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A Review Article On Comparative Analysis To Report Quality Parameters Of Triphala Churna

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ABSTRACT

Triphala churna is a traditional formulation of ayurvedic made from three 3 fruits –Amla, baheda and haritaki. It is also known as herbal laxative that help in quick relief from digestive distress like Constipation, acidity, bloating and many digestion problem. It contains vitamin C rich Amla it is also helping elevating your immunity level and energy level. Regular conception of this powder keeps your active through the day while supporting healthy functioning of the digestive system. Ambla is rich in vitamin C which help in blostering the immune system of the body. Baheda has anti allergic property and helps detoxify the body.

Haritaki is also known as the king of medicine in Ayurvada and is also help combat stomach ailment and maintain healthy organ functioning.

Objective: The study was designed to evaluate quality profile of polyherbal formulation Triphala Churna one was taken from marketing and other one prepared in laboratory. In order to inform industry and regulatory agencies of any defects and to make recommendations regarding the quality and consistency status of the products on the market, the study was designed to evaluate the variation in quality specifications and compare them with the standard values prescribed within the Ayurvedic and Indian Pharmacopoeia..

Methods: Both the formulation of Triphala Churna(Marketing and lab)were assessed comparitvely for their organolaptic, physicochemical and phytochemical properties as per the methods prescribed in Pharmacopoeias

Results: The data analysis showed that all the parameters of the Triphala Churna formulations (marketed and laboratory) had about identical values with some substantial variance in a small number of parameters and were compliant with the standard values mentioned in pharmacopoies..

Conclusion: Therefore, the analysis shows that in order to eliminate variance across various ayurvedic medications, more severe quality control parameters need to be created.

Keyword: Quality Evaluation; Triphala Churna; phamaceutical analysis.

INTRODUCTION

Triphala churna is a traditional formulation of ayurvedic made from three 3 fruits –Amla, baheda and haritaki. It is also known as herbal laxative that help in quick relief from digestive distress like Constipation, acidity, bloating and many digestion problem. It contains vitamin C rich Amla it is also helping elevating your immunity level and energy level. Regular conception of this powder keeps your active through the day while supporting healthy functioning of the digestive system.

Helps ease digestion: triphala churan helps is bowl movement and keep digestive trouble away. Stop bloating is a common problem in everyone's life gass and uneasiness it strengthens back rectal muscle, relief and clean digestive tract.

It also helping in breakdown off food and quick absorption of nutrients by the body please stop

Ambla is rich in vitamin C which help in blostering the immune system of the body.

Baheda has anti allergic property and helps detoxify the body.

Haritaki is also known as the king of medicine in Ayurvada and is also help combat stomach ailment and maintain healthy organ functioning. It's explosive ratio is 3:2:1. 600 gram of triphala churna contain 300 gram of amla,200 gram of baheda and 100 gram of harad. Since ancient times, both industrialised and emerging nations have employed a range of therapeutic plants in the Ayurvedic medical system.assessing the quality is crucial to support the acceptance and safety of herbal compositions. The lack of specific quality control criteria for herbal medicines and their formulations is one of the biggest issues facing Ayurveda. In order to evaluate the quality of pharmaceuticals, herbal formulations must be standardised. It is founded on the concentration of it's active ingredients, physical,chemical,phytochemical and in vito and invivo parametes.

Triphala churna is a well recognised and revered polyherbal medicine consisting of dried fruits.

It is classified as tridoshic rasayan in ayurvadic medicine as it promotes longevity and rejuvenation in patients of all constitution and ages. It has various application in medical field like laxatives, eye, antiinflammatory, antiviral and so on. Its is also effective in headache, dyspesia,ascites and leucorrhea also used as a blood purifiers and possessanti inflammatory and anti aging properties.Triphala is claimed to have antiviral and antibacterial effect.[1]

Chemical Composition

The fruits of Terminalila bellerica consist of protiens and oils that include omega-3 and omega 6 fatty acids. Because of its high fatty acid content, this plant can impact cholestrol level, increasing high-density lipoprotein levels (good cholestrol) while decreasing low-density lipoprotein levels(bad cholestrol), making it effective in treating coronary artery disease. Amla, or Phyllanthus emblica, fruit contains a lot of ascorbic acid, or vitamin C..

Theraputic uses of triphala

Triphala Churna works on all the Doshas: Vata, Pitta and Kapha.

- Laxative
- Anti-inflammatory
- Antiviral
- Blood purifying
- Analgesic
- Anti-arthritic
- Hypoglycemic
- Anti-ageing
- Antibacterial

Triphla is used to treat fatigue, oxidative stress and infection disorders like tuberculosis, pneumonia, AIDS and periodontal disese among others. For headaches, dyspepsia, ascitesand leukorrhea.

