vii. Basic Pharmaceutical dosage forms and Secondary dosage forms of āyurveda

In Āyurveda, drug formulations (kalpanā) are broadly categorized into (1) Basic dosage forms ($m\bar{u}la$ or primary kalpanā*) and (2) Secondary dosage forms (derivatives or $vikalpa~kalpan\bar{a}$). Foundational treatises like Charaka Saṃhitā, Suśruta Saṃhitā, and Shārṅgadharasaṃhitā classify these dosage forms based on preparation techniques (e.g., extraction with water, ghee, oil), fermentation, or mechanical processes. Additionally, classical authorities such as Kashyapa~ and $Sh\bar{a}r\dot{n}gadhara~$ provide age-specific and condition-specific dosing schedules, ensuring both the safety and efficacy of medicinal interventions from infancy through adulthood. Below is an extensive review of these dosage forms, supplemented with data from Shārṅgadhara Saṃhitā and Kasyapa, as well as modern adaptations and usage contexts.

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Basic Ayurvedic Dosage Forms (Mūla Kalpanā)

Traditionally, five fundamental or "panchavidha" forms are recognized—**Swarasa** (expressed juice), **Kalka** (paste), **Kwatha** (decoction), **Hima** (cold infusion), and **Phāṇṭa** (hot infusion). However, for practical usage, many authors converge on three to five main forms.

Swarasa (Fresh Juice Extract)

- Preparation: Mechanical expression (mortar-pestle, cloth pressing) of fresh herb to yield potent juice.
- **Usage**: Typically used where concentrated potency is desired (e.g., *Tulsi* swarasa for acute respiratory symptoms).
- Stability: Short shelf life unless processed further (e.g., fermentation or addition of preservatives).

Kalka (Paste)

- Definition: A semi-solid paste achieved by grinding fresh or dried herbal material with minimal liquid.
- Shārṅgadhara's Dosing:
 - Deepanīya (appetizing) formulas → around 1 aksha (~12 g).
 - Jīvanīya / Samsamanīya (vitalizing, balancing) → about 2 aksha.
 - Vamana/virechana (emetic or purgative) → ~½ aksha.
 - Rationale: More potent or irritating forms used in smaller dosages, while milder daily supportive forms at larger doses.

Kwatha (Decoction)

- **Definition**: A water-based decoction prepared by boiling coarse powder in water, reducing to specified volume.
- Examples: Daśamūla kashāya, Punarnavādi kaṣāya.
- Shārngadhara's Dosing:
 - Vāta-Pitta-Kapha-hara → ~2 prasṛta (pr. = ~25-50 ml each).
 - Jīvanīya-Samsamanīya → ~4 prasṛta.
 - Vamana-virechana → ~1 prasṛta (due to stronger effect).
- Clinical Relevance: Useful in subacute or chronic conditions; dosage adjusted per dosa state or disease stage.

Hima (Cold Infusion) and Phāṇṭa (Hot Infusion)

- Hima: Soaking herbal powder in cold water for 8-12 hours, minimal heat, ensuring certain volatile or heat-labile compounds remain intact.
- Phānţa: Infusing coarse powder in hot water briefly (~15 minutes), milder extraction than kwatha, preserving moderate heat-sensitive constituents.

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Secondary Ayurvedic Dosage Forms (Vikalpa Kalpanā)

These formulations build upon the basic forms, applying **fermentation, trituration, or combining** with additional media (oil, ghee, sugar, etc.) to yield stable and specialized products.

Cūrna (Powder Form)

- **Definition**: Fine powder from one or multiple herbs.
- Shārngadhara's Dosing:
 - ∘ Deepanīya → "Agra parvāṅguli grahya" (approx. 2–3 g or "one finger measure").
 - Jīvanīya → ~2 pinches (pinch = ~500 mg?).
 - *Vamana-virechana* $\rightarrow \sim \frac{1}{2}$ **pinch** (due to strong effect).
- Rationale: Stronger or more irritant cūrṇa used in lesser amounts. Others can be used daily for digestive/metabolic support.

