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# Pharmaceutical and Analytical Study of *Vidangadi Churna*

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## ABSTRACT

*Vidangadi Churna* is a herbo-mineral formulation containing *Vidanga, Nagara, Yava Kshara and Lauha bhasma* and is described in various classical texts of *Rasashastra*. The formulation for present study has been taken from *Chakradutt* written by *Chakrapani* in 11th century. *Vidangadi churna* has been indicated in *sthaulya rogadhikara*. *Bhaishajya Kalpana* is an integral part of *Ayurveda* which deals with the procurement, processing and right application of a drug to cure any diseases. This branch includes various *Kalpana* like *Swarasa, Kwatha, Leha, Sandhan, Churna* etc. These *Kalpana* are mainly concerned with the utility of the drug and availability. Simply it is an art of preparing and dispensing of medicine. The aim of this branch is the constant search of the formulations useful to resolve the complexity of diseases, having multidirectional action. When a similar kind of thing is done repeatedly it surely leads to disliking for it, like wise when a drug is repeatedly prescribed in the same form it causes reluctance in drug ingestion by patient. So easy administration of the drugs, ease transportable, better palatability as well as better accuracy of dosage form were the basic thoughts, which gave rise to variety of *Kalpana* or formulations. In the present study *Vidangadi Churna* was prepared as per classical reference to develop SOP (Standard Operating Procedure) and analyze sample as per classical parameters.

**Key Words** *Vidangadi Churna*, herbo-mineral, *Chakradutta, Bhaishajya Kalpana*

## INTRODUCTION

The word Pharmaceutical means manufacturing single and compound drug which can be used for medicinal purposes. *Bhaishajya Kalpana* is the pharmaceutical science giving more (emphasis) on the use of herbal medicines. If we delve deeper in this *bhaishajya kalpana*, we get the idea of the five basic primary medicinal formulations known as *Panchvidha Kashaya Kalpana*. Acharya *Charak* gives classification of this *Panchvidha KashayaKalpana* in *sutra sthana* of *Charak Samhita*. It comprises of *Swarasa, Kalka, Kwatha, Hima* and *Phanta*. Though the *Panch vidha kashaya kalpana* doesn't include *churnakalpana*, it is one of the frequently prescribed formulation by the Ayurvedic physicians because of its ease of preparation.-.*Vidangadi churna* has been indicated in *sthaulyarogadhikara*.

*Sthaulya* is abnormal and excess accumulation of *Medo Dhatu*. In medical science it is compared with obesity and it is defined as excess body and visceral fat that poses health risk. Obesity is the

most common nutritional disorder in the present situation. The most commonly used definition established by World Health Organization is- 'Obesity is a common chronic disorder of excessive body fat and has become a global epidemic which is present not only in the industrialized world but also in many developing and even in underdeveloped countries'.

## AIMS AND OBJECTIVES

The present study has been carried out with following aims and objectives-

- To develop Standard Operating Procedure(SOP) of *Vidangadi Churna.*
- To analyze sample of *Vidangadi Churna* as per classical parameters .

## MATERIALS AND METHODS

The pharmaceutical study was conducted in departmental laboratory, Department of *Rasashastra* & *Bhaishajya Kalpana*, National Institute of Ayurveda, Jaipur, Rajasthan.

**Pharmaceutical Study:**

All raw materials were procured from Pharmacy of National Institute of Ayurveda, Jaipur.

Preparation of *Vidangadi Churna* involved the following steps:

1. **Preparation of *Yava Kshara.***
2. **Preparation of *Lauha Bhasma.***
3. **Preparation of *Vidangadi Churna.***

**1) Preparation of *YavaKshara*[1]**

*Yava kshara* was prepared by following classical methods. Matured *Yava Panchanga* weighing 80 kg was collected and dried completely in sunlight for 8 days. After removing the physical impurities, dried *Panchanga* was burnt completely by placing it in a big iron pan. After the self-cooling, 4.160 kg white ash was collected[2].

The ash was collected in a specially designed steel vessel and 4 times of water was added to it. The ash was mashed thoroughly with hands and left undisturbed for 3h. After that, the clear supernatant liquid layers were collected through the outlet and filtered through three layered cotton cloth. The residual ash was again mashed with 2 times of water and kept undisturbed for the next 3h, followed by a collection of the second filtrate. A similar method was followed for the 3rd time to collect third filtrate[3]. Total water taken was 8 times of ash.

