A compendious review of Chitraka Haritaki Avaleha – A polyherbal Ayurveda formulation for bronchial asthma

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Abstract

Introduction: Avaleha (confection) is an unique dosage form of Ayurvedic pharmaceutics, which is frequently prescribed in various disorders and especially in respiratory disorders. Chitraka Haritaki Avaleha (CHA) is one such formulation being used extensively by Ayurveda physicians for bronchial asthma, despite its classical use in various other disorders too. CHA was first time described by Vrindamadhava in the 9th century and had been amended for many times till today. Because of its demand, many pharmaceutical companies are also manufacturing it, and is freely available in the market. Aim: The aim is to screen and compile references pertaining to composition, method of preparation, therapeutic uses, organoleptic, and physico-chemical parameters of CHA from different classics and original research articles. Materials and methods: Description of CHA was extensively reviewed from Vrindamadhava, Chakradatta, Vangasena, Gadanigraha, Yogataramini, Bhaishjiyata Ratnavali and Yogaratnakara. Synonyms, Rasapanchaka (Ayurveda principles of drug action), and Dosha Karma (therapeutic attributes) of ingredients were compiled from Bhavaprakasha Nighantu. Organoleptic and physicochemical parameters were compiled from original research articles, searched from PubMed, Google Scholar, and Research Gate. Results: Variations in formulation name, ingredients, method of preparation, therapeutic indications and Anupana (adjuvant) was observed in the classical texts. Value of water-soluble extracts and pH of analytical study was found different than Ayurveda Pharmacopoeia of India standards. Conclusion: Screening through various texts revealed that CHA has been mentioned in seven classical treatises and two gazetted texts with amendments which indicate its high demand and clinical efficacy in bronchial asthma along with other diseases. Disparity found in analytical parameters indicates the need of standardization of pharmaceutical process.

Keywords: Analytical study Chitraka Haritaki, confection, organoleptic parameter, pH value, physico-chemical

Introduction

In Ayurveda, Avaleha (confection) are compound formulations, used in the management of various disease conditions. Chitraka Haritaki Avaleha (CHA), Bharangyadi Avaleha, Kantakari Avaleha, Vasa Avaleha, Chyavanaprashra Avaleha, and Kansa Haritaki Avaleha are frequently prescribed Avaleha, especially for ailments of the respiratory tract.[1-5] CHA is one of the important Avaleha formulation used for the management of bronchial asthma.[6] CHA consists of 23 ingredients, as per the (Ayurvedic Formulary of India [AFI]).[7] It is also known to pacify symptoms of diseases such as Agnimandya (digestive impairment), Shwasa (asthma), Kasa (cough), Kshaya (tuberculosis), Pinasa (chronic rhinitis/sinusitis), Krimi (worm infestation), Gulma (abdominal lump), Arsha (hemorrhoids), Udavarta (constipation).[8] As there is no need of food restriction during the intake of CHA,[9] it is easy to prescribe and hence widely used among physicians. However, since the 9th century till today, different classics have modified its pharmaceutical processing, ingredients and Anupana (adjuvant). As, it is important for the physician to know details of drugs being used by them, critical review of the classical references along with available original published researches on pharmaceutical parameters of CHA was done.

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Aim and objective
To screen and compile references pertaining to composition, method of preparation, Anupana and therapeutic indications, along with available research data of organoleptic and physico-chemical parameters of CHA from different classics, published reports, and original research works.

Materials and methods
A review of Ayurveda formulations related to Sanskrit based classical texts available in the library of the Institute of Teaching and Research in Ayurveda, Jamnagar was carried out. The texts having formulation named CHA, or formulations with different names but having the same ingredients as mentioned in AFI, were included for the review study. Compiled text or classical texts which did not mention such formulations were excluded from the study. After screening seven classical texts (Vrindamadhava, Chakradatta, Vangasena, Gadanigraha, Sharangdhar Samhita, Bhavaprakasha, Yogaratnakara) and two gazetted books [Ayurveda Pharmacopeia of India (API) and Ayurvedic Formulary of India (AFI)] were reviewed for the study, out of which reference of Bhaishajya Ratnavali was considered as standard comparator (as it is mentioned in AFI) [Table 1].