Guţikā / Vaţi (Pills/Tablets)

- Typically derived from **kalka** plus a binding medium (honey/ghee).
- Offer convenience, standardized dosing, longer shelf life.
- Classic examples: Chitraka Harītakī Vaţi, Kaishora Guggulu, etc.

Āsava-Ariṣṭa (Fermented Preparations)

- Prepared by **fermenting** decoctions (kwatha) or juices with sugar or jaggery, enabling natural alcoholic fermentation (2–10% alcohol).
- Good for chronic diseases, relatively stable shelf life, improved palatability and absorption.
- Ariṣṭa typically from decoction; āsava from raw juice (swarasa).

Ghṛta (Medicated Ghee) and Taila (Medicated Oil)

- Ghṛta: Kāsya pa or text references mention increments in infant dosing (grain size, pinch, etc.).
- Kasyapa's Guidelines for Ghṛta:
 - o Jātamātra (newborn) "kolasthi," increasing gradually to "kola" by 1 month, "dwikola" at 3 months.
 - o By 4-5 months various forms (dry vs. fresh amalakī) adjusting to the child's digestive development.
- Taila: For external or internal use (nasya, abhyanga). E.g., Anu taila, Mahānārayaṇa taila.

Lehya (Confections) / Avaleha

- Thick paste from decoction plus sweeteners (jaggery, sugar, honey). Example: Chyawanprāsh, Brahma rasāyana.
- Palatable, stable forms for Rasāyana or daily supplementation.

Dose Guidelines: Insights from Sharngadhara and Kasyapa

Shārngadhara's Age-based Dose (Rathi/Masha)

- 1. Child Dosing
 - First month postpartum: ~1 rathi, incrementing by 1 rathi monthly until 1 year.
 - At 1 year: ~1 māshā.
 - o Increase 1 māshā every year up to 16 years → 16 māshā = adult dose.
 - For ages **16-70**: stable at 16 māshā (approx. 12-16 g depending on region-specific definitions).

Kasyapa's Ghṛta Dosage for Infants

- Jātamātra: Minimal "kolasthi" or "kolārdha" from the 20th night.
- 1 month: ~1 kola.
- 3 months: ~2 kola (dwikola).
- 4 months: "Sushka āmalakī" portion.

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forms.



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• 5-6 months: "Ardra āmalakī" portion for added nutritional synergy.

Such age-tiered schedules reflect the progressive development of an infant's digestive and metabolic capacity, ensuring gentle assimilation of medicated ghee or herbal additions.

Contemporary Relevance and Applications

1. Manufacturing Standards

- GMP guidelines under Schedule T demand uniform dosing forms (chūrṇa, kvātha, etc.) with consistent potency, validated by modern analytical tools (HPTLC, HPLC).
- Understanding classical dosage references helps calibrate modern unit-based labeling (e.g., mg, ml) in line with regulatory demands.

2. Clinical Trials

- RCT designs for classical formulations often adapt the suggested dose from references like Shārṅgadhara or Kasyapa, correlating approximate rathi/māshā to metric equivalents (1 māshā ~1 g or variable regionally).
- Pediatric or geriatric populations can thus be safely included, with age-based adjustments gleaned from classical guidelines.

3. Teaching and Global Dissemination

- Āyurvedic institutions integrate these dosage forms into pharmaceutics (Bhaishajya Kalpanā) curricula, bridging textual data with practical production.
- Exports or cross-border usage of chūrṇas, ghṛtas, or arishtas must reference classical authenticity and handle dosage disclaimers in SI units for consumer clarity.

Future Directions

1. Standardization

- Converting *rathi, māshā, prasṛta* references into consistent metric measures fosters international acceptance.
- Detailed monographs in the *Ayurvedic Pharmacopoeia of India (API)* illustrate the transformations from ancient weights to modern grams/milliliters.

2. Research

- Investigating synergy among basic forms (like swarasa + taila) in specific diseases.
- Evaluating the effect of fermentation times, ghee-sneha processes, or mineral incineration on the final bioavailability.

3. Innovative Dosage Forms

- o Nano-technological versions of classical forms (e.g., nano-ghṛta capsules, freeze-dried kvātha granules).
- Maintains classical compositions but ensures extended shelf life, exact dosing, and global compliance for shipping or large-scale distribution.

