

CHE-201-IKS-T: Ancient Indian Chemistry

Course Type: IKS (Theory)

No. of Credits: 2

Course Outcomes

At the end of the course, student will be able to

1. Know the Indian Knowledge System and its significance in the protection of traditional knowledge.
2. Understand the need of the Indian Knowledge System (IKS) and significance of the ancient Indian Chemistry.
3. Relate the various concepts of ancient chemistry with the concepts of modern Chemistry.
4. Organize the contributions made by the ancient Indians in the field of Science and related concepts.
5. Evaluate the contribution of Indians in the development of chemistry.
6. Outline the chemistry heritage of ancient India.

Course Contents

Chapter 1: Ancient Indian Chemistry

[5 Hours]

From Alchemy to Chemistry: Early Chemical Techniques, Technology and Arts, Different Areas of Development in Ancient India: Glass Making (Literary Sources, Foreign Travellers' Account, Archaeological Evidences), Paints and Dyes, Perfumes and Cosmetics, Chemicals in Ancient India, Paper and Ink Making, Alcoholic Liquors.

Chapter 2: Indian Alchemy in medicines

[5 Hours]

Rasayanas, Etymology of Rasayana, Rasayana as Elixir, The position of Rasayana in Indian medicines Charaka and two categories of medicines, Herbal Rasayanas, Metallic preparations as Rasayana, Iron as a reducing Agent, Charaka's incidental mention of a gold preparation, Calcined metals as Phlogiston, Calcined metals as alchemical preparations, Pulverization of calcined metals, Calcined gold as the ideal herbo-metallic preparation, Indian alchemy (500 A.D.), Indian alchemy (1000 A.D.)

Chapter 3: Metallurgy in India

[15 Hours]

Primary Texts on Metallurgy in India: Rig-Veda (tr. adapted from R.T.H. Griffiths), Arthaśāstra (tr. R.P. Kangle), Varāhamihira (b. ~ 485 CE), Khaḍgalakṣaṇam (tr. Vibha Tripathi), Nāgārjuna (7th or 8th century CE), Rasendramaṅgalam (tr. H.S. Sharma), Vāgbhaṭa (13th century), Rasaratnasamuccaya (tr. INSA) **Classification of metals: Survarṇa** (gold) :

Varieties, Description of different types of suvarṇa (Prākṛta suvarṇa, Sahaja suvarṇa, Vahni sambhūta suvarṇa, Khanija suvarṇa, Rasendra vedhaja suvarṇa), Pharmaco-therapeutic properties of gold. **Rajata (silver)** : Varieties, Description of different types of rajata (Sahaja rajata, Khanija rajata, Kṛtrima rajata), Qualities of superior and inferior silver, Pharmaco-therapeutic properties of silver **Tāmra (copper)**: Varieties, Description of different types of tamra (mleccha and nepālaka tāmra), Qualities and inferior tāmra, Pharmaco-therapeutic properties of tāmra **Loha (iron)**: Varieties, subvarieties, Pharmaco-therapeutic properties of muṇḍa loha **Vaṅga (tin)**: Varieties, Physical properties, Pharmaco-therapeutic properties of vaṅga **Nāga / śīśa (lead)**: **Physical properties of lead**, Pharmaco-therapeutic properties of lead **Pittala (brass)** : Varieties, Physical properties of superior pittala, Physical properties of superior and inferior properties of pittala, Pharmaco-therapeutic properties of pittala; **Knowledge of Fundamental Concepts of Chemistry**: Concept of atom, nano particles, metallurgy in India (extraction, Purification, alloying process): copper, iron, zinc, gold and silver, Disappearance of metallurgical skills

Chapter 4: Contribution of Indian Chemists

[5 Hours]

Nagarjuna, Vagbhata, Govindacharya, Yashodhar, Ramchandra, Somdev, Acharya Prafulla Chandra Ray, Sir Har Gobind Khorana, Shanti Swarup Bhatnagar, C. N. R. Rao, Raghunath Anant Mashelkar

References

1. Indian Alchemy Or Rasayana By S. Mahdihassan
<https://archive.org/details/IndianAlchemyOrRasayanaByS.Mahdihassan/page/n79/mode/2up>
2. History of Chemistry in ancient and medieval India Acharya Prafulla Chandra Ray (Edited by P.Ray, Indian Chemical Society, Calcutta, 1956, page no. 208-239)
3. India's Glorious Scientific Tradition by Suresh Soni
4. Chapter 15- Scientists of Ancient India, <https://digital.nios.ac.in/content/223en/CH.15.pdf>
5. Some famous Indian Scientists by S Chandrasekhar,
<https://www.tifr.res.in/~outreach/biographies/scientists.pdf>
6. **Other source:** Wikipedia https://en.wikipedia.org/wiki/List_of_Indian_scientists