

## BASIC PRINCIPLES OF PHARMACEUTICAL SCIENCE IN *Āyurvēda*

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### ABSTRACT

Pharmaceutical is one of the allied branches of science, which is closely associated with Medical science. Today pharmaceutical chemistry and pharmacognosy are playing important role in treatment for a disease and its prevention. Herbal medicines are being used by about 80% of the world population mostly in the developing countries in the primary health care. There has been an upsurge in demand for the Phyto-pharmaceutical products of *Āyurvēda* in western nations, because of the fact that the synthetic drugs are considered to be unsafe. Due to this many national and multinational pharmaceutical companies are now concentrating on manufacturing of *Āyurvēdic* Phyto-pharmaceutical products.

*Āyurvēda* is the Indian traditional system of medicine, which also deals about pharmaceutical science. The *Āyurvēdic* knowledge of the pharmaceutical science is scattered in *Āyurvēdic* classical texts. *Śāraṅghadhara Saṁhita*, which is written by *Śāraṅghadhara*, explain systematically about the information of the *Āyurvēdic* pharmaceutical science and also updated it. Industrialized manufacturing of *Āyurvēdic* dosage forms has brought in new challenges like deviation from basic concepts of medicine preparation. *Śāraṅghadhara Saṁhitā* the devout text on pharmaceutics in *Āyurvēda* comes handy to solve such problems, as the methods described are very lucid and easy to follow.

### Introduction

Basic principles are very important in every science, each science has it's own basic principles. Similarly pharmaceutical science is also having it's own basic principles which should be understand and followed while formulating and preparation of a

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formulation. If a formulation prepared without following basic principles it may lead to complications because the quality and efficacy of drug depends on it. There has been an upsurge demand for *Āyurvēdic* products in western nations, because of the fact that synthetic drugs considered to be unsafe. Many multinational pharmaceutical companies are now concentrating on manufacturing of *Āyurvēdic* products. These companies are not abiding to the basic principles of *Āyurvēda* because of difficulty in understanding them. In *Āyurvēda*, the branch, which deals with the preparation of drugs, is known as *Bhaiṣajyakalpana*. There is no specific classical text except Sarangadhara Samhita, deals with formulations of drugs and may be considered as the source for *Āyurvēdic* Pharmaceutical Science. It contains three *Khaṇḍa* (sections) and some chapters of first section deals with basic principles of preparation of drugs, where as second deals with pharmaceutics.

### **Basic Principles of *Bhaiṣajyakalpana***

#### ***Nature of drugs according to the place where they grow***

Normally the climate surroundings Vindhya mountains are *āgnēya* (tropical zone) hence the herbs grown are *āgnēya* (*Agni* predominant) in nature, where as the climate surrounding Himalayas is *Soumya* (Temperate) so, the plants grown are *Soumya* (*Jala* predominant) in nature. Herbs growing in forests other than these will have the qualities of that place. Hence the formulations should be prepared accordingly based on the *Prakṛti* (constitution), requirement of the recipient.

#### **Collection of drugs<sup>1</sup>**

The person intended to collect the drugs should be pure mentally as well as physically. The herbs should be collected during early in the morning, sunshine or daytime. Before collecting the person should pray Lord *Śiva* in silence and collect the herbs growing in the northerly direction.

The herbs collected from or grown on anthills, dirty places, marshy lands, burial grounds, salty soils, roads and also those places, which have been infected with worms, affected by the fire and snow will not yield the desired effect.

*Śaratṛtu* (autumn) is the best time for the collection of herbs for all types of purposes. But the herbs for *Vamana karma* (emesis) and *Virēcana karma* (purgation) should be collected at the end of *Vasanta ṛtu* (spring).