Along with the review of CHA, synonyms of its ingredients, Rasapanchaka (Ayurveda principles of drug action) and Dosha Karma (therapeutic attributes) were compiled from Bhavaprakash Nighantu [Tables 2 and 3].

For organoleptic and physicochemical parameters of CHA, original research articles of the last 10 years were searched from PubMed, Google Scholar, and Research Gate with keywords “Chitraka Haritaki Avaleha,” “organoleptic,” pharmacognostical” and/or “physico-chemical.” Five articles were found to have these parameters [Table 4].

Results
Out of total of 15 classical texts screened, CHA was not found in eight Ayurveda texts (Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Ashtanga Samgraha, Kashyapa Samhita, Sharangdhar Samhita, Sahastrayoga and Rasa Ratna Sammucchaya) and hence excluded from the review. The rest of the seven texts have mentioned this formulation with the same or different names [Table 1]. Vrindamadhava (9th century) had described this formulation for the first time. Later on, this formulation appears in Chakradatta (11th century), Vangasena (12th century), Gadanigraha (12th century), Yoga Tarangini (17th century), Bhaishajya Ratnavali (19th century) and in Yogaratnakara (20th century).

Details of name, ingredient, Anupana, indications in different texts are mentioned in Table 1.

The formulation composition and ratio of ingredients for the preparation of CHA are mentioned in Table 5.

As mentioned in Table 1, total seven classical texts and two gazetted texts (API and AFI) were reviewed out of which Acharya Vangasena in Chikitsa Sara Samgraha has mentioned different name, for this formulation, i.e., Nrupati Rasayana. In Gadanigraha, Acharya Sodhala has mentioned two formulations with the name of Chitraka Haritaki.

Contents of CHA mentioned in Vrindamadhava, Chakradatta, Yogaratnakara, AFI and API are similar to that of Bhaishajya Ratnavali, while in Dvitiya CHA, Shunthi has been replaced with Nagakeshara (Mesua ferrea Linn.) and in Yoga Tarangini; Dashamula has been replaced with Laghu Panchamula.

Vrindamadhava and Gadanigraha, have mentioned that Anupana of CHA should be as per digestive capacity while AFI has advocated milk. The rest of the classics have not mentioned Anupana (vehicle) for this formulation.

According to Gadanigraha, CHA cures Antra Vriddi (intestinal hernia) if taken continuously for 2 months and if taken for 3 days, it cures Pinasa along with Rajayakshma, Kushta, Arsha, Bhagaadara and Shopha; while Dvitiya CHA if taken for 21 days, then the person can digest food efficiently in addition to above effects. The rest of all details are same as available in standard comparator, Bhaishajya Ratnavali.

Synonyms for ingredients of Chitraka Haritaki Avaleha
Ingredients with their different names are depicted in Table 2 and the source of the synonyms is Bhaavaprakasha Nighantu. The synonyms are mentioned to avoid confusion between various synonymous names of the same drugs mentioned by different texts.

Rasapanchaka of ingredients of Chitraka Haritaki Avaleha
Ingredients (according to standard reference i.e., Bhaishajya Ratnavali) of CHA and their Rasapanchaka and Dosha Karma are depicted in Table 3. Maximum Dravya of this formulation possesses Ushna Virya (hot potency) and Madhura (sweet) Virya (hot potency) and Madhura (sweet) Vipaka (post-digestive effect). The source of the Rasapanchaka and Dosha Karma is Bhaavaprakasha Nighantu.

Organoleptic and physico-chemical parameters of Chitraka Haritaki Avaleha
As shown in Table 4, total of five published articles has mentioned organoleptic and/or physicochemical parameters of CHA, out of which, article serial number 3 (Accelerated stability study of CHA; V K Singh et al.) has only organoleptic parameters which are also mentioned in article serial number 2 (Physico-chemical and phytochemical standardization of CHA; V K Singh et al.) by the same author of the same sample and hence article serial number 3 was excluded from the review. Article serial number 5 (A randomized controlled clinical study on the efficacy of Chitrakaharitaki Avaleha in Vataja Pratishhaya w.s.t. to allergic rinitis in children; T J Yaddav et al.) has mention organoleptic parameters and hence was included for analytical review only. Hence, results of organoleptic characters of the remaining three original research works are mentioned in Table 6 and physicochemical parameters mentioned in four original research works are mentioned in Table 7 and compared with available standards of API.
### Table 1: Description of Chitraka Haritaki Avaleha in various texts