Below is a summarized table capturing Basic (Mūla) Ayurvedic dosage forms, Secondary (Vikalpa) forms, classical references, key preparation details, dosage guidelines from Shārṅgadhara and Kasyapa, and modern relevance.

Dosage Form	Classical Source & Definition	Key Preparation & Example	Shārṅgadhara / Kasyapa Dose Guidance	Contemporary Relevance
1. Swarasa (Expressed Juice)	- One of the 5 mūla kalpanā ; fresh juice of plants Earliest textual mention: <i>Charaka Saṃhitā</i> , <i>Suśruta Saṃhitā</i> .	- Obtained by crushing fresh herbal materials (leaves, stems) in a mortar & pressing through cloth E.g., <i>Tulsi</i> (Ocimum sanctum) juice.	- Infants: Typically minimal usage, often not standard in Kasyapa's direct list but occasionally recommended in small droplet forms General adult: Doses vary (10-20 ml) depending on potency.	- Quick assimilation; short shelf life Used in modern research to isolate labile constituents (e.g., antioxidant assays for fresh <i>Tulsi</i>) E.g., in R&D or limited daily dosage

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2. Kalka (Paste)	- Another primary form (mūla kalpanā) Kalka = semisolid paste from powdered or fresh herbal mass.	- Prepared by grinding in mortar with minimal water/ghee Common in daily usage for external applications (e.g., Lepa) or internal with honey/ghee.	- Shārṅgadhara:- Deepanīya (appetizer): ~1 Aksha (approx. 12 g) Jīvanīya-Samsamanīya: 2 Aksha Vamana-virechana: ~½ Aksha (due to potent nature).	- Modern factories may convert <i>kalka</i> into tablets or capsules for shelf stability Topical usage remains widely practiced (e.g., <i>Lepa</i> for inflammatory conditions).
3. Kwatha (Decoction)	- Most ubiquitous form among <i>mūla kalpanā.</i> - Water-based decoction: herb is boiled, then reduced to a specified fraction.	- E.g., Daśamūla Kaṣāya, Punarnavādi Kwatha Adjust water volume & boiling time per textual references.	- Shārṅgadhara :- Vāta-Pitta-Kapha-hara: ~2 prasṛta (25-50 ml × 2) Jīvanīya-Samsamanīya: 4 prasṛta Vamana-virechana : 1 prasṛta Kasyapa : More on <i>ghṛta</i> & infant schedules, less direct kwatha mention for neonates.	- Frequently used in outpatient & inpatient setups for chronic disorders Modern labeling: standard single- dose pouches or freeze- dried granules for convenience, ensuring consistency (HPTLC fingerprint).
4. Hima (Cold Infusion) / Phāṇṭa	- Hima: Herbal soaking in cold water (6-12 hr), minimal heat Phāṇṭa: Mild hot infusion (~15 min).	- Hima: e.g., Dhānyaka Hima from coriander seeds Phāṇṭa: mild extraction, preserving moderate heat- labile constituents.	- Typically smaller volumes (1-2 prasṛta) used for mild conditions or specific doṣaNot heavily enumerated by Kasyapa for child usage, but recommended in certain Pitta or heat-labile cases for gentle extraction.	- Used when certain compounds degrade under high temp In R&D labs, tested for gentler extraction methods correlating with "cold pressed" product lines, e.g., commercial mild infusions.
5. Cūrņa (Powder)	- A secondary dosage form (vikalpa), though some classify it under basic forms Fine powder of single or multiple herbs.	- E.g., Triphala Cūrṇa, Hingvāṣṭaka Cūrṇa Mechanically ground, sieved, stored in airtight containers.	- Shārṅgadhara:- Deepanīya (appetizer): "Agra parvāṅguli grahya" (~2-3 g) Jīvanīya-Samsamanīya: ~2 pinches Vamana-virechana: ½ pinch Kasyapa's direct references revolve around ghee formula for neonates, but cūrṇa dosage can be adjusted to child's capacity.	- Widely commercialized: sachets, bottled powders Manufacturers adopt GMP guidelines, ensuring minimal humidity, stable shelf life, e.g., <i>Triphala</i> , <i>Sitopaladi Cūrṇa</i> .
6. Guţikā / Vaţi (Pills/Tablets)	- Secondary derivative from <i>kalka</i> with binding mediums Offers convenience, standardized dosage, longer shelf.	– E.g., Kaishora Guggulu, Chitraka Harîtakî Vați.	- Shārṅgadhara doesn't detail child dosage extensively for <i>vaṭi</i> , but adult usage ~1-2 tablets (~1-2 g) Infants: occasionally small "pills" dissolved in honey.	produce consistent sized tablets Favored for exports (easy labeling in mg or grains).
7. Āsava-Ariṣṭa (Fermented)	- Fermented from kwatha (ariṣṭa) or swarasa (āsava) with sugar/jaggery, ~2-10% ethanol.	– Classic examples: Aśvagandhāriṣṭa, Arjuna–āriṣṭa, Punarnavāsava.	- Shārṅgadhara gives general guidelines: ~4 to 6 teaspoons daily for adult Kasyapa for pediatric usage typically not recommended (due to alcohol).	 Popular in chronic diseases management; robust shelf-life, minimal refrigeration Modern QC includes verifying ethanol percentage, microbial load, ensuring no contamination.

