A Review Article on Formulation And Evaluation Parameter of Triphalachurna Tablets

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Abstract- *Ayurveda is well-thought-out as the science of life, for the reason that the ancient Indian system of health care aimed on the views of man and his ailment. From prehistoric times traditional herbal remedies have been commonly adapted in India. Herbal extracts are economical with less adverse effects as they interact with special chemical receptors within the body. There is a folk saying in India which says, "No Mother? Do not worry so long as you have Triphala". As it safeguards internal organs, just like a mother shields her offspring. Triphala is made by equal parts of three fruits namely amalaki (Emblica officinalis), haritaki(Terminalia chebula), and bibhitaki (Terminalia belerica). This herb contains antioxidants,gallic acid and ascorbic acid. It has beneficial effects in treating various ailments and thus has acquired importance in clinical research for its anticaries, antioxidant, anticollagenase and antimicrobial activities. The objective of the present article is to provide a brief overview of Triphala and its various applications in dentistry. The study was designed to formulate and pharmaceutically evaluate a herbal powdered drug Triphala Churna in to Triphala Tablet by incorporation of Senna Leaf Powder. The raw materials were procured, authenticated and standardized to determine their ash value, extractive value, moisture content and its chromatographic studies. The in house tablet was formulated and the evaluation parameters were studied for its weight variation, hardness testing, disintegration time test, friability test. Triphala Churna is used as a daily tonic to improve the digestion with a mild laxative propoties. We have incorporated Senna Leaf powder to the powdered drug and formulated in to a tablet dosage form to improve its therapeutic activity with respect to its laxative effect and the tablet form of Triphala is considered as one of the most preferred way of consuming it.*

Keywords- Quality evaluation, triphalachurna , pharmaceutical analysis , phytochemical analysis , heavy metals analysis

I. INTRODUCTION

Natural products including plants offer large structural diversity of phytoconstituents to be used as various classes of therapeutic agents to treat different ailment and modern techniques for extraction, isolation, structural elucidation, bioassays and formulation into various dosage forms. Synergistic effects are of vital importance in phytomedicines. Present study was designed to formulate Triphala tablets from Triphalachurna incorporated with Senna leaf powder.In house Triphalachurna was prepared and standardized by comparing with the marketed product, then it was formulated into tablet dosage form and the various evalution parameters were studied. Triphalachurna is used as a daily tonic, was combined with Senna leaf powder to enhance its laxative property. The prepared drug was developed into a tablet form to enhance the palatability of the users as one of the most preferred way of consuming it.[1]

Ayurveda endeavors to generate balance between the body's natural protection mechanism counter to the ailments.Age-old heritage of traditional herbal therapy is commonly found in India. It has been applied for treating most of the diseases because of their wide acceptance, reliability and being less expensive. Advent of new era of medicine has gradually pushed herbal therapy from its plinth. However, several factors like drug resistance and safety of drugs has raised the need for newer research, concerns on the safety profile and rising costs has entailed us to look over the herbal way.Triphala is a dried powder of three assorted fruits namely, Indian Gooseberry (EmblicaOfficinalis) also known as Amalakior Amla, Black Myrobalan (Terminalia Chebula) also known as Haritakior Harada, and Belleric Myrobalan (Terminalia Bellirica) also known as Bibhitakior Bahera, hence it is named as Tri (Three) Phala (Fruit). The combination of these three herbs in defined proportion results in a wonder formulation. Therefore, it is widely used in traditional medicines and home remedies for centuries. As it is nontoxic and has variety of therapeutic properties, it has gained popularity in modern medicine as well as in dentistry. It can be used as nutraceutical agent in dentistry for treating caries, periodontal diseases in the form of mouthwash, root canal irrigant, pit and fissure sealant.[2]

Churna is defined as a fine powder of drug or drugs in Ayurvedic system of medicine. Drugs mentioned in patha, are cleaned properly, dried thoroughly, pulverised and then

sieved. The churna is free flowing and retains its potency for one year, if preserved in an airtight container. Triphala Churna, Trikatu Churna, Drakeshadi Churnaand Sudharsana Churnaare some of examples. Churnaformulations are similar to powder formulations in Allopathic system of medicine. In recent days churna is formulated into tablets in order to fix the dose easily. These forms of medicament are prescribed generally because of their particle size. Smaller the particle size greater is the absorption rate from g.i.t and hence the greater is bioavailability.

