

# **THE AYURVEDIC PHARMACOPOEIA OF INDIA**

**PART - II (FORMULATIONS)  
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**Appendix-7,8**



सत्यमेव जयते

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**APPENDIX-7**  
**KṢĀRASŪTRA**

**7.1. - Methods of Physical Test**

**7.1.1. - Length:** Length is the distance from end to end of the thread, and measured as follows: Fix a standard meter scale on a table. Place the thread with one cut end exactly coinciding with a division on the scale. Applying just enough tension to keep the thread straight, place the other cut end on the scale, and note the division on the scale with which it coincides. Read the length and record it to a mm on the meter scale, (which should be marked in mm). Repeat the test on four more threads belonging to the same batch. The average is taken as the length of the thread.

**7.1.2. - Weight:** Record the weight of each thread used in the test for Length, on a balance of sensitivity 0.1 mg. (0.0001 g) The average is the weight of the thread.

**7.1.3. - Diameter:** Determine the diameter on a measuring instrument of the dial gauge type, with a sensitivity of 0.0025 mm. The table of the dial gauge is about 5 cm in diameter, with a pressor foot of about 12.5 mm. The total load applied by the foot when in use shall be  $200 \text{ g} \pm 15 \text{ g}$ .

Take the thread to be measured from its tube and expose it to room temperature for about half an hour. Hold the thread across the gauge table with just the tension required to keep it straight, and allow the pressor foot to touch it. Record the reading on the dial gauge as the thickness of the thread at that point. Three readings are to be taken for each thread, one at mid point, and two at equidistance on either side of the midpoint. No point should be within 3 cm of either end of the thread.

The test is repeated with four more threads of the same batch. The average is taken as the diameter of the thread.

**7.1.4. - Tensile strength:** This is expressed as the breaking load in kg when tested as given below.

The thread under test is tied to a hook suspended from a stand. A weighing pan of 250 g is attached to the other end of the thread, and a weight of 2 kg is placed on the pan. Weights

are added to the pan in increments of 50 g, allowing five seconds between such additions. At the time the thread breaks, the total weights in the pan and weight of the pan itself is recorded as the breaking load of the thread. If the breakage occurs within 1 cm from either ends, the test should be repeated on a fresh thread. The average of five tests is recorded as the breaking load of one batch.

## 7.2. - Methods of Chemical Test

**7.2.1. - Loss on drying:** Take 5 Kṣārasūtra and weigh accurately. Place in the form of a coil, in a tared petri dish; keep at 105<sup>0</sup> in an oven for 3h. Cool in a desiccator, weigh to constant weight and calculate loss on drying.

**7.2.2. - Water soluble extractive:** Take 5 Kṣārasūtra and weigh accurately. Macerate the test material with water (1: 40 w/v) for 5 minutes at room temperature, reflux for 5 minutes on steam bath, cool to room temperature and filter into a graduated tube. Make up the original volume with water. Evaporate a known volume and dry to a constant weight at 100 -105<sup>0</sup>.

**7.2.3. - n- Hexane soluble extractive:** Carry out as given above using *n-hexane* instead of water.

**7.2.4. - pH (Alkalinity):** Take about 0.1 g of coated material of Kṣārasūtra and add 10 ml of carbon dioxide free water. Vortex the mixture for 1 minute, set aside for 15 minutes, vortex again for 1 minute and filter. Determine the pH of clear supernatant using digital pH meter.

### 7.2.5. - Sodium and Potassium:

Prepare separate stock solution of *sodium / potassium* (500 mEq) by dissolving 2.9230 g *sodium chloride* / 3.7280 g *potassium chloride* in 100 ml triple distilled water. Prepare separate working standard solutions containing 0.5, 1.0, 2.0, 4.0 and 5.0 mEq of *sodium/potassium* from the respective standard stock solutions. Using flame photometer with appropriate filters, calibrate the standard solutions and prepare separate calibration plots respectively for *sodium/potassium*.

Take 0.1 g coated material of Kṣārasūtra add 15 ml of triple distilled water in 50 ml of volumetric flask and shake vigorously and make the volume upto the mark. Filter the solution and choosing *sodium* and *potassium* filter, calculate the content of the

*sodium/potassium* respectively in the coated material of Kṣārasūtra by interpolation from the calibration plot.

**7.2.6. - Total alkalies:** Estimate the total alkalies as carbonate in the coated material of Kṣārasūtra by titrating a known volume of the aqueous solution prepared for determination of pH, with N/25 *hydrochloric acid* using pH meter to an end point pH of 3.6. Calculate percentage of total alkali as carbonate using the titer value.