| Reviewed text (Chapter name, number/verse number) | Name of formulation | Total number of ingredients | Name of ingredients | Anupana | Therapeutic indication |
|--------------------------------------------------|---------------------|----------------------------|---------------------|---------|-----------------------|
| Vrindamadhyava (Nasarogadhihika, 60/29-31)        | Chitraka Haritaki   | 23                         | Chitraka, Amalaki, Guduchi Swarasa (juice), Dashamula, Haritaki Churna, Trikatu, Yavakhshara, Madhu, Guda, Trijata | Yathagni (As per digestive capacity) | Mandagni (subdued digestive power), Kshaya, Kasa, Pinessa, Krimi, Gulma, Udavarta, Arsha, Shwasa, Rasayana (rejuvenating drugs) |
| Chakradatta (Nasa Roga Chikitsa, 56/28-30)       | Chitraka Haritaki   | 23                         | Chitraka, Amalaki, Guduchi, Dashamula, Haritaki Churna, Trikatu, Yavakhshara, Madhu, Guda | - | Mandagni, Kshaya, Kasa, Pinessa, Krimi, Gulma, Udavarta, Arsha, Shwasa, Rasayana |
| Vangavana, (Nasaroga, 70/55-39)                  | Nrupati Rasayana    | 23                         | Chitraka, Amalaki, Guduchi, Dashamula, Haritaki, Guda, Madhu, Trikatu, Yavakhshara | - | Mandagni, Pinessa |
| Gadanigraha, Prathama Bhaga (Lehadhihika, 5/118-113) | Chitraka Haritaki   | 23                         | Chitraka, Amalaki, Guduchi, Dashamula, Haritaki Churna, Trikatu, Yavakhshara, Madhu, Guda | As per digestive capacity | Arsha, Shwasa, Bhagandara (anal fistula), Kasa, Krimi, Shopha (swelling), Kusothi (skin disease), Gulma, Aantaravridhi, Pinessa, Rajayaksha |
| Gadanigraha, Prathama Bhaga (Lehadhihika, 5/112-114) | Dvitiya Chitraka Haritaki | 23                         | Chitraka, Amalaki, Guduchi, Dashamula, Haritaki Churna, Maricha, Pippali, Nagakshersha, Trijata, Yavakhshara, Madhu, Guda | As per digestive capacity | Kasa, Shwasa, Bhagandara, 18 Kusothi, 8 Udara Roga (diseases related to abdominal organs), Kshatakshya (lung parenchymal diseases), Rajayaksha |
| Yoga Tarangini (Taranga 72)                      | Chitraka Haritaki   | 18                         | Chitraka, Laghu Panchamula, Guduchi, Amalaki, Guda, Madhu, Trijata, Yavakhshara | - | Shosha, Shwasa, Pralapana (insanity), Kasa, Yamathu (vomiting), Kaphaja Pratishayya (a type of cold), Urahkshata (lung parenchymal diseases), Hikka (hiccups), Kaphaja Shiroroga (a type of headache), Mandagni |
| Bhaishajya Ratnavali (Nasa Roga Chikitsa, 63/25-28) | Chitraka Haritaki   | 23                         | Chitraka, Amalaki, Guduchi, Dashamula, Haritaki, Trikatu, Yavakhshara, Madhu, Guda | - | Mandagni, Kshaya, Kasa, Pinessa, Krimi, Gulma, Udavarta, Arsha, Shwasa |
| Yoga Ratnakara, Utarardha (Nasa Roga Chikitsa)   | Chitraka Haritaki   | 23                         | Chitraka, Amalaki, Guduchi, Dashamula, Haritaki, Trikatu, Yavakhshara, Madhu, Guda | - | Shosha, Shwasa, Malavaroda (constipation), Yamana, Kaphaja Pratishayya, Kshina, Urahkshata, Hikka, Kaphaja Roga, Shiroroga |
| AFI Part 1, volume 1 (Avaleha, 3/10)             | Chitraka Haritaki   | 23                         | Chitraka, Amalaki, Guduchi, Dashamula, Haritaki, Trikatu, Yavakhshara, Madhu, Guda | - | Mandagni, Kshaya, Kasa, Pinessa, Krimi, Gulma, Udavarta, Arsha, Shwasa |
| API Part 2, volume 1 (Avaleha, 1/4)              | Chitraka Haritaki   | 23-Chitraka Amalaki, Guduchi, Dashamula, Haritaki, Trikatu, Yavakhshara, Madhu, Guda | - | Mandagni, Kshaya, Kasa, Pinessa, Krimi, Gulma, Udavarta, Arsha, Shwasa |