It is prescribed by the Ayurvedic physician for treating conditions such as diabetes, indigestion, constipation etc. Indigestion is a common ailment affecting the general population and in allopathy system antacids are commonly prescribed. Since the usage of such aluminium containing antacids cause deleterious effects like Alzheimer's disease upon long term usage, we explored an alternative and safe remedy for indigestion. Hence we prepared a churna with natural ingredients commonly used by mankind for culinary purposes. Thus the present study examined the favourable influence of four spices formulated into churna said to have digestive property. The common ingredients of these churna were Ginger(*Zingiber Officinale*), Ajowan (*TrachyspermumAmmi*), Cinnamon (*Cinnamomum Zeylanicum*)and Fennel (FoeniculumVulgare). The formulated churna derived from above said drugs is reported to have a wide range of biological activity. Ginger contains aromatic principle like Zingiberine and bisaboline while pungent principles are gingerols and shogaols. Other components are nerol, geraniol, d-camphor, β-Phellandrene, linalool, α-farnesene, Shagoal, and also diarylheptanoids such as Gingerone A&B. This is used in the treatment of flatulence, colic, indigestion, vomiting, and constipation. It also maintains the tonicity of intestine muscle. Ajowan was found to contain essential oil that contains 50% thymol. This is used in traditional medicine for the treatment of indigestion and also as antispasmodic. Cinnamon contains cinnamaldehyde, which is a phenyl-propene derivative. It was found to possess antibacterial property and is mostly used as carminative. Fennel contains anethole and fenchone. This is mainly used as a carminative. An earlier report on the digestive and carminative property of the mentioned ingredients prompted us to formulate and evaluate the digestive enzyme activity namely amylolytic, lipolytic and proteolytic activity in comparison with GASTRAP (marketed formulation) used as a digestive agent.[3]

TriphalaChurna is a herbal formulation used extensively as treatment of It is used in the treatment of eye disorders with inflammation, where in it is used to wash the eyes. It is used to treat oral ulcers, where in it is used for gargling. Oral intake is indicated in liver disorders, edema and inflammation. It is used along with cow urine cow urine to treat testicular disorders.It Balances vatta and kapha. Churna can be defined as a dried powdered mixture of one or multiple herbs.TriphalaChurna is prepared from three herbs Amlaki (EmbilicaOfficinalis), Haritaki (Terminalia Chebula) and Bibhitaki (Terminalia Bellerica). The Pharmacopeial standards in Ayurvedic, Siddha and Unani are not adequate enough to ensure the quality of formulations. Analysis of marker compounds is necessary to maintain the quality and identity of the formulations. In order to assess the quality of in house formulation,it was prepared at laboratory scale as per pharmacopoeial standards and it was subjected to various quality control tests.

Triphala is a drug widely used in many disorders due to its various pharmacological activities. Triphalais composed of the three Myrobalans, Terminalia ChebulaRetz. (Haritaki), Terminalia BellericaRoxb. (Bibhitaki) and EmblicaOfficinalis Gaertn. (Amalaki) and is one of the most commonly used Ayurvedic preparations. The formulation generally consists of equal proportions of pericarps of this myrobalans.Triphala has been described in the ancient Ayurvedic text as a TridoshicRasayana, a therapeutic agent with balancing and rejuvenating effects on the three humours or constitutional elements in Ayurveda vata, pitta and kapha. Terminalia chebula Retz and Terminalia bellericaRoxb have a warm energy, while Emblicaofficinalis Gaertn. is cool in nature. Triphala, being a combination of all three, is therefore balanced, making it useful as an internal cleansing, detoxifying formula. It is regarded as an important Rasayana and good purgative in Ayurvedic medicine. Recipe for this traditional herbal supplement is described in the traditional Indian texts, the Charak and Susruta Samhita.