All the three filtrates (of *Ksharajala*) were individually subjected to heat to evaporate the water content and to obtained white colour *Kshara*. Total weight of *Yava kshara* was 925g.

**2) Preparation of *Lauha Bhasma***

*Lauha shodhana* was done in two batches of 500 g each. For Batch 1, 500g raw *Lauha* was taken on ladle and was heated using fire gun up to red hot and quenched in specific liquid media (serial wise – *Taila, Takra, Gomutra, Kanji, Kulattha Kwatha* )[4], which was taken in a stainless steel vessel. After cooling down *Lauha* was taken out from the vessel, again taken on ladle and heated and quenched. These processes, were repeated 7 times in each media. Amount of liquid media taken for quenching was equal to the quantity of *lauha* taken for *shodhana*. Weight of *Lauha* and volume of

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media was noted each time. Time taken for each process was also noted, and all the data was recorded. At the end of *samanya shodhana* 520 g *shuddha lauha* was obtained and 20 g was gained in Batch1. Same quantity and procedure was repeated for second batch. In Batch 2, 515 g *suddha Lauha* was obtained.

For *Vishesha shodhana* 520 g *Shodita Lauha* was taken on ladle and was heated using fire gun up to red hot and quenched in *triphala kwatha*, which was taken in a stainless steel vessel. After cooling down *Lauha* was taken out from the vessel, again taken on ladle and heated and quenched. These processes, were repeated 7 times. Amount of *triphala kwatha* taken for quenching was equal to the quantity of *Lauha* taken for *vishesha shodhana*[5]. After *vishesha shodhana* 582 g of *shuddha Lauha* was obtained and 62 g was gained in Batch 1. In Batch 2, 578 g *was obtained after vishesha shodhana* .

Purified iron was further reduced to powder by hammering repeatedly in an iron mortar and the powder was then mixed with a sufficient quantity of decoction of *triphala*. It was then exposed to the sun. Once the *kwatha* got evaporated the liquid was again added. This process was continued for seven days. After *bhanupaka*[6], a weight gain of 374g was observed in Batch 1 and 366g g was observed in Batch 2.

*Lauha* was taken in a *sthali* and *triphala kwatha* was added and heated till the liquid evaporated. After *sthalipaka*[7], weight of *Lauha* obtained was 640g and 316 g was lost in Batch 1. Same quantity and procedure was repeated in Batch 2 and a 63g of *Lauha* was obtained in Batch 2.

640 g *shodhita Lauha* & 180 ml. of *triphala kwatha* were put together in a *Khalwa* and triturated for 3 hours. When the whole mass attained a paste like consistency, small amount of this doughy mass was taken and made in to pellet form and transferred to a plastic sheet .In this way the whole mass was converted to pellets and transferred to the plastic sheet. Prepared pellets were kept on plastic sheet for drying. All dried pellets were weighed properly. Two earthen *Sharava* were took and rubbed over the floor to make their brim surfaces even, and then all the dried pellets were arranged in one *Sharava* and another *Sharava* was kept over it. *Sandhi bandhana* was done with the help of mud smeared cloth and dried. The *Sharava Samputa* was subjected to heat in a muffle furnace. The temperature was allowed to rise up to 750 degree and then it was maintained for 120 minutes. Thereafter the furnace was switched off and allowed for self-cooling. On the next day, when temperature of furnace came down, pellets were collected and weighed. The same procedure was repeated until *bhasma* which passed the classical tests were obtained[8]. Final yield of bhasma is mentioned in Table.1. Total 18 putas were required to get a properly prepared bhasma having the colour of *pakwa jambu phala* (dark violet).

**Table 1** Results of *Lauha*d uring *Bhasma* preparation

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| Batch | Quantity of raw iron | Weight of *lauha* after *samanya shodhana* | Weight of *lauha* after *vishesha sodhana* | Weight of *Lauha* after *Bhanupaka* | Weight of *lauha* after *sthalipaka* | Final yield of *bhasma* |
|---|---|---|---|---|---|---|
| **Batch 1** | 500g | 520g | 582g | 956g | 640g | 556g |
| **Batch2** | 500g | 515g | 578g | 944g | 634g | 543g |