*Dashamula: Equal mixture of ten drugs namely Agnimantha (Premona mucronata Roxb.), Bilva (Aegle marmelos Cor.), Brihati (Solanum indicum Linn.), Gokshura (Trilicus terrestris Linn.), Kantakari (Solanum suavattense Bur.), Gambhari (Gmelina arborea Linn.), Pata (Stevospersum suaveolens DC.), Prishnaparni (Uraria picta Desv.), Shalaparni (Desmodium gangeticum DC.) and Shyonaka (Oroxylum indicum Vent.). Trikatu: Equal mixture of three drugs namely Shanthi (Zingiber officinale Rosc.), Maricha (Piper nigrum Linn.) and Pippali (Piper longum Linn.). Trijata: Equal mixture of three drugs namely Tvaka (Cinnamomum zeylanicum Breyn.), Ela (Elettaria cardamomum Maton.) and Patra (Cinnamomum tamala Nees and Eberm.), Laghu Panchamula: Equal mixture of five drugs namely Brihati, Kantakari, Shalaparni, Prishnaparni and Gokshura.
As per Table 6, according to standards of API, CHA has blackish brown color, semisolid touch, pleasant odor and bitter astringent taste. Out of these, taste mentioned for CHA articles of Achyuta Atara et al. and Poonam Gaur et al. is astringent, pungent and sweetish sour with astringent respectively, which is devoid of bitterness and hence different than API standards, and the justification for this change is not found in the article.

The physico-chemical parameter of any drug provides information about its purity.\(^{(17)}\) As mentioned in Table 7, loss on drying, total ash, acid insoluble ash and alcohol soluble extractive of three researches are fulfilling the standards of API, but values of water-soluble extractive and pH are not matching with API standards. Total ash and alcohol soluble extractive mentioned in the research work of Yadav et al. are also different than that mentioned in API.

### Discussion

The basic method of the preparation of CHA includes three major components; Drava Dravya (containing decoction of Chitraka, Amalaki, Guduchi and Dashamula), Madhura Dravya (jaggery and honey) and Prakshpepa Dravya (Trikatu Trijata, and Yavakshara). Drava Dravya helps in the extraction of water-soluble active principles; Madhura Dravya is responsible for palatability and also acts as preservatives; Prakshpepa Dravya enhances the taste as well as increases the bioavailability of the drugs.\(^{(18)}\)

This standard pharmaceutical procedure of CHA was amended by Chakradatta and Gadanigraha by using fresh juice of Guduchi and Amalaki in place of decoction, while Yogaratnakara, had specified the quantity of water (3 Drona = 36.6 liters) for preparation of decoction from Kwathya Dravya (400 Pala = 19.2 kg). Major variation was observed in stages of the process during which Haritaki is to be added. Chakradatta, Acharya Vangasena, Gadanigraha, Yoga Tarangini and API opined to add Haritaki at the timing of boiling of decoction during Gudapaka, while Yogaratnakara opines to add Haritaki after Gudapaka. It is important to note that, as boiling of the tea leaves leads to more yield of tannin,\(^{(19)}\) boiling of Haritaki during Gudapaka leads to more tannin release which makes Avaleha more astringent. Hence to reduce astringent taste of CHA, Yogaratnakara might have changed the sequence of Haritaki addition. The same could be the reason of the change in taste of CHA in the research work of Poonam Gaur et al. In the same work; sour taste might be because of the proportionate increase in Amalaki content when Haritaki proportion is reduced.

Acharya Vangasena has mentioned another name “Nrupat Rasayana” of this formulation and claimed that it can digest food which is as hard as stone, cures Pinasa in three days if taken continuously and there is no need to follow food restrictions while taking this formulation. This name is given as no food restriction is needed during intake of it.