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8. Ghrta (Medicated Ghee)

- A secondary form derived from basic extracts combined into ghee.- Kasyapa details infant usage in progressive increments.

- Kalyāņaka Ghṛta, Mahātiktaka Ghṛta, etc.- Various dravyas processed with ghee for

- Kasyapa's schedule for neonates/infants:- 0-1 month: minimal "kola-sthi" or - Some ghrtas are "kola-ardha."- 1 month: "kola." 3 months: "dwi-kola." 4-5 months: "sushka/ardra āmalakī" references.deeper tissue effect. Shārngadhara references adult usage ~1-2 tsp daily or condition-based.

"Rasāyana" i.e. potent rejuvenators.- Modern R&D explores nanoemulsion forms for improved bioavailability.

9. Lehya / Avaleha (Confections) - Thick paste from decoction + sweeteners (jaggery/sugar/honey).-Often used as rasāyana or consistency, daily supplement.

E.g., Chyawanprāśa, Brahma rasāyana.-Cooked to specific ensuring a thick jam-like form.

 \sim 1-2 tsp for adult (10-12 g). Children: half or quarter spoon depending on age from 2 yrs onward.- Kasyapa rarely specified direct "avaleha" for neonates but some mild formulations allowed after 6 months.

- Shārngadhara:- typical dose - Highly commercial with major brands (e.g., Dabur Chyawanprash, Patanjali Chyawanprash).- Clinical trials exploring immunomodulatory, antioxidant effects with standardized polyphenol content.

Key Observations:

1. Age-Based Dosing:

- o Shārṅgadhara and Kasyapa specify incremental dosage for neonates to adolescents, ensuring safe assimilation based on physiological growth.
- o Rathi-māshā-prasṛta units approximate to grams or milliliters in modern practice, though regional conversions vary.

2. Strength of Formulations:

- Potent or purgative forms (e.g., for virechana) typically require smaller doses.
- o Daily tonics (e.g., Jīvanīya, Rasāyana) can be administered in larger or more frequent doses.

3. Contemporary Manufacturing:

o Industries adapt classical references to GMP protocols (Schedule T), advanced quality checks (HPTLC, HPLC), standardized packaging, and labeled SI-based doses for global acceptance.

Conclusion

The basic pharmaceutical dosage forms (swarasa, kalka, kvātha, hima, phāṇṭa) and secondary dosage forms (cūrṇa, vati, āsava-ariṣṭa, ghṛta, lehyam, etc.) anchor Āyurvedic therapeutics, reflecting millennia of textual and clinical refinement. Sharngadhara and Kasyapa provide authoritative dosing schedules tailored to age and physiological capacity, ensuring rational, safe, and context-specific usage. Modernization—through GMP, advanced standardization, and metric conversions—integrates classical knowledge into contemporary manufacturing and research, preserving the holistic essence of Ayurveda while advancing its global viability and scientific credibility.

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