Application

1. Helpful in weight loss:
2. Acts as a detoxifier:
3. Cures digestive issues:
4. Helps in fighting infections and enhances immunity:
5. Beneficial in maintaining oral hygiene:
6. Beneficial for eye health:
7. Helpful in treating gastric ulcers:
8. Helps in treating urinary tract infections
9. Helpful in reducing joint and bone pains:
10. Helpful in healing wounds:
11. Effective in regulating blood pressure:
12. Helpful in stimulating hair growth:
13. Keeps your hormones in place:
14. Helpful in reducing dark circles:
15. Helpful in curing bad breath:

16. Beneficial for kids

II. LITERATURE REVIEW

Revathi S, Gopal V ,Jeyabalan G , Dhanraju Met.al. Amalaki or Amla Amla, also known as Indian gooseberry, is identified botanically as Emblica officinalis Gaertn and also Phyllanthus Emblica Linn. In Sanskrit, it is also called as Dhatri (the nurse) distinguished due to its incredible healing properties. It is consumed in various forms, from pickles and preserves to yogurt coalesced with amla fruit powder. Amla is as well the most fertile natural source of vitamin C in the form of ascorbic acid containing 600 mg per 100 grams in an easily edible form. Amla is a super food made up of over 80% water and it has very less calories. It has manifested to be an efficacious herbal medicine for the intervention and hindrance of eye disease, cancer, digestive problems, and diabetes. It also functions as diuretic, liver tonic, restorative and anti-inflammatory. It also comprises of protein, fiber, phosphorous, iron, carotene and vitamin B complex and gallic acid according to the Indian Council of Medical Research.

Haritaki or Harada The botanical name is Terminalia Chebula Retz. It is conceived as one of the most significant ayurvedic herbaceous plant whilst it has an astringent and unpleasant taste . Harada has been used widely for many centuries in both Ayurvedic and Tibetian medicine. It is named as “king of medicine” in Tibetan medicine. Many delineations of the healing form show a handful of Haritaki. It is a potent anti-fungal, anti-bacterial as well as antiviral and also it is anti-inflammatory. It turns down the blood sugar levels and enhances insulin sensitivity. It is a best redressal for skin problems, for hair loss and dandruff. It also treats constipation, dementia and diabetes.[7]

Bibhitaki or Baheda The botanical name is Terminalia Bellirica and it is strong laxative herbaceous plant. By nature, it is astringent, sweet and also heating. It is a restorative to “Kapha” and is believed to amend conditions of vitiated voice. Baheda is a potent ancient rejuvenator with detoxifying calibers on the body muscles, blood, and tissues with fat in the body. It treats diabetes , high blood pressure, & rheumatism. Bibhitaki is extremely feasible with circumstances necessitating redundant mucose tissue in the system and is also beneficial for featured bone formation.[7]

Plan of work

- Preformulation Studies
  - Bulk Density
  - Tapped Density
  - Hausner’s Ratio
  - Carr’s Index
  - Angle of Repose
- Organoleptic Evaluation
  - Appearance
  - Colour
  - Odour
  - Test
  - Texture
- Physicochemical Evaluation
  - Ash Value
  - pH Value
  - LOD
  - LOI
  - Extractive Value
- Pharmaceutical Evaluation of Tablet
  - Weight variation
  - Hardness Test
  - Friability Test
  - Disintegration Test
  - Drug profile

1. AMLA(EmblicaOfficinalis)

Fig 4.1 FreshFruit and Dried Fruits of Amla

1.1 Synonym

Emblica, Indian Goose Berry, Amalki

1.2 Biological source: This consists of dried, as well as fresh fruits of the plant Emblica officinalis Gaerth Phyllanthus Emblica Linn. belonging to family Euphorbiaceae. It contains not less than 1.0 per cent w/w of gallic acid calculated on dry basis.

1.3 Geographical source: It is a small or medium size tree found in all deciduous forests of India. It is also found in 5 Lanka and Myanmar. The leaves are feathery with small oblong pinnately arranged leatlets. The me is characteristic greenish-grey with smooth bark. Cultivation and Collection Intolerant to frost or drought, it is grown by seed germination; besides, Amla can also be propagated by budding or cutting. It does not tolerate the frost or drought. It is normally found up an altitude of 1500 m. Commercially, it is collected from wild grown plants. Now a days the newly released varieties are selected for better yield. These are known as Banarasi, Kanchan, Anand-2, Balwant, NA6, NA7 and BS-1. Seeds or seedlings are placed at distance of 4.5 x 4.5 metres in red loamy or coarse gravelly soil. Proper arrangement for irrigation required.

Drip irrigation is most suitable. Fertilizers in the dose-range of 750- 900 gms of urea, 1 kg superphosphate and 1-1.5 kg of potash per annum depending upon the quality of soil are sufficient. I The above dose is divided into two equal parts, one! part is applied in September 7 October and the second in April May every year. Pruning is done regularly and only 4-6 branches about 0.75-1.0 metre above the ground are retained. Plant bears male and female flowers separately. Male flowers are reported in the axil of the leaf, in bunches while the solitary female flowers are in the axil of the banchesThe extent of fertilization is 25-30 per cent of flowers. Cultivated plants bear comparatively large fruits. The tree flowers in hot season and the fruits ripen during the winter.