Pic. - 1 picture (Marketing Triphala Churna)
2 picture (Lab Triphala Churna)

Benefits of Triphala Churna

1. Benefits of Triphala for infections:

- Triphala and its constituents have proven to be highly effective antibacterial agents against a range of pathogens..
- The effectiveness of triphala churna against the HIV virus has been established.
- Triphala churna and triphala mashi have demonstrated antibacterial effects against several bacteria, such as E. coli and S. auresus..

2.Benefits of Triphala for Dental Care

- Triphala decreased levels of substances linked to tissue damage during periodontitis.
- Triphala mouthwash has been clinically evaluated and was proven to be just as efficient as chlorhexidine in reducing plaque scores and microbiological levels of Lactobacillus bacteria.

3. **Benefits of Triphala for stress**

- Triphala supplementation has been shown to lower stress.
- By raising lipid peroxidation and corticosterone levels, triphala therapy can stop the behavioural and biochemical abnormalities brought on by cold stress..
- Triphala shields mice against changes in antioxidant and cell-mediated immune response brought on by noise.

4. Benefits of Triphala for joint

- Triphala inhibited monosodium urate crystal-induced arthritis in mice (gouty arthritis) by lowering paw volume, lysosomal enzymes, lactate dehydrogenase Î2-glucuronidase lipid peroxidation, and the proinflammatory cytokine tumour necrosis factor-alpha, according to studies.
- Although further research is required, it may one day be used to treat gout in people.

5. Benefits of triphala for digestive Tract:

- Both Triphala churna powder and triphala mashi extracts reduced castor oil-induced diarrhoea.
- The extracts exhibited a potent antidiarrheal effect, as evidenced by improvements in initial defecation time, total faecal weight, intestinal transit time, stool volume, frequency, consistency, mucus level in stool, and flatulence.

6. Benefits of Triphala for Liver:

- Triphala was shown to be less effective than silymarin in protecting mice's livers from acetaminophen-induced liver damage.
- Triphala restored the levels of several antioxidant enzymes, decreased the levels of proinflammatory cytokines and lipid peroxides, and reduced liver damage as shown by lower liver enzyme readings.

7. Benefits of Triphala for Diabetes:

- Animal studies have shown that providing the same dose of triphala and its individual components to rats with normal blood sugar levels and diabetic rats induced with alloxan lowers serum glucose levels.
- As a result, triphala may help treat human diabetes with further study.

8. Benefits of Triphala for Obesity:

- Triphala was administered to mice as part of a research on obesity, and it was discovered that their body weight was lower than that of the control animals.
- Gallic acid, a phenolic compound present in triphala, was selected as the bioactive marker due to its ability to combat obesity.

9 .Benefits of Triphala for Heart:

- It has been shown that triphala has a lipid-lowering effect on rats. There were substantial drops in total cholesterol, low-density lipoprotein, very low-density lipoprotein, and free fatty acids, indicating hypocholesteremic state.
- These properties make it cardio-protective.

10. Benefits of Triphala for Skin:

- A research found that triphala extract used topically helped rats with various bacterial infections recover their wounds.
- Through raising levels of collagen, hexosamine, and uronic acid, the triphala ointment increased wound closure and decreased bacterial count, according to experiments.

11. Benefits of Triphala for Radioprotective activity:

- When taken orally, triphala has been shown in preclinical studies to have radioprotective effects.
- Triphala was most beneficial when administered prior to radiation exposure, reducing DNA damage in spleen and blood white blood cells and restoring normal function to several gastrointestinal enzymes such xanthine oxidase and super oxide dismutase..
- This shows that oxidative damage in the cells and organs was inhibited, which explains how the benefits were mediated..

12. Benefits of Triphala for Immunity:

- Numerous animal models have demonstrated the powerful immunomodulatory effects of triphala.
- Immunomodulatory effects are attributed to flavonoids, tannins, alkaloids, glycosides, saponins, and phenolic compounds..

- According to studies, giving triphala to animals under the stress of noise reduced corticosterone levels and boosted antioxidant activity.

13. Benefits of Triphala for Antioxidants activity:

- Triphala supplementation, it has been discovered, increases the activity of antioxidant enzymes, which may have significantly decreased stomach cancer in mice.
- Similar outcomes were noted when rats were fed triphala and subjected to noise stress..
- These results demonstrate the antioxidant properties of triphala and its capacity to guard the body against a range of diseases and stresses..