**7.2.7. □ Turmeric:** Moisten 0.2 g of coated material of Kṣārasūtra and 0.05 g Turmeric, each separately, with 0.5 ml % v /v hydrochloric acid for 5 minutes. Extract each separately with 4 x 5 ml *acetone* by vortexing for 30 seconds, at 0,5<sup>th</sup> and 10<sup>th</sup> minutes. Pool the respective extracts, filter and make up the volume to 25 ml using *acetone*. Read the absorbance of the each extract after suitable dilution, at 418 nm against *acetone* Blank. Calculate the percentage of Turmeric in the coated material of Kṣārasūtra using the absorbance of Reference Turmeric.

#### **7.2.8. - Curcumin**

Moisten 0.2 g of coated material of Kṣārasūtra with 0.5 ml % v/v *hydrochloric acid* for 5 minutes. Extract the mixture with 4 x 5 ml *acetone* by vortexing for 30 seconds, each at 0, 5<sup>th</sup> and 10<sup>th</sup> minute. Pool the extracts, filter and make up the volume to 25 ml using *acetone*. Take 10 ml of the solution, evaporate at room temperature to about 0.1 ml. Apply quantitatively 0.1 ml of sample solution, 15 µl (1 mg/ml) solution of Reference Curcumin in *acetone* and 50 µl of *acetone* as Blank on a chromatoplate. Develop the Plate in *chloroform: methanol* (49:1). Mark the yellow coloured Curcumin zone in reference, test sample and blank . Separate the spots and extract each with 5 x 4 ml *methanol* and make up the volume to 25 ml in each case. Read the absorbance of *methanol* solution of coated material of Kṣārasūtra and Curcumin after suitable dilution against blank at 418 nm. Calculate the percentage of Curcumin in the sample with respect to the Reference Curcumin.

#### **7.2.9. - Sulphated Ash**

Heat silica crucible to redness for 10 minute, allow to cool in a desiccator and weigh. Take 3 Kṣārasūtras, in the crucible and weigh accurately. Ignite gently at first, until the substance is thoroughly charred. Cool, moisten the residue with 1 ml of conc. *Sulphuric acid*, heat gently until white fumes are no longer evolved and ignite at 800<sup>0</sup> until all

black particles have disappeared (conduct the ignition in a place protected from air currents). Allow the crucible to cool, add a few drops of conc. *sulphuric acid* and heat. Ignite as before, allow to cool and weigh to constant weight. Calculate the percentage of Sulphated ash.

#### 7.2.10. - Euphol

Extract 0.2 g of coated material of K<sup>3</sup>/<sub>4</sub>ārasūtra with 5 x 5 ml *n-hexane* by vortexing for 30 seconds, each at 0, 5<sup>th</sup>, 10<sup>th</sup>, 15<sup>th</sup> and 20<sup>th</sup> minute. Pool the extracts, filter and recover the solvent under reduced pressure and redissolve the residue in 1 ml *chloroform:methanol* (3:2). Apply quantitatively 100 μl of the above solution, 100 μl (5 mg /ml) solution of Reference *Euphol* in *n-hexane* and 100 μl of *n-hexane* as Blank on a chromatogram plate. Develop the plate in *chloroform: n-hexane* (4:1). Mark the *Euphol* zones in sample, Reference *Euphol* and Blank by visualizing in iodine chamber. Remove the iodine by vaporizing in an oven at 50<sup>o</sup> for 20 minutes. Separate the zones individually, extract each with 5 x 4 ml *n-hexane* and make up the volume to 25 ml in each case. Take 2 ml from each extract separately in a test tube and dry on a boiling water bath. Cool the residue to the room temperature and add 4 ml of *acetic anhydride* to each and cool further in an ice bath for 15 minutes. Add 0.05ml cold conc. *sulphuric acid* carefully to each tube and mix thoroughly and set aside in a dark cupboard for exactly 1.5 hours and read the absorbance at 281 nm against Blank. Calculate the percentage of *Euphol* in the coated material of K<sup>3</sup>/<sub>4</sub>ārasūtra with respect to the Reference *Euphol*.

## APPENDIX-8

### WEIGHTS AND MEASURES

#### 8.1. - METRIC EQUIVALENTS OF CLASSICAL WEIGHTS AND MEASURES

**Weights and measures described in Ayurvedic classics and their metric equivalents adopted by the Ayurvedic Pharmacopoeia Committee**

The following table of metric equivalents of weights and measures, linear measures and measurement of time used in the Ayurvedic classics have been approved by the Ayurvedic Pharmacopoeia committee in consultation with Indian Standards Institution.

