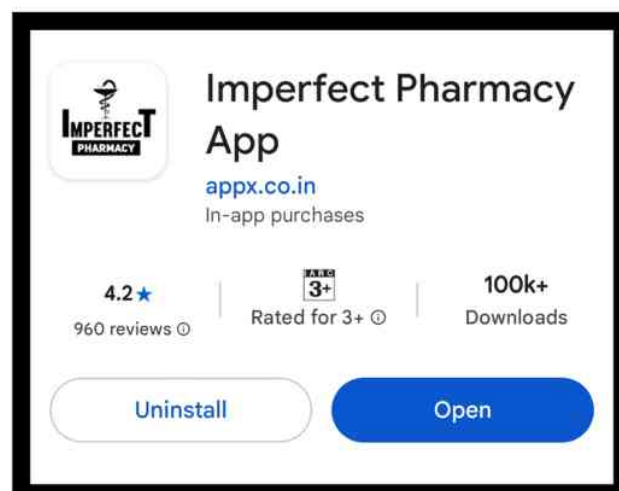
③ PATANJALI AYURVED

- Founded by Baba Ramdev & Acharya Balkrishna.
- Offers a wide range of Ayurvedic medications, herbal supplements, food products & personal care items.
- Promotes Ayurveda at National & international levels.

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④ ALICANTO BIOTECH

- A reputed Ayurvedic manufacturing & marketing company.
- Known for quality control & innovative herbal technologies.
- Produces a variety of Ayurvedic formulations.

⑤ BAIDYANATH

- One of the oldest Ayurvedic pharmaceutical companies
- Manufactures classical Ayurvedic medicines, herbal supplement, skincare & haircare products.
- Strong focus on traditional formulations.

⑥ SRI SRI TATVA

- Inspired by Sri Sri Ravi Shankar.
- Produces Ayurvedic medicines, herbal supplements, skin care & haircare products.

⑦ ZANDU AYURVEDA

- Part of Emami group.
- Specializes in herbal healthcare products for digestion, immunity & joint health.
- Well-known for classical Ayurvedic formulations.

⑧ AIMIL PHARMACEUTICALS

- Focuses on blending modern scientific research with Ayurvedic principle.
- Manufactures herbal medicines for various chronic & lifestyle diseases.

⑨ HAMDARD

- Established in 1906
- Famous for Unani medicines & herbal formulations.
- Known for products promoting overall wellness.

⑩ VICCO LABORATORIES

- Renowned of herbal dentals & skincare products.
- Popular for Ayurvedic toothpaste, creams & turmeric-based formulations.

IMPORTANCE OF PLANT-BASED INDUSTRIES

- Promote natural & safe healthcare products.
- Preserve & utilize traditional medicinal knowledge.
- Support Ayurveda, Unani & Siddha herbal medicine systems.
- Contribute to employment, exports & economic growth.

MEDICINAL & AROMATIC PLANT-BASED INSTITUTIONS IN INDIA

- India is one of the richest countries in the world in terms of medicinal & aromatic plant diversity.
- It is estimated that India has uses nearly 8000 medicinal plant species in traditional & modern healthcare systems.
- The country has a strong network of research institutions, universities, council & industries working in the areas of medicinal plants, Ayurveda, Siddha, Unani & Herbal drug development.

ROLE OF THESE INSTITUTIONS

- Conservation & cultivation of medicinal plants
- Scientific validation of traditional medicines
- Development of standardized herbal formulations
- Quality control & safety evaluation.
- Promoting Ayurveda, Siddha & Unani systems
- Documentation of traditional knowledge

MEDICINAL & PLANT - BASED INSTITUTIONS IN INDIA

- CCRAS (Central Council For Research in Ayurveda and Siddha) - New Delhi
- CCRUM (Central Council for Research in Unani Medicine) - New Delhi
- CSIR - NBRI (National Botanical Research Institute) - Lucknow
- CSIR - CDRI (Central Drug Research Institute) - Lucknow
- CIMAP (Central Institute of Medicinal & Aromatic Plants) - Lucknow
- ICMR (Indian Council of Medical Research) - New Delhi
- National Medicinal Plants Board (NMPB) - New Delhi
- Gujarat Ayurveda University - Jamnagar
- National Institute of Ayurveda - Jaipur
- Banaras Hindu University - Varanasi (BHU)
- FRLHT (Foundation of Revitalisation of Local Health Tradition) - Bengaluru
- Botanical Survey of India - Kolkata
- NBPGRI (National Bureau of Plant Genetic Resources) - New Delhi
- IMPCOPS - Chennai
- Indian Drug Manufacturers Association (IDMA) - Mumbai
- Ayurvedic Drug Manufacturing Association (ADMA) - Mumbai
- TBGRI (Tropical Botanical Garden & Research Institute) - Thiruvananthapuram