## 3) Preparation of *Vidangadi Churna*[9]

**Table 2** Ingredients of *Vidangadi Churna*

| S. N. | Ingredients | Parts Used | Weight |
|---|---|---|---|
| 1. | *Vidanga* | *Phala* | 1 Part |
| **2.** | *Shunthi* | *Rhizome* | 1 Part |
| **3.** | *Yava kshara* | - | 1 Part |
| **4.** | *Lauha Bhasma* | - | 1 Part |
| **5.** | Honey | As a *Sahapana* | 2 part of total powder |

**Table 3** Foreign matter and results after powdering

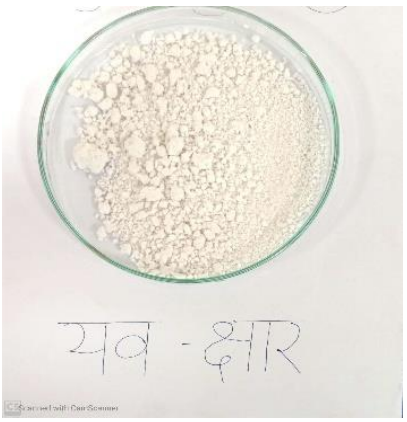
| S.N. | Ingredients | Quantity taken (in g.) | Foreign material (in g.) | Powdered obtained (in g.) | Total loss (in g.) |
|---|---|---|---|---|---|
| 1. | *Vidanga* | 1500 | 44 | 1440 | 60 |
| 2. | *Shunthi* | 1500 | 20 | 1474 | 26 |
| 3. | *Yava Kshara* | 950 | - | 944 | 6 |
| 4. | *Lauha Bhasma* | 900 | - | - | - |

The enlisted Ingredients as in Table. 2 , (*Vidanga* and *Shunthi*) were finely powdered individually with the help of electric pulverisor and sieved through mesh 80 no.separately. *Yava kshara* was made into fine powder individually with the help of mixer and sieved through 80 no. mesh. Accurately weighed 900 g of fine powder of each drugs were taken in a mortar and pestle and mixed properly till it became uniform.

**Pharmaceutical Sudy photos –**


**1. *Vidanga***

**2. *Shunthi***




**3. *Yava Kshara***

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**4. *Lauha Bhasma*** ***Vidangadi Churna***

**Analytical Study[10] -**

Testing of all the classical parameters were carried out at Drug testing laboratory, Department of *Rasashastra* & *Bhaishajya Kalpana*, NIA, Jaipur.

**(1.) Organoleptic parameters:**

The specific characters which are mentioned in our classics for evaluating the qualities of *Churna* by colour, touch, fineness, taste, odour etc. are given in table. 4. *Rupa* (Appearance & color), *Sparsha* (Touch) - Soft particles that could be detected by touch, *Gandha* (Odour)-Specific odour, *Rasa* (Taste)- Specific taste.

**(2.) Physicochemical analysis:**

**Total Ash:**

he test was carried out to evaluate the Ash content of the *churna*.

**Procedure**:

Accurately weighed 3g of drug was taken in a tarred silica dish and kept in a muffle-furnace at a temperature 450$^0$C until free from carbon (white ash). Then it was cooled and weighed. The percentage of ash was calculated with reference to the air-dried drug. The obtained result is shown in table.5.

**Acid-Insoluble Ash:**

The test was carried out to evaluate the percentage of acid insoluble inorganic content of the *churna* i.e. sand, siliceous earth.

**Procedure:**

Ash obtained from the total ash test was transferred to a 250ml beaker and 25ml diluted hydrochloric acid was added to it. The crucible was washed with 10ml of acid and the washing was transferred to the beaker. The beaker was then heated, the solution was then filtered and the insoluble matter was collected on an ashless filer paper (Whatman no.41). Filtrate was washed until it became neutral and the filterpaper ccontaining the filtrate was transferred to the original crucible. It was dried on hot plate and later inginted at 450$^0$c in a Bunsen Burner until it became ash. The residue was allowed to cool in a dessicator for 30 minutes and then weighed .The procedure was repeated until constant weight was obtained. The acid insoluble ash was calculated with reference to the air dried drug.

**pH determination (10% aqueous Solution) :**

**Procedure:**

For the Determination of pH, calibration of Digital pH meter was done with buffer solutions of

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different pH. The pH meter was dipped in the test sample (in 10% aqueous solution) and the value was noted. The obtained result was shown in table 5.

**Alcohol Soluble Extractive:**

This test was carried out to evaluate the alcohol soluble principles of the *churna*.