Parts of different plants/trees to be collected are

1. The entire root system - smaller plants. eg. *Laghu Pañcamūla*
2. Root bark - big trees. eg. *Bṛhat Pañcamūla*
3. Stem bark - big trees. eg. *Pañca Valkala*
4. *Sara* (pith) - *Bījaka* etc.,
5. Leaves - *Tāliśa* etc.,
6. Fruits - *Triphala* etc.,
7. Flowers - *Dhātaki* etc.,
8. *Kṣīra* (latex) - *Snuhi* etc
9. If the part of the plant not mentioned - Root of the plant should be taken.

#### **Manaparibhasa (System of weights and measures)<sup>2,3,4,5</sup>**

*Mānaparibhāṣa* is important in pharmaceuticals because the efficacy of the drugs also depends upon it. So without knowing *Mānaparibhāṣa*, dealing with drugs and formulations will be impractical. Determination of weights and measurements of drugs while formulating should not be so rigid. The physician should decide the quantity of the ingredients in a formulation accordingly i.e. on the basis of the disease, nature of person and drug etc., *Kaliṅga* and *Māgada Mānas* are the two system of weights and measurements was prevailing those days, out of which *Māgada Māna* is considered as the best.

### Māgada Māna

*Trasarēṇu* is also known as *Vamśi*. The minute particle of dust visible in a beam of sunlight is if divided into 30 parts and one part of it equal to the *Paramāṇu* (atom).

1/30 <sup>th</sup> <i>Paramāṇu</i>	=	1 <i>Trasarēṇu</i>
6 <i>Vamśi</i>	=	1 <i>Marīci</i> = 0.22 mg [App]
6 <i>Marīci</i>	=	1 <i>Rājika</i> = 1.30 mg [App]
3 <i>Rājika</i>	=	1 <i>Sarṣapa</i> = 3.12mg [App]
8 <i>Sarṣapa</i>	=	1 <i>Yava</i> = 31.25 mg
4 <i>Yava</i>	=	1 <i>Guñja (Raktika)</i> = 125mg
6 <i>Guñja</i>	=	1 <i>Māṣa (Hēma/Dhānyaka)</i> = 750mg
4 <i>Māṣa</i>	=	1 <i>Śāṇa (Dharana/Tanka)</i> = 3 gms
2 <i>Śāṇa</i>	=	1 <i>Kōla (Kshudraka/Vataka/Drankshana)</i> = 6 gms
2 <i>Kōla</i>	=	1 <i>Karṣā (Akṣa/Kavalagraha/panithala)</i> = 12gms
2 <i>Karṣā</i>	=	1 <i>Ardhapala (Shukti/Ashtamika)</i> = 24 gms
2 <i>Ardhapala</i>	=	1 <i>Pala (Mushti/chaturthaka)</i> = 48gms
2 <i>Palas</i>	=	1 <i>Prasṛta</i> = 96gms
2 <i>Prasṛti</i>	=	1 <i>Añjali (Kudava/Ardhasharava)</i> = 192gms
2 <i>Añjali</i>	=	1 <i>Māṇika (Sharava/Ashtapala)</i> = 384 gms
2 <i>Māṇika</i>	=	1 <i>Prasṛta</i> = 768gms
4 <i>Prasṛta</i>	=	1 <i>Āḍaka</i> = 64 <i>Palas</i> -3072gms [3.072Kg]
4 <i>Āḍaka</i>	=	1 <i>Drōṇa</i> =12,288gms [12.288Kg]
2 <i>Drōṇa</i>	=	1 <i>Śūrpa (Kumba)</i> = 64 <i>Māṇika/Sarava</i> -24.576Kg
2 <i>Śūrpa</i>	=	1 <i>Drōṇi</i> = 49.152Kg
4 <i>Drōṇi</i>	=	1 <i>Khāri</i> = 4960 <i>Palas</i> -196.608 Kg
2000 <i>Pala</i>	=	1 <i>Bhāra</i> = 96Kg
100 <i>Pala</i>	=	1 <i>Tula.</i> = 4.800Kg

**Kalingamāna**

12 Gaurasarṣapa	=	1 Yava
2 Yava	=	1 Guñja
3 Guñja	=	1 Valla
8 Guñja	=	1 Māṣa (in some places 7 Guñjas)
4 Māṣa	=	1 Śāṇa (Tanka)
6 Māṣa	=	1 Gadyāna
10 Māṣa	=	1 Karṣa
4 Kharṣa	=	1 Pala
4 Pala	=	1 Kuḍava.