Alternative crops to the extent of 7-8 years age of Amla trees can be undertaken. Black gram, math, gaur, sunflower, ground nut etc. are the common alternative crops of choice. Each plant can bear 175-300 kg of fruits and each of healthy fruit weights approximately 25-35 gm. Plant hormones like Gibberlic acid or planofix in the range of 30-50 ppm are most useful to incise the yield per hectare. Duathase-78, DDT is useful to get rid of rust, blue mold or other fungal infections.

1.4 Macroscopic characters

- **Colour** - The green colour changes to light yellow or brick red at maturity.
- **Odour** - Odourless
- **Taste** - The taste of Amla is sore and astringent.
- **Size**- The average size of an Amla is between 1.5 and 2.5 cm in diameter.
- **Shape** - The fruits are depressed, globular.
- **Extra features -** Fruits are fleshy obscurely 4 lobed with 6-trygonus seeds. They are very hard and smooth in appearance

1.5 Chemical tests

2. Alcoholic or aqueous extract of the drug gives blue colour with ferric chloride solution,
3. Adding gelatin and sodium chloride in aqueous extract produces milky white colour.
4. In the aqueous extract of Amla add lead acetate to remove percipitate by filtration. To filtrate add solution of 2:6 dichlorophenol-indophenols; the colour disappears.

1.6 Standards of quality

Total Ash = Not more than 3.0 percent
Acid Insoluble Ash = Not more than 5.0 per cent. 3 Not more than 2.0 percent
Water Soluble Extractives = Not less than 40.0 percent
Alcohol Soluble Extractives = Not less than 30.0 percent

1.7. Uses

- Amla fruits are largely used in Indian medicines.

It is used as an acrid, diuretic, refrigerant and laxative. Dried fruits are given in diarrhoea and dysentery. They are also administered in jaundice, dyspepsia and anaemia along with iron compound. Fruits are also used in preparation inks, hair oils and shampoo,

- It is reported that fixed oil from fruits possesses the property of promoting hair growth. Seeds of the fruits are given in treatment of asthma and bronchitis.
- The leaves are used fodder. Alcoholic extract of the fruit is anti-viral. It is a popular ingredient of 'Triphala' and "Chyawanprash". Amla, being a rich source of vitamin C, is considered important to slow the ageing process.
- It improves skin health. Ageing is a cumulative result of damage to various cells and tissues, mainly by oxygen free radicals.
- Vitamin C is a scavenger of free radicals which breaks them down. It has an antioxidant synergism with vitamin E (which prevents peroxidation of lipids).
- Amla is a major ingredient of ancient Ayurvedic preparation Chyawanprash, believed to delay ageing process thereby adding to longevity.

2 HARADA(Terminalia Chebula)

Fig 4.2 Fresh Fruit and Dried Fruits of Harda

2.1 Synonyms

Chebulic Myrobalans, Harde, Haritaki

2.2 Biological source: It consists of dried, ripe, and fully matured fruits of Terminalia chebulaRetzr belonging to family Combretaceae. It contains not less than 5.0 per cent of chebulagic acid and not less than 12.5 per cent of chebulinic acid.

2.3 Geographical source: Myrobalan tree is found in the sub-Himalayan tracks from Ravi to West Bengal, Assam all deciduous forests of India, specifically in Madhya Pradesh, Maharashtra, Bihar and Assam. Cultivation and Collection It grows at an altitude of 1800 m. It is not cultivated and fruits are collected from wild grown forest plants, it is a tree, 15-25 m in height, and 1.5-2.5 m in diameter. The tree is rounded, cowned with spreading branches and oxate leaves. It has yellowish-white flowers in the terminal spike.