**Procedure:**

Accurately weighed 5g coarsely powdered drug was macerated with 100 ml of alcohol of specified strength (Ethyle Alcohol of 99.99% strength) in a closed flask for 24 hours. During the first 6 hours it was shaken frequently and then allowed to stand for eighteen hours. After thatit was filtered rapidly, taking precautions against loss of solvent. The filtrate was then evaporated to dryness in a tarred flat bottom shallow dish. It was then dried at $105^0$C to constant weight and weighed. The percentage of alcohol soluble extractive was calculated with reference to the air dried drug. The obtained results were shown in table no. 5.

**Water Soluble Extractive:**

This test was carried out to evaluate the water soluble principle of the sample.

**Procedure:**

Accurately weighed 5g coarsely powdered drug was macerated with 100 ml of distilled water in a closed flask for 24 hours. During the first 6 hours it was shaken frequently and then allowed to stand for eighteen hours. After thatit was filtered rapidly, taking precautions against loss of solvent. The filtrate was then evaporated to dryness in a tarred flat bottom shallow dish. It was then dried at $105^0$C to constant weight and weighed. The percentage of alcohol soluble extractive was calculated with reference to the air dried drug. The obtained results were shown in table no. 5.

**Loss on Drying (LOD):**

This Parameter determines the amount of volatile matter (i.e., water drying off from the drug). For substances appearing to contain water as the only volatile constituent, this procedure is appropriately used.

**Procedure:**

For the determination of LOD, 10g of accurately weighed was taken in a tarred evaporating dish. After placing the above said amount of the drug in the tarred evaporating dish, it was then dried at $105^0$C for 2 hours and weighed. Drying and Weighing was continued at one hour interval until difference between two successive weighing corresponds to not more than 0.25 percent. Weight loss was calculated and expressed as % w/w. The obtained result is shown in table 5.

**Particle Consistency:**

100 g of the drug weighed accurately was placed on the top sieve of a set of sieves, covered with lid and shaken until no further separation occurs. Drug left in the each pan was collected and weighed separately. The percentage of the same was calculated based on the amount of drug taken. The obtained result was shown in table 6.

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## RESULTS

Total weight of fine powder of ingredients was 3600g and final weight of *vidangadi churna* obtained was 3585 g. Total weight loss was 15g.

**Table 4** Organoleptic parameters of *Vidangadi Churna.*

| Sr. no. | Tests | Results |
|---|---|---|
| 1. | Appearance | Fine powder |
| 2. | Colour | Brown |
| 3. | Odour | Pleasant |
| 4. | Taste | Salty |

**Table 5** Physico-chemical parameters of *Vidangadi Churna.*

| Sr. no. | Tests | Results |
|---|---|---|
| 1. | Total Ash (W/W %) | 52.10 % |
| **2.** | Acid insoluble ash (W/W %) | 27.15 % |
| **3.** | $P^H$ (W/V) | 6.5 |
| **4.** | Alcohol soluble extractive (W/W %) | 5.28 % |
| **5.** | Water soluble extractive (W/W %) | 31.58 % |
| **6.** | Loss on drying at 105°C (W/W %) | 8.15 % |

**Table 6** Particle Consistency of *VidangadiChurna*

| S.N. | NAME OF TEST | RESULT |
|---|---|---|
| 1. | % of Moderately Coarse Powder | 0 |
| 2. | % of Coarse Powder | 0 |
| 3. | % of Moderately Fine Powder | 15.61 |
| 4. | % of Fine Powder | 74.18 |
| 5. | % of Very Fine Powder | 10.21 |

## DISCUSSION

Preparation of *Yava Kshara* was carried out as per reference of *Rasa Tarangini*. Dried *Panchanga* was made into small pieces for better drying. After complete drying, *Panchanga* was added little by little into the fire for proper burning. Ash and water were taken volumetrically by keeping constant weight for *Ksharajala* preparation. RO water was used to avoid any interference of inorganic salts present in tap water. Stainless steel vessel was used to prevent possible chemical reactions. Ash was rubbed well in water for proper mixing and allowed to settle down for 3 h. *Ksharajala* was obtained very cautiously through the outlet without disturbing the vessel. A clean cotton cloth was used for this purpose. Initially, *Ksharajala* was yellowish colored clear liquid. Aggregation, vapors and crackling sounds were increased proportionally with temperature. Color was changed from yellowish to brownish gradually as the temperature wasraised. *Kshara* started sticking to the vessel in final stages, and bumping was observed. It was stirred carefully to prevent bumping and sticking at this stage. Finally, white colored *Kshara* was obtained.