(Kuḍava means the vessel of 4 Aṅgulis [3/4" or 1.96 cms] in length, breath and height made up of mud or wood or bamboo or metal.)

Note: From Praśhta onwards there is no difference in Kaliṅga and Māgadāmāna.

**Śāraṅadhara Caturguṇa Māna**

Śāraṅadhara, made the Mānas easy to understand and follow without any confusion.

4 Māṣa	=	1 ṭaṅkaṇa, -3gms
4 ṭaṅkaṇa	=	1 Akṣa, -12gms
4 Akṣa	=	1 Bilva, - 48gms
4 Bilva	=	1 Kuḍava, -192gms
4 Kuḍava	=	1 Prastha, -768gms
4 Prastha	=	1 Āḍaka, -3.072Kg
4 Āḍaka	=	1 Rāśi, -12.288Kg
4 Rāśi	=	1 Drōṇi, -49.152Kg
4 Drōṇi	=	1 Khāri, -196.608Kg

1. Rules regarding the usage of *Purāṇa* (old), *Navīna* (new), *Ārdra* (fresh/green) and *Suṣka* (dry) Drugs<sup>1,6</sup>
  - Always in all occasions *Navīna dravyas* should be used in the preparation of drugs.
  - *Vidaṅga*, *Kṛṣṇa* (long pepper), *Guda* (jaggary), *Dhānya* (Paddy), *Ājya* (Ghee) & *Mākṣika* (honey) should be taken *Purāṇa* (older) one.
  - Drugs either in *Ārdra* or *Suṣka* forms should be used in the preparation accordingly.
  - *Guḍūci*, *Kuṭaja*, *Vāsa*, *Kūṣmāṇḍa*, *Śatāvri*, *Aśvagandha*, *Sahakāri*, *Śatapūṣpa* and *Prasariṇi* should be taken in *Ārdra* (fresh/green) form only.
2. Regarding the quantity of dry/fresh (green) drugs in the preparation of drugs<sup>1,6</sup>
  - Drugs are to be formulated taking into consideration of dry drugs. So while preparing drugs, the quantity of dry drugs should be in accordance with the formulation. But, in case of green drugs, they should be taken in double the prescribed quantity.
  - *Guḍūci*, *Kuṭaja*, *Vasa*, *Kūṣmāṇḍa*, *Śatāvri*, *Aśvagandha*, *Sahakāri*, *Śatapūṣpa* and *Prasariṇi* should be used in green state. So, they should be taken only in prescribed quantity but not in double the quantity.
  - In compounding a formulation the quantity of both the green and dry drugs should be the same if their prescribed quantity ranges from *Guñja* to *Kuḍava* and from *tula* and above; whereas if the quantity ranges from *prastha* to *tula*, green drugs and *drava* (liquid) drugs should be taken double the quantity but not above of *tula*.
  - The proportion of the ingredients in a formulation if not mentioned, the ingredients should be taken equal quantity.
  - In a formulation if a drug mentioned twice, it should be taken in double quantity.
3. Rules regarding *Svēta* & *Rakta Candana*<sup>1,6</sup>