IMPORTANCE OF THESE INSTITUTIONS

- Strengthen India's Herbal & Traditional medicine sector
- Promote global acceptance of Indian medicinal plants
- Support research - based herbal drug development
- Protect traditional knowledge & biodiversity

SCHEDULE T - GMP

- Schedule T is a part of the D & C Rules, 1945, which specifies Good Manufacturing Practices (GMP) for drugs of the Indian Systems of Medicine (ISM).
- These include :
 - Ayurveda
 - Siddha
 - Unani
- Schedule T came into force to ensure that ASU medicines are manufactured under controlled, hygienic & standardized conditions so that the final products are safe, effective & of consistent quality.

OBJECTIVES OF GMP

- To ensure quality, safety & purity of ISM drugs.
- To prevent contamination, adulteration & sub-standard products.
- To bring uniformity in manufacturing practices.
- To protect public health.

COMPONENTS OF GMP

- Good manufacturing practices consist of several essential components that ensure quality, safety, purity consistency of pharmaceutical & herbal products.
- It involves :
 - ① Location & Surrounding
 - ② Building
 - ③ Water supply
 - ④ Disposal of Waste
 - ⑤ Container's cleaning
 - ⑥ Storage Area
 - ⑦ Working Space
 - ⑧ Equipments
 - ⑨ Health & Hygiene of Workers
 - ⑩ Medical Services
 - ⑪ Batch Manufacturing Record
 - ⑫ Distribution Record
 - ⑬ Record of Market Complaints
 - ⑭ Quality Control
 - ⑮ Standard Operating Procedures

① LOCATION & SURROUNDINGS

- Manufacturing unit should be in a clean area.
- Surroundings should be free from dust, smoke, bad smell, & pollution.
- Area should not cause any contamination risk.

② BUILDING

- Building should be properly designed & constructed.
- Adequate lightning & ventilation must be provided.
- Walls & floors should be smooth & washable.

③ WATER SUPPLY

- Clean & potable water should be available.
- Water should be suitable for manufacturing & cleaning.
- Regular water quality testing is required.

④ DISPOSAL OF WASTE

- Waste should be collected & disposed regularly.
- Proper system for solid & liquid waste disposal.
- Disposal should not cause pollution or contamination.

⑤ CONTAINERS CLEANING

- Containers should be properly cleaned before use.
- Cleaning should prevent contamination & mix-up.
- Clean containers should be stored properly.

⑥ STORAGE AREA

- Separate storage for raw materials & finished products.
- Storage area should be clean & dry.
- Materials should be properly labeled.

⑦ WORKING SPACE

- Sufficient working space should be available.
- Proper arrangement to avoid crowding & mix-up.
- Space should allow easy cleaning & movement.

⑧ EQUIPMENT

- Equipment should be suitable & non-reactive.
- Regular cleaning & maintenance is necessary.
- Equipment should work properly to ensure uniform product quality.

⑨ HEALTH & HYGIENE OF WORKERS

- Workers should maintain personal cleanliness.
- Use of protective clothing like gloves & caps.
- Sick workers should not handle products.

⑩ MEDICAL SERVICES

- Medical check-up facilities should be available.
- Workers should undergo periodic health examinations.
- First aid facilities should be provided.

⑪ BATCH MANUFACTURING RECORD

- Each batch should have a separate manufacturing record.
- Record should include ingredients, quantity & process details.
- Helps in traceability & quality control.

⑫ DISTRIBUTION RECORD

- Records of distribution & sale should be maintained.
- Help to track products in the market.
- Useful during product recall.

⑬ RECORD OF MARKET COMPLAINTS

- All customer complaints should be recorded.
- Complaints should be properly investigated.
- Corrective actions should be taken if needed.

⑭ QUALITY CONTROL

- Quality control system should be available.
- Testing of raw materials & finished products is required.
- Ensures product safety & standard quality.

⑮ STANDARD OPERATING PROCEDURES (SOPs)

- Written SOPs should be available for all activities.
- SOPs ensure uniform & correct procedures.
- Workers should be trained to follow SOPs.

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