In Gadanigraha, Acharya Sodhala has done amendment in Dvitiya CHA and used Nagakeshara (Mesua ferrea Linn.) in place of Shunthi and has mentioned to use fresh (Navina) Chitraka root and doubled the quantity of honey and
Table 3: Rasapanchaka and Dosha Karma of Ingredients of Chitraka Haritaki Avaleha as per Bhavaprakasha Nighantu

| Drug       | Rasa (taste) | Guna (property) | Virya (potency) | Vipaka (postdigestive effect) | Dosha Karma (type of action on specific Dosha) |
|------------|--------------|-----------------|-----------------|-----------------------------|-----------------------------------------------|
| Chitraka   | Katu (pungent) | Laghu (light), Ruksha (dry), Tikshna (sharp) | Ushna (hot) | Katu (pungent) | Kapha Vatahara (pacifies Kapha and Vata Dosha) |
| Amalaki    | Pancha Rasa-Alavana (all 5 tastes except salty) | Guru, Ruksha, Shita (cold) | Shita | Madhura (sweet) | Tridosha Shamaka (pacifies all three Dosha) |
| Guduchi    | Tikta (bitter), Kashaya (arisingent) | Guru (heavy), Snigdha (oily) | Ushna | Madhura | Tridoshahara (pacifies all three Dosha) |
| Haritaki   | Madhura (sweet), Amla (sour), Katu, Tikta, Kashaya | Laghu, Ruksha | Ushna | Madhura | Tridoshahara (pacifies all three Dosha) |
| Brshati    | Katu, Tikta | Laghu, Ruksha, Tikshna | Ushna | Katu | Kapha Vata Shamaka (pacifies Kapha and Vata Dosha) |
| Kantakari  | Katu, Tikta | Laghu, Ruksha, Tikshna | Ushna | Katu | Kapha Vatahara |
| Shalaparni | Madhura, Tikta | Guru, Snigdha | Ushna | Madhura | Tridoshahara |
| Prshnaparni | Madhura | Laghu, Snigdha | Ushna | Madhura | Tridosha Shamaka |
| Gokshura   | Madhura | Guru, Snigdha | Shita | Madhura | Vata Pitta Shamaka (pacifies Vata and Pitta) |
| Patala     | Tikta, Kashaya | Laghu, Ruksha | Ushna | Katu | Tridoshahara |
| Shyonaka   | Madhura, Tikta, Kashaya | Guru | Ushna | Katu | Kapha Pitta Shamaka (pacifies Kapha and Pitta) |
| Agramamtha | Katu, Tikta, Kashaya, Madhura | Laghu, Ruksha | Ushna | Katu | Kapha Vatahara (pacifies Kapha and Vata) |
| Bilvva     | Kashaya, Tikta | Laghu, Ruksha | Ushna | Katu | Kapha Vata Shamaka |
| Gambhari   | Tikta, Kashaya, Madhura | Guru | Ushna | Katu | Tridosha Shamaka |
| Yavakshara | Kashaya, Madhura | Guru, Ruksha, Sukshma (subtle) | Shita | Katu | Kapha Pitta Shamaka |
| Guda       | Madhura | Laghu, Snigdha | Shita | Madhura | Vata Pitta Shamaka |
| Madhu      | Madhura, Kashaya | Guru, Ruksha, Sukshma | Shita | Katu | Kapha Vata Shamaka |
| Shunthi    | Katu | Laghu, Snigdha | Ushna | Madhura | Vatahara (pacifies Vata) |
| Marichha   | Katu | Laghu, Tikshna | Ushna | Katu | Kapha Vata Shamaka |
| Pippali    | Katu | Laghu, Snigdha, Tikshna | Anushsha-shita | Madhura | Kapha Vata Shamaka |
| Tvaka      | Madhura, Katu, Tikta | Ruksha, Laghu, Tikshna | Ushna | Katu | Kapha Vatahara, Pitta Vardhaka (increases Pitta) |
| Ela        | Madhura, Katu | Laghu, Ruksha | Shita | Shita | Tridoshahara |
| Patra      | Madhura, Tikta, Katu | Ruksha, Laghu, Tikshna | Ushna | Katu | Kapha Vatahara |