14. Benefits of Triphala for Eyes:

- A research discovered that triphala was helpful in preventing and decreasing selenite-induced cataract development..
- Triphala reduced nuclear cataracts in animal tests by restoring antioxidant enzyme levels. Triphala, according to ayurveda, can also aid in preventing blindness and nearsightedness..

15. Benefits of Triphala for Cancer:

- Triphala has been demonstrated in cancer research to destroy cancer cells.
- Its primary component gallic acid may be responsible for inhibiting the proliferation of cancer cells.
- Researchers discovered that a higher triphala concentration decreased the viability of breast cancer cells while having no impact on healthy breast cells.
- Triphala increased intracellular reactive oxygen species in breast cancer cells.

16. Benefits of Triphala for Aging :

- Triphala extract exhibits a potent anti-aging impact on human skin cells..
- It activates the antioxidant genes that produce cellular antioxidants in human skin cells as well as the genes that synthesise collagen-1, elastin, and collagen-2.
- The presence of protecting phytochemicals inhibits the production of melanin and hyperpigmentation.

Precautions to take with Triphala

If you have a severe cough, diarrhoea, or early-stage dysentery, you shouldn't take it.

REVIEW OF LITERATURE

1. **AS Kulkarni *et al*, (2022)** Dentifrices are goods that are crucial to everyday living and are mostly used to maintain proper dental hygiene, according to the research he conducted for his study. Throughout the day, oral hygiene may be kept up by using a range of dentifrices made from both herbal and artificial substances. The majority of synthetic dentifrice preparations include negative effects. In this study, an effort is made to create a natural tooth powder that may be used to promote good dental hygiene and counteract the negative effects of synthetic tooth powder. A variety of herbal herbs, including Apamarga, Clove, Triphala, Pacha Karpoora, Ritha, and Mulethi, were used to create the tooth powder. By examining crucial evaluation criteria including organoleptic, microscopical, physicochemical, rheological, and phytochemical features, the developed formulation was standardised**.** The agar well diffusion technique was used to test the formulation's antibacterial effectiveness against Streptococcus aureus. The findings indicated that the created dentifrice has an antibacterial action that has promise for application in treating dental disorders.

2. **J R Florence *et al*, (2022)** On this work's analysis of sensor-based classification and assessment methodologies for the evaluation of churna, they conducted an experiment. A Siddha remedy in powder form is called churna. Based on organoleptic and physicochemical criteria, the churna is assessed. In this paper, the physicochemical characteristics such as moisture content value and pH value as well as organoleptic factors such as colour are evaluated. A hardware and software module for churna recognition and categorization may be developed and integrated more easily with the help of the suggested technique. The suggested hardware configuration includes a Raspberry Pi 3b camera, colour sensor, moisture sensor, and pH sensor. Churnas are distinguished by categorising the colour values using independent support vector machine (SVM) and random forest (RF) classifiers, both of which are machine learning methods. . The experimental findings show that the RF Classifier performs better than the SVM Classifier in terms of churna name identification with more precision, sensitivity, and specificity.

3. **SD Jain, *et al*, (2021**) According to his study, there are several applications for ayurvedic formulations such as solid dose (vati, churna), semisolid (avaleha, ghritas), and liquid (asava, arishta). They influence or assist in balancing the three doshas in the body and return homeostasis, which accumulates in the digestive tract and extends to the tissues. It has long been a concern to standardise and analyse the chemical markers of Ayurvedic and other polyherbal formulations. To preserve the quality and effectiveness of herbal products, standardisation is urgently needed, according to researchers**.**. Over other traditional chromatographic methods, HPTLC provides a number of significant benefits, including unparalleled versatility (stationary and mobile phase), a selection of detection wavelengths, user-friendliness, speed, and cost-effectiveness/economicality. The current paper summarises the development of an HPTLC/HPLC approach that has been optimised and validated for the simultaneous quantification of markers in various Ayurvedic Churnas/preparations. The HPTLC/HPLC profile is very beneficial in the establishment of standards. The current study is an effort to compile significant studies done on Ayurvedic

preparations such as churnas, avaleha, asava, arishta, vati, rasa, taila, ghritas, and herbal capsules, among others. These studies may be used to develop or compile the fingerprint profile for evaluating the quality and purity of Ayurvedic formulations, which will be useful as a reference when developing pharmacopoeial standards.