2.4 Macroscopic characters

- **Colour** - Fruits are yellowish-brown
- **Odour** - Odourless
- **Taste** - Astringent, slightly bitter and sweetish at the end
- **Size**- 20 to 25 mm long and 15 to 25 mm wide
- **Shape** - Ovate and wrinkled longitudinally

2.5Extra features: The fruits are hard and stony with single seed which is light yellow in colour and 15 to 320 mm in length. The pulp of the fruit is non-adherent to the seed Myrobalan fruits are an important source of tannin. Depending upon the geographical source, they vary in tannin content and the fruits collected from Chennai are very rich in lannin. The approximate analysis of the fruits is as follows:

Moisture per Tannin-25-32 percent. Waterinsoluble matter 40-50 percent. The tannins of myrobalans are of the tannins of myrobalans are of pyrogallol type chebulinic, ellagic and gallic acids are the other contents of myrobalans. Myrobalan also contains olysable tannins), which yield chebulic acid and d-galloyl glucose on hydrolysis. Chebulagic, glucose and sorbitol (about 3.5 per cent). During the maturation of the tree, the amount of tannin decreases, whereas the acidity of the fruits increases.

2.6 Standards of quality

Drugs containing tannin

Total ash	=	Not more than 5.5 %
Acid insoluble ash	=	Not more than 0.5 %
LOD	=	Not more than 9.0 %
Alcohol soluble extractives	=	Not less than 40.0 %
Water soluble extractives	=	Not less than 56.0 %

2.7Uses

Myrobalan used mainly as an astringent, laxative, stomachic and tonic. The laxative property of Myrobalan is due to anthracene derivative present in the pericarp. It is also an anthelmintic. Fruit pulp is used to cure bleeding. It is an ingredient of ayurvedic preparation Triphala', used treatment of variety of ailments. Commercially, it is used in dyeing and tanning industry and a the treatment of water used for locomotives. Myrobalan is also used in the treatment of pil external ulcers.

3 BAHERA (Terminalia Bellerica)

Fig 4.3 Fresh Fruit and Dried Fruits of Bahera

3.1 Synonym

Sellaric myrobalan, Baheda, Bibhitak are other names of Bahera.

3.2 Biological source: It consists of dried ripe fruits of the plant Terminalia belerica Linn. belonging to family Cambretaceae, and should contain not less than 0.3 per cent of ellagic acid and 0.75 per cent of gallic acid in dried form.

3.3 Geographical source: The tree is found in all the decidous forests of India, up to an altitude of 1000 m. It is found abundance in Madhya Pradesh, Uttar Pradesh, Punjab, Maharashtra and in Sri Lanka and Malaya

3.4 Cultivation and collection: Cultivation of Bahera, though not done on commercial scale, can be carried out by sowing the seeds. The seeds can retain the viability for a year and their rate of germination is about 80 per cent. The plant can also be raised by transplantation. It takes about 15-30 days for germination of seed. The maximum height of the plant is about 40 m and the girth is 2-3 m. The stem of the plant is straight and the leaves are broadly elliptic and clustered towards the end of the branches. Flowers at simple, solitary and in auxiliary spikes.

3.5 Macroscopic characters

- **Colour** - Fruits are dark brown to black
- **Odour** - Odourless
- **Taste** - Astringent
- **Size**- 3-2 cm in length
- **Shape** - Fruits are globular and obscurely 5 angled Thetras are pulpy with

hard and stany seeds, Scanned

3.7Chemical constituents: The fruits contain about 20 30 per cent of tannins and 40 45 per cent water-soluble extractives. It also contains colouring matter besides gallic acid, ellagic acid, phyllemblin, and ethyl gallate and galloyl glucose. The seeds contains non-edible oil. The plant produces a gum. It also contains most of the sugars as reported in myrobalan.

3.8 Standards of quality

Total ash	=	Not more than 4.5%
LOD	=	Not more than 10.0%
Acid insoluble ash	=	Not more than 0.2%
Alcohol soluble extractives	=	Not less than 17.0%
Water soluble extractives	=	Not less than 26.0 %
Loss on drying	=	Not more than 10.0 %

3.9Uses: Bahera is used as an astringent and in the treatment of dyspepsia and diarrhoea. It is a constituent of triphala. The purgative property of half ripe fruit is due to the presence of fixed oil. The oil on hydrolysis yields an irritant recipe: Gum is used as a demulcent and purgative. Oil is used for the manufacture of soap.