During *Shodhana* of *lauha* gravimetrically same amount of liquid media was taken for quenching. For quenching it is essential that the material should dip into the liquid media completely, and it was observed that iron scraps were dipped completely into same amount of media. So here gravimetrically same amount of liquid media was taken. 500g *Lauha* was heated up to completely red hot state. Because at the red hot state of *Lauha* desired changes takes place (iron is converted to ferroso-ferric oxide at red hot state by reacting with atmospheric oxygen). After heating it was instantly quenched in the liquid media. Instant quenching is important because repeated immediate cooling after heating leads to breaking of the material. During *Shodhana* colour of *Lauha* became black. This is because during red hot state *Lauha* (iron) reacts with atmospheric oxygen and steam to form ferroso-ferricoxide. Ferroso ferric oxide is black in colour, and reaction of *lauha* occurs mainly on surface, so *lauha* flakes became black after *shodhana*. During *shodhana* some part of *lauha* was converted to ferroso-ferric oxide.

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After *samanya shodhana* weight of *lauha* a 4% gain was observed. Some of the *lauha* parts which became fine may have escaped to the liquid media while quenching.

*Vishesha shodhana* was done in *triphala kwatha. Nirvapa* was done for 7 times. A gain of 11.92 % was noted .Some part of *lauha* may have converted to ferroso-ferric oxide during red hot state. This compound formation may cause increase in weight after *vishesha shodhana*. Addition of extract of *triphala*– to *lauha* during *vishesha shodhana* may be the reason for the increase in weight.

After the process of *Bhanupaka*, there was a huge gain in the weight, which may be due to accumulation of *triphala kwatha* residues. For the process of *Sthalipaka, triphala* was taken in a quantity three-times that of *lauha churna* for preparing *kwatha* as compared with *Bhanupaka*, where the amount was equal that of *lauha churna* taken before.

The process of *Putapaka* was carried out using Electric muffle furnace. *Triphala kwatha* was used as the *bhavana dravya*. The various works carried out on conventional *puta* showed the range of temperature for *Gajaputa* from 750° to 1,000°C. Therefore, the temperature of 750°C was decided for preparation of *Lauha Bhasma*. Total 18 puta was given. Up to the 4$^{th}$ *puta*, pellets were very hard, colour was brown which on 18$^{th}$*puta* became soft and colour was seen as *Pakwa jambu phala*.

Initially the raw materials, *vidanga* and *shunthi* were found easy to powder, which gradually became difficult to powder at the end. Because after certain extent when mixer-grinder became hot and the residual powder in it became hard like granules, it was impossible to further powder it. Hence, rest of the coarse powder was discarded. Quantity of *Vidangadi Churna* was 3585g and 15g of loss was obtained.

Data pertaining to Ash value of *Vidangadi churna* has been tabulated in Table 4. Total ash of *Vidangadi churna* as 52.10% w/w. The total ash usually consist of-phosphates, silicates and silica. The total ash figure is of importance and indicates to some extent the amount of care taken in the preparation of the drug. If the total ash is treated with dilute hydrochloric acid, the percentage of acid-insoluble ash may be determined. As shown in Table no. 4. Acid insoluble ash was found to be 27.15 % w/w in *Vidangadi churna*. Acid insoluble ash usually consists mainly of silica. A high acid-insoluble ash in drugs indicates contamination with earthy material and may be fine particles from grinding stones possibly got mixed with the drug during prolonged *Mardana*. As per the data shown in Table no. 4, pH value of *Vidangadi churna* was found to be 6.5. Data pertaining to Alcohol soluble extract of the all stages have been tabulated in Table 4. which showed the value as 5.28 % w/w. Extractive values for water soluble were shown in the Table 4. It was found that water soluble extract in *Vidangadi churna* was 31.58 % w/w. The loss on drying of any sample is directly related to its moisture content. If the moisture content is very high in any drug it may affect its preservation. Hence, the loss on drying of the sample was determined and as data shown in

Table no. 4. It was found that *Vidangadi churna* had 8.15 % loss on drying. Estimation of particle consistency of *Vidangadi churna* was carried out which is tabulated in Table 5. In *Vidangadi churna* maximum part i.e., 74.18 % was in fine powder form.

## CONCLUSION

The analytical values were with in the range mentioned in the API and were suggestive of the genuineness of the raw material used and the quality of the end product was good .

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