- In the formulations of *Cūrṇa* (powder), *Snēha* (oil/ghee) and *Āsava* (fermented preparation) if *Candana* is mentioned, *Svēta Candana* is to be used.
  - Where as in the preparation of *Kaṣāya* (decoction) and *Lēpa* (topical application) *Rakta Candana* should be taken.
4. Self-life period of various preparations<sup>1,6</sup>
- Generally all types of formulations *Vīrya* (potency) starts deteriorating after one year.
  - *Vīrya* (potency) of *Cūrṇa* (powders) deteriorates after 2 months.
  - *Vīrya* (potency) of *Guṭīkās* (pills) deteriorates after 1 year.
  - *Vīrya* (potency) of *Lēhya* (confections) deteriorates after 1 year.
  - *Vīrya* (potency) of *Snēhas* (oil/ghee) deteriorates after 4 months.
  - *Āsava/Ariṣṭā* (fermented preparations) become more potent as they become older.
  - *Dhātu* (metal, mineral preparations) become more potent as they become older.
  - The medicines that were subjected to *Laghu Pāka* (improper preparation) will become poor in action after one year.
5. Miscellaneous Rules and regulations<sup>6,1</sup>
- While formulating a drug, the quantity of the green and dry drugs should be the same if their prescribed quantity ranges from *Guñja* to *Kuḍava* and from *Tula* and above.
  - If the prescribed quantity of ingredients ranges from *Prastha* to *Tula* green drugs and liquids should be taken double the prescribed quantity. But not so upwards of *Tula*.
  - A formulation receives its name usually from the first drug in its composition.
  - In a formulation the ingredients included inappropriate for the diseases, the wise physician should omit them.

- In a formulation the drugs suitable for disease can be include even though not mentioned.
- If time administration is not mentioned, morning time considered as best.
- If the liquid is not specified, the water should be used.
- If oil is not specified, the *Tila taila* should be taken.
- If the type of vessel not specified, the earthen vessel can be considered.

### **Conclusion**

It is difficult to follow the basic principles discussed above because, in ancient times *Āyurvēdic* medicines were used to be prepared by the practicing physician himself for the purpose of his patients. But, at present it is not possible due to the increasing demand. So it is been supplanted by the pharmaceutical industry. The increasing needs of population and the shortage of authentic raw materials, made difficult for the pharmaceutical industries to follow the basic principle and adopt uniformity in the manufacturing of *Āyurvēdic* medicine. Hence, it is difficult to ensure the safety, quality and efficacy of *Āyurvēdic* medicines available in the market. So it is the right time to



update the basic principles of *Bhaiṣajya Kālpana* of *Śāraṅghadhara Saṁhitā*, so that the pharmaceutical industry may follow and ensure to produce standard *Āyurvēdic* medicines to maintain quality, safety, and efficacy of the finished products.

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## सारांश

### आयुर्वेद में औषध-कल्प विज्ञान के मूलभूत सिद्धांत

वारणासी सुबोस, पिट्टा श्रीनिवास एवं अला नारायण

औषध-कल्प-विज्ञान चिकित्सा विज्ञान की एक महत्वपूर्ण शाखा है। औषध-कल्प-रसायन-विज्ञान और औषधीय वनस्पति शास्त्र रोगों की चिकित्सा और रोकथाम करने के लिए महत्वपूर्ण भूमिका निभा रहे हैं। विकासशील देशों में प्राथमिक चिकित्सा व्यवस्था के लिए विश्व की ८० पितशत वनौषधियों का उपयोग किया जा रहा है। कृत्रिम औषधियों का सेवन असुरक्षित होने के कारण समस्त विश्व में आयुर्वेदीय औषधियों की आवश्यकता बढ़ रही है। इसी कारण बहुत सी राष्ट्रीय और बहुराष्ट्रीय कम्पनियाँ आयुर्वेदीय औषधियों के निर्माण पर दृष्टि केन्द्रित कर रही हैं।

आयुर्वेद प्राचीन भारतीय चिकित्सा पद्धति है। इसमें औषध-कल्प-विज्ञान भी अन्तर्निहित है। आयुर्वेदीय शास्त्रों व ग्रन्थों में यह विज्ञान इधर-उधर बिखरा पड़ा है। इसलिए आचार्य शार्ङ्गधर ने इस विज्ञान के प्रकीर्ण विषयों को एकत्र करके अपनी संहिता में क्रमबद्ध स्वरूप में निबद्ध किया है। आयुर्वेदीय औषधियों की गुणवत्ता इसी विज्ञान के मूलभूत सिद्धांतों पर आधारित है।