III. MATERIAL AND METHOD

1Materials

1.1 Drug and Raw Materials

Drug	Manufacture by
Triphalachurna (Procured from market)	Ayurvedic Research foundation Pvt. Ltd.
Amla (*Embelica officinalis*) fruit	
Harida (*Terminalia Chabula*) fruit	
Bahera (*Terminalia Belerica*) fruit	
Ethanol	Changshu Hongsheng Fine Chemicals
Lactose	MCC Laboratory Ltd.
Starch	K.R. Chemicals (India)
Talc	Thermosil Fine Chemical Industries

1.2 Preparation: Drug Mentioned in yoga are cleaned and dried properly they are finally powdered and sieved. If more than one drugs are present then each one is separately powdered, sieved and weight accurately and then mixed together.[9]

1.3Preparation of tablets: Direct compression method has been employed to prepare Triphala tablets with Triphalachurna and Senna leaf powder using Lactose, Starch, Talc as an excipients.

All the excipients including drug were weighed accurately according to the batch formula. The drug was thoroughly mixed with lactose on a butter paper with the help of a stainless steel spatula. Then all the ingredients except lubricants were mixed in the order of ascending weights and blended for 20 minutes. After uniform mixing of ingredients the lubricant was added and again mixed homogeneously for 10 minutes. The prepared blend of each formulation was compressed on 08-station rotary tablet punching machine at a pressure of 0.5 ton for 30s to form single layered flat faced tablet of 8mm diameter.[11-12]

1.4Formula Each 5 tablets contain

Sr. No.	Ingredients	Weight
1	TriphalaChurna	1 gm
2	Lactose	1.5 gm
3	Starch	0.25 gm
4	Talc	0.5 gm

2 Methods

2.1 PreformulationStudy [13-5]

Pharmaceutical parameters like Bulk density, Tapped density, Carr's Index, Hausner's Ratio and Angle of repose were determined as per standard protocols.

- **Determination of Bulk Density and Tapped Density:** Bulk density is defined as the mass of many particles of the material divided by the total volume they occupy. The total volume includes particle volume, inter-particle void volume and internal pore volume. Tapped density is the term used to describe the bulk density of a powder (or granular solid) after consolidation/compression prescribed in terms of "tapping" the container of powder a measured number of times, usually from a predetermined height.

The term bulk density refers to a measure used to describe a packing of particles or granules and the term Tapped density refers to the true density of the particles or granules.

Formula for calculation:

$$\text{Bulk density} = \frac{\text{Weight of powder taken}}{\text{Bulk volume of powder}} = \frac{10}{\pi r^2 h_b}$$

$$\text{Tapped density} = \frac{\text{Weight of powder taken}}{\text{Bulk volume of powder}} = \frac{10}{\pi r^2 h_t}$$

Where,

$\pi r^2 h$ = Volume of graduated cylinder

h_b = Bulk height of powder

h_t = Tapped height of powder

- **Determination of carr's compressibility index:** The Carr index is an indication of the compressibility of a powder. It is another indirect method of measuring the powder flow from bulk and tapped density.

Formula for calculation:

$$\text{Carr's index}(\%) = \text{Tapped density} - \frac{\text{Bulk density}}{\text{Tapped density}} \times 100$$

- **Determination of hausner's ratio:** Hausner's ratio is related to inter-particle friction and as such can be used to predict the powder flow properties.

Formula for calculation:

$$\text{Hausner's ratio} = \frac{\text{Tapped density}}{\text{Bulk density}}$$

- **Determination of angle of repose:** The angle of repose is a parameter used to estimate the flowability of a powder. It is defined as the maximum angle possible between the surface of the pile of powder and the horizontal plane. Powders with low angles of repose will flow freely and powders with high angles of repose will flow poorly.

Formula for calculation:

$$\tan\theta = \frac{h}{r}$$

Where,
θ = Angle of repose
h = Height of pile
r = radius of the base of pile
Methods for preliminary qualitative phytochemical tests of the plant extracts are given below,

Table 1: Relationship of angle of repose, carr's index &hausner's ratio with flow properties of powder

Angle ofRepose	Carr's Index	Hausner's Ratio	Flow Properties
25-30	<10	1-1.11	Excellent
31-35	11-15	1.12-1.18	Good
36-40	16-20	1.19-1.25	Fair
41-45	21-25	1.26-1.34	Passable
46-55	26-31	1.35-1.45	Poor
56-65	32-37	1.46-1.59	Very Poor
>66	>38	>1.6	Very Very Poor

- **Organoleptic evaluation[19]**

Organoleptic evaluation means the study of drugs using organs of senses. It refers to the methods of analysis like colour, odour, taste, size, shape, and special features, such as: touch, texture, etc. Obviously, the initial sight of the plant or extract is so specific that it tends to identify itself.