Table 4: Results for organoleptic and physico-chemical parameters of Chitraka Haritaki Avaleha

| Author/s | Title | Journal | Volume (issue), Year |
|----------|-------|---------|----------------------|
| Achyuta et al. | Pharmacognostical and physicochemical evaluation of Chitraka Haritaki: A compound Ayurvedic formulation | Int. J. Res. Ayurveda pharm. | 5 (3), 2014 |
| V K Singh et al. | Physico-chemical and phytochemical standardization of Chitraka Haritaki Avaleha | International journal of pharmaceutical & biological archives | 6 (3), 2015 |
| VK Singh, et al. | Accelerated stability study of Chitraka Haritaki Avaleha | International journal of pharmacy and pharmaceutical sciences | 8 (2), 2016 |
| Poonam et al. | Pharmaceutical and pharmacognostical evaluation of Chitraka Haritaki-An Ayurvedic compound | World journal of pharmaceutical research | 6 (5), 2017 |
| Yadav and Tukaram | A randomized controlled clinical study on the efficacy of Chitrakaharitaki Avaleha in Vataja Pratishayaya w.r.t. to allergic rhinitis in children | International Journal of Ayurvedic Research (PIJAR) | 1 (3), 2017 |
Yavakshara (1 Pala = 48 grams). Here, it is interesting to notice that by amending the content and procedure, Acharya has changed the indication by focusing on improvement in digestion. This might be because Shunthi, due to its pungent taste; oily property; and sweet post digestion effect, enhances its effect on the respiratory system. While Nagakeshara due to its bitter, pungent, astringent taste; light, dry property; and pungent post-digestive effect[20] and increased dose of Yavakshara enhances digestion power.

In Yoga Tarangini and Yogaratnakara, the quantity of Prakshepa Dravya (Trikatu and Trijata) is reduced to half in comparison to the standard comparator. This may be to make CHA more palatable by reducing its spicy and bitter taste. The impact of this change, on the phytochemical constitution and clinical efficacy is a matter of further study.

According to AFI, the therapeutic dose of Chitraka Haritaki Avaleha is mentioned as 6–12 g and has been indicated for Gulma (abdominal lump), Udavarta (constipation),

Table 5: Formulation composition of Chitraka Haritaki Avaleha as per Bhaishajya Ratnavali

| Name of ingredients | Scientific name/English name | Part used | Ratio  |
|---------------------|------------------------------|-----------|--------|
| Chitraka            | Plumbago zeylanica Linn.     | Root      | 25 part|
| Amalaki             | Emblica officinalis Gaertn.  | Fruit     | 25 part|
| Gaduchi             | Tinospora cordifolia Mier ex Hook | Stem   | 25 part|
| Haritaki            | Terminalia chebula Retz.     | Fruit pericarp | 32 part|
| Brihati             | Solanum indicum Linn.        | Root      | 2.5 part|
| Kantakari           | Solanum surattense Burm.     | Root      | 2.5 part|
| Shalaparni          | Desmodium gangeticum DC.     | Whole plant | 2.5 part|
| Prishnaparni        | Uraria picta Desv.           | Root      | 2.5 part|
| Gokshara            | Tribulus terrestris Linn.    | Root      | 2.5 part|
| Gambhari            | Gmelina arborea Linn.        | Root      | 2.5 part|
| Patala              | Stereospermum suaveolens DC. | Root      | 2.5 part|
| Shyonaka            | Oroxyllum indicum Vent.      | Root      | 2.5 part|
| Agnimitranga        | Premna micranota Roxb.       | Root      | 2.5 part|
| Bilva               | Aegle marmelos Corr.         | Root      | 2.5 part|
| Yavakshara          | Alkaline substance of Hordeum vulgare L. | Water soluble ash of plant | ¼ part |
| Guda                | Jaggery                      | -         | 50 part|
| Madhu              | Honey                        | -         | 4 part |
| Shunthi             | Zingiber officinale Rosc.    | Rhizome   | 1 part |
| Maricha             | Piper nigrum Linn.           | Fruit     | 1 part |
| Pippali             | Piper longum Linn            | Fruit     | 1 part |
| Tvaka               | Cinnamomum zeylanicum Breyn  | Bark      | 1 part |
| Ela                 | Elettaria cardamomum Maton.  | Seeds     | 1 part |
| Patra               | Cinnamomum tamala Nees and Eberm | Leaves  | 1 part |