#### I. WEIGHTS AND MEASURES

Classical Unit	Metric Equivalent	
1 Ratti or Guñjā	= 125 mg	
8 Ratti or Guñjās	= 1 Māṣa	= 1 g
12 Māṣas	= 1 Karṣa	= 12 g
	(Tola)	
2 Karṣas (Tolas)	= 1 Śukti	= 24 g
2 Śuktis	= 1 Palam	= 48 g
(4 Karṣas or Tolas)		
2 Palams	= 1 Prasrti	= 96 g
2 Prasrtis	= 1 Kuḍava	= 192 g
2 Kuḍavas	= 1 Mānika	= 384 g
2 Mānikas	= 1 Prastha	= 768 g
4 Prasthas	= 1 Āḍhaka	= 3 kg 73 g
4 Āḍhakas	= 1 Dṛoṇa	= 12kg 228 g
2 Dṛoṇas	= 1 Śūrpa	= 24kg 576 g
2 Śūrpas	= 1 Dṛoṇi	= 49kg 152 g
	(Vahi)	
4 Dṛoṇis	= 1 Khāri	= 196kg 608g
1 Palam		= 48 g
100 Palams	= 1 Tula	= 4 kg 800 g
20 Tulas	= 1 Bhāra	= 96 kg

In case of liquids, the metric equivalents would be the corresponding litre and milliliter.

#### II. LINEAR MEASURES

Classical Unit	Inches	Metric Equivalents
1. Yavodara	1/8 of 3/4 ”	0.24 cm
2. Aṅgula	3/4 ”	1.95 cm
3. Bitahasti	9”	22.86 cm
4. Aratni	10 1/2 ”	41.91 cm
5. Hasta	18”	
45.72 cm		
6. Nṛpahasta (Rājahasta)	22”	55.88 cm
7. Vyama	72”	182.88 cm

#### III. MEASUREMENT OF TIME

Unit	Equivalent(in hours,minutes & in seconds)	
2 Kṣaṇa	= 1 Lava	
2 Lavas	= 1 Nimeṣa	
3 Nimeṣas	= 1 Kaṣṭha	= 4.66 seconds
1 Ghati		= 24 Minutes
30 Kaṣṭhas	= 1 Kalā	= 2 Minutes 20 seconds
20 Kalā + 3 Kaṣṭhas	= 1 Muhūrta	= 48 Minutes
30 Muhūrtas	= 1 Ahorātra	= 24 Hrs.
15 Ahorātras	= 1 Pakṣa	= 15 Days
2 Pakṣas	= 1 Māsa	= 30 Days/ One Month
2 Māsa	= 1 Ṛtu	= 60 Days/ Two Months
3 Ṛtus	= 1 Ayana	= 6 Months
2 Ayanas = 1 Samvatsara		= 12 Months/ One Year
5 Samvatsara	= 1 Yuga	= 5 Years
1 Ahorātra of Devas		= 1 Year
1 Ahorātra of Pitaras		= 1 Month

## 8.2. - METRIC SYSTEM :

### Measure of Mass (Weights)

1 Kilogram (Kg)	–	is the mass of the International Prototype Kilogram.
1 Gramme (g)	–	the 1000 <sup>th</sup> part of 1 Kilogram.
1 Milligram (mg)	–	the 1000 <sup>th</sup> part of 1 gramme.
1 Microgram ( $\mu$ g)	–	the 1000 <sup>th</sup> part of 1 milligram.

### Measures of capacity (Volumes)

1 Litre (l) is the volume occupied at its temperature of maximum density by a quantity of water having a mass of 1 Kilogram.  
1 Millilitre (ml) the 1000<sup>th</sup> part of 1 litre.

The accepted relation between the litre and the cubic centimetre is 1 litre = 1000.027 cubic centimeters.

### Relation of capacity of Weight (Metric)

One litre of water at 20<sup>o</sup> weighs 997.18 grams when weighed in air of density 0.0012 gram per millilitre against brass weights of density 84 grams per millilitre.

### Measures of Length

1 Metre (m)	is the length of the International Prototype Metre at 0.
1 Centimetre (cm)	– the 100 <sup>th</sup> part of 1 metre.
1 Millimetre (mm)	– the 1000 <sup>th</sup> part of 1 metre.
1 Micron ( $\mu$ )	– the 1000 <sup>th</sup> part of 1 millimetre
1 Milliimicron (m $\mu$ )	– the 1000 <sup>th</sup> part of micron.