1.2 Physico-chemical evaluation [20-24]

Physicochemical parameters like foreign matter, moisture content (Loss on Drying), pH, total ash, acid Insoluble ash, water-soluble extractive, alcohol soluble extractive values of all three samples were determined as per standard protocols. All the procedures are described as follows:

- **Determination of foreign matter:** 100g of sample was taken and spread in a thin layer on a suitable platform and was examined in daylight with unaided eye (or using 6x or 10x magnifying glass) and the foreign matter was separated and weighed. The percentage of foreign matter was calculated with reference to the drug sample.

  Standard: The sample should not contain more than 2% of foreign matter, unless otherwise specified in individual monograph.

- **Determination of moisture content/ loss on drying (LOD):** An accurately weighed 5g of polyherbal formulation powder was taken in a tarred evaporating dish. The crude drug was then heated at 105 °C in an oven for 3 hours. The drying and weighing was continued at half an hour interval until difference between two successive weighing corresponded to, not more than 0.25 per cent. Percentage moisture content of the sample was calculated with reference to the air dried powdered drug material.

Formula for Calculation:

$$\%LOD = \frac{w_2 - w_3}{w_3 - w_1} \times 100\%$$

Where,
W_1 = weight of container (g)
W_2 = weight of container + wet sample (g)
W_3 = weight of container + dried sample (g)
w_2- w_3 = weight of moisture
w_3- w_1 = weight of dried sample

- **Determination of loss on ignition (LOI)**

An accurately weighed 5g of polyherbal formulation powder was taken in a previously ignited and tared silica crucible and was heated in the oven at 105 °C overnight (or the previously dried sample can also be used). The crucible was cooled and reweighed. The crucible was then placed into the furnace tray and was ignited in the Muffle Furnace at 500 °C for about 4hrs. The sample was then cooled in a dessicator

for 30min and reweighed with the ash in it (WA). The observations were noted.

Formula for Calculation:

$$\%LOI = \frac{w_s - w_a}{w_s - w_c} \times 100\%$$

Where,

W_C = weight of crucible (g)
W_S = weight of sample (g)
W_A = weight of ash (g)

- **Determination of total ash:** An accurately weighed 3g of the sample was taken in a previously ignited and tared silica dish/ crucible. The material was evenly spread and ignited in a Muffle Furnace by gradually increasing the temperature to not more than 450 °C – 600 °C till the carbon free ash was not obtained. The total ash value was calculated with reference to the air-dried powdered drug material.

Formula for calculation:

$$\%Total\ ash = \frac{Weight\ of\ ash}{Weight\ of\ sample\ taken} \times 100\%$$

- **Determination of extractive values**

a) **Determination of alcohol soluble extractives**: 5gm of churna was accurately weighed and placed inside a glass stoppered conical flask. It was then macerated with 100ml of ethanol. The flask was shaked frequently during the first 6 hours and was kept aside without disturbing for 18 hours. It was then filtered and about 25ml of filtrate was transferred into a tared flat-bottomed shallow dish and was evaporated to dryness on a water bath. It was then dried to 105 °C for 6 hours, cooled and finally weighed. The percentage of Alcohol Soluble extractives was calculated with reference to the air-dried powdered drug material.

Formula for calculation:

$$\%\ of\ Alcohol\ soluble\ extractive = \frac{Weight\ of\ residue \times 100 \times 100\%}{25\ Weight\ of\ sample\ taken}$$

- **Determination of water soluble extractives**: Proceed as directed for determination of Alcohol–Soluble Extractive, using chloroform water (2.5ml chloroform in purified water to produce 1000ml) instead of ethanol.

- **Determination of pH value:** The powder sample of triphalachurna was weighed to about 5g and immersed in 100 ml of water in a beaker. The beaker was closed with aluminum foil and left behind for 24 hours in room temperature. Later the supernatant solution was decanted into another beaker and the pH of the formulation was determined using a calibrated digital pH meter.

3Pharmaceutical evaluation of tablets[25]

The prepared tablets were subjected to post compression parameters. The parameters studied are weight variation, hardness, and friability & disintegration time test.