Table 6: Organoleptic characters of Chitraka Haritaki Avaleha as per various published articles

| Parameters       | Achyuta Atara et al. | Poonam Gaur et al. | V.K. Singh et al. | API[16]       |
|------------------|----------------------|--------------------|--------------------|---------------|
| Color            | Dark brown           | Dark brown         | Blackish brown     | Blackish Brown|
| Touch            | Soft                 | Semisolid          | Soft and viscous   | Semisolid paste|
| Odour            | Pleasant             | Sweetish aromatic | Spicy pleasant     | Pleasant      |
| Taste            | Astringent, pungent  | Sweetish sour with astringent | Bitter astringent | Bitter Astringent|
| Appearance       | -                    | -                  | Thick semi solid mass | -          |

API: Ayurveda Pharmacopoeia of India

Table 7: Physico-chemical parameters of Chitraka Haritaki Avaleha as per various published articles

| Parameter                  | Achyuta Atara et al. | Poonam Gaur et al. | V. K. Singh et al. | T. J. Yadav et al | API |
|----------------------------|----------------------|--------------------|--------------------|------------------|-----|
| Loss on drying (%w/w)      | 23.5                 | 14.25              | 23.78              | 15.86            | Not more than 36.0 |
| Total ash (%w/w)           | 2.5                  | 0.787              | 4.045              | 10.56            | Not more than 4.7  |
| Acid insoluble ash (%)     | -                    | -                  | 0.306              | -                | Not more than 1.0  |
| Alcoholic-soluble extractive (%w/w) | 69           | 89.2               | 48.64              | 17               | Not less than 21.0 |
| Water soluble extractive (%w/w) | 61%             | 79.85              | 65.29              | 24               | Not less than 67.0 |
| pH (1% aqueous solution)   | 5.80                 | 4.5                | 5.19               | 5.72             | 6.4 to 6.6         |

API: Ayurveda Pharmacopoeia of India
Pinasa (chronic rhinitis/sinusitis), Kasa (cough), Shwsasa (dyspnoea/asthma), Arsha (hemorrhoids), Agnimandya (digestive impairment), Kshaya (tuberculosis) and Krmi (worm infestation). According to API, part to be used of Dashamula Dravya is stem bark; which might be to conserve the biodiversity of herbal plants.\[21\]

It is always important to observe organoleptic and physicochemical parameters of the finished product, especially in which stringent and multiple complex procedures are involved. All the reviewed articles had mentioned that CHA was prepared as per the reference of Bhaishajya Ratnavali, which is also mentioned in API and API. Despite having same method of preparation, disparity in the organoleptic and analytical parameters is apparent [Tables 6 and 7]. Water-soluble extractive and pH of all these samples are not matching with API standards. This disparity might be due to variation in the quality of raw drugs, seasonal variation, differences in pharmaceutical instruments used in CHA preparation or may be due to difference in the assessment method of organoleptic and physicochemical parameters. Hence, this may be matter for further research to find out that, how to overcome above-mentioned confounders to achieve unanimity in these parameters.

Scope and limitations of this study

Review article provides bird eye view of the subject that is an important and probably required step in the scientific validation or discovery process.\[21\] This review article provides the historical background of amendments along with data of organoleptic and analytical parameters of recent (last 10 years) original research works which provide platform for researchers to develop research questions for fundamental as well as applied research. Along with these outcomes, this review study also has certain limitations. In this review work, classical texts, which are not available in the Institute of Teaching & Research in Ayurveda library, were not screened. Unpublished raw data of original research carried out on organoleptic and analytical parameters of CHA was also not included in this study.

Conclusion

Chitraka Haritaki Avaleha was introduced by Vrindamadhava in Ayurveda pharmaceuticals and is mentioned thereafter in various texts, which indicates its clinical acceptance and efficacy. By keeping Bhaishajya Ratnavali as standard comparator, variations in formulation name, ingredients, method of preparation, indication and Anupana is observed. Most of the ingredients in Chitraka Haritaki Avaleha have Vatakapha and Tridosha pacifying properties, which makes it effective in the treatment of bronchial asthma. Organoleptic and physicochemical parameters mentioned in the published research works when compared with available standards of API reveals that the values of water-soluble extracts and pH differs and this can be a matter for further extensive research. This review might help the clinician and researcher to get the compendious idea of Chitraka Haritaki Avaleha.

Conflicts of interest

There are no conflicts of interest.

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