- **Weight variation test:** Twenty tablets were selected at random and weighed individually. The individual weight was compared with the average for determination of weight variation.
- Take 20 tablet and weighted individually
- Calculate average weight
- % weight variation = individual weight/average weight * 100
- The tablet pass the USP test if number more than 2 tablet are out of % limit and if not tablet differs by more than 2 times of % limit.
- **Hardness:** Hardness of the tablets was determined by using Monsanto hardness tester.
- Tablets require a certain amount of strength , or hardness and resistance to friability, to withstand mechanical shock of handling in manufacture , packaging and shipping
- Hardness thus sometimes terms the tablet crushing strength.
- Tablet hardness tester are
- Monsanto teste

Pfizer tester
Strong-Cobb tester

Erweka tester

Friability test: Friability of the tablets were determined byusing Rochefriabilator.

- USP test to determine how will tablets will stand up to Coating , Packaging , Shipping and other processing condition
- 10 tablet where dusted and weighed on the analytical balance
- The tablets were placed in the section 1 of the of drum of the friability tester and rotated 100 times
- The tablet were re-dusted and re-weighted

- According to USP, the tablet should not lose more than 1% of their total weight
- Friability(%)= W1-W2/W1 * 100
- W1= Weight of tablets before test (initial)
- W2= Weight of tablets after test (Final)
- **Disintegration time test:** Disintegration time test was determined by using six basket disintegrator.
- The USP device to test disintegration uses 6 glass tube that are 3" long; open at the top and 10 mesh screen at the bottom end
- To test for disintegration time , one tablet is placed in each tube and the basket rack is positioned in 1-L beaker of water , stimulate gastric fluid at 37 +- 0.5*C such the tablet remain 2.5 cm below the surface of liquid on their upward moment and not closer than 2.5 cm from the bottom of the beaker in their downward movement.
- Move the basket containing the tablets up and down through a distance of 5 to 6 cm at the frequency of 28-32 cycle per minute.

IV. RESULT

Pharmaceutical valuation

Sr.No.	Properties	TriphalaChurna
1	Bulk Density	0.796
2	Tapped Density	0.826
3	Hausner's Ratio	1.037
4	Carr's Index	3.6
5	Angle of Repose	37.33

Organoleptic evaluation

Sr. No.	Properties	Churna
1	Apperance	Powder
2	Colour	Yellowish Brown
3	Odor	Characteristic
4	Taste	Bitter
5	Texture	Moderately fine Powder

Physical properties

Sr. No.	Properties	Churna
1	Foreign Matter	Nill
2	Moisture Content/ Loss on Drying (LOD)	3.112 %
3	Loss on Ignition (LOI)	46%
4	Total Ash	8.4%
5	Extractive Values	12%
6	pH Value	3.2

Weight variation test

Tablet	Weight	Weight variation
1	0.302	0.00
2	0.300	0.662
3	0.310	-2.64
4	0.300	0.662
5	0.310	-2.64
6	0.280	7.28
7	0.308	-5.96
8	0.300	0.662
9	0.310	-2.64
10	0.300	0.662
11	0.300	0.662
12	0.310	-2.64
13	0300	0.662
14	0.320	-5.96
15	0.310	-2.64
16	0.300	0.662
17	0.310	-2.64
18	0.300	0.662
19	0.280	7.28
20	0.300	0.662

Weight(Avg. & Total) of prepared tablets.

Total Weight (gm) = 6.050
Avg. weight (gm) = 0.302

Hardness test

Tablets	Hardness (kg/cm^2)
1	5.3
2	4.3
3	4.0
4	4.6
5	5.1
Avg. Hardness	**4.66**

Friability test

Tablets	Avg. Wt. before test (gm)	Avg. Wt. after test (gm)	% Friability (Loss in Avg Wt.)
Prepared Tablets	6.050	6.040	0.16

Disintegration

Tablets	Disintergration
1	2.00
2	2.90
3	1.20
4	3.00
5	2.30
6	2.00
6	2.00
Avg. Time (min)	**2.13**

Recommended dosage of triphala

- Triphala Powder - 1/2-2 teaspoon once or twice a day.
- Triphala Capsule - 1-2 capsules twice a day.
- Triphala Tablet - 1-2 tablets twice a day.
- Triphala Juice - 2-3 teaspoon once or twice a day

V. CONCLUSION

In the present investigation various standardization parameters such as physicochemical parameters like weight variation test ,hardness test, friability test were carried out . It is concluded that the formulation of triphalachurna tablets has been prepared and evaluate mentioned parameter which shows satisfactory results .

These tab full_fill all the objectives :

To mask the unpleasant taste of the triphalachruna
Tablets are easy to carry and pack
Tablets can give a desired or calculated dose of medicament

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