4. **CM Bidikar, *et al,* (2021)** According to research, there are several applications for ayurvedic formulations such as solid dose (vati, churna), semisolid (avaleha, ghritas), and liquid (asava, arishta). They influence or assist in balancing the three doshas in the body and return homeostasis, which accumulates in the digestive tract and extends to the tissues. It has long been a concern to standardise and analyse the chemical markers of Ayurvedic and other polyherbal formulations. For researchers, standardisation is essential in the modern day to establish criteria for preserving the quality and effectiveness of herbal products. Over other traditional chromatographic methods, HPTLC provides a number of significant benefits, including unparalleled versatility (stationary and mobile phase), a selection of detection wavelengths, user-friendliness, speed, and cost-effectiveness/economicality**.**

5. **S Shidhaye *et al,* (2019)** They demonstrated through an experiment and explanation how humans have depended on nature for their daily survival from the dawn of civilisation. Natural treatment methods are the foundation of the old and efficient medical system known as Ayurveda. Since ancient times, triphala churna has been a significant ayurvedic remedy in India. Currently, a number of pharmaceutical and ayurvedic firms produce triphala churna, but the absence of standardised formulation is a significant roadblock. Effective standardisation is required to increase product safety, efficacy, and purity, and it also deepens patient belief in Ayurveda**.**

6. **S Patil, *et al,* (2019)** The effectiveness and safety of herbal medicine are significantly impacted by the profile of the ingredients in the finished product, according to research. It is challenging to define quality control measures for Ayurvedic formulations because of the complex nature and intrinsic unpredictability of the phytoconstituent in plant-based medicines. These traditional herbal compositions must adhere to regulatory guidelines to build a solid chemical, manufacturing, and control foundation for scientific proof. Madhu Shoonya Churna is traditionally used to manage diabetes. The purpose of the research is to standardise the production process for this Churna and to establish the quality control standards. The formulation underwent tests for powder qualities, phytochemical components, and organoleptic properties. HPLC and HPTLC were used for the instrumental analysis. The findings were beneficial for standardising ASU medications.

7. **Purohit AP, *et al,* (2000)** Reviewed to clarify how an important part of the shift towards alternative therapies is herbal medications. The kingdom of herbal medicine plants has been essential to man's existence on this planet. Nature has always served as a shining example of how to emphasise the remarkable phenomena of symbiosis.

8. **Rajasekaran P *et al,* (2009)** It was shown that at least 25% of medications in contemporary pharmacopoeias are still derived from plants, and many more are synthetic counterparts based on plant-derived prototype chemicals. Thus, it is important to standardise the botanical materials utilised in the procedure.

9. **Shreedhara, CS *et al,* (2009)** The WHO has advanced guidelines to support the member states in their efforts to formulate national policies on conventional medicine and to study their potential adequacy, including evaluation of its quality, safety, and efficacy, as well as research that has recognised the importance of medicinal plants for public health care in advanced nations.

10.V Jain *et al*, (2011) In order to prove the legitimacy of Ayurvedic medicines and herbal formulations, they conduct research on the measurement of active principles using cutting-edge analytical technologies. One of the well-known Ayurvedic remedies that is listed in the Indian Ayurvedic regimen is triphala churna. The goal of the current work is to use TLC Densitometric Methods (HPTLC) to establish a fingerprint method for Triphala churna utilising gallic acid as a reference. The three constituents in the composition all contain a significant amount of gallic acid. The method's linearity, accuracy, limit of detection, limit of quantification, assay precision between and within days, repeatability of measurement, and reproducibility of sample application all underwent validation.

METHODS AND MATERIALS

It is a study of lab formulation compered with market formulation for analysis and quality parameter were done.

In this this study many evaaluation parameter were done such as organolaptic and parmaceutical properties. In organoleptic evaluation end properties such as color order taste and texture off drug to touch were performed as per standard procedure and noted down

For the standardization of pharmaceutical evaluation formulations were done by evaluating the macroscopical, bulk density and tapped density, powder flow properties, determination of moisture content ,determination of carr'compressibility index, determination of Hausner's ratio,angle of response ,loss on ignition ,ash value and Phytochemical evaluation such as heavy metal test, These all activity are done to assess the quality and safety and therapeutic activity of formulation.

MATERIALS

Raw Materials :

Triphala is consisting three fruits of medicinal plants such as Amlaki, Bhibitaki and Haritaki. These three fruits are collected from local market. Dried all these fruits and making a coarse powder and then seived.

And one marketed triphala was collected from local pharmacy. Triphala was grinded by hammer mill and sieved through mesh number 10. Obtained coarse powder then stored in an air tight container.

METHODS

Organoleptic Evaluation

Organolaptic propeties are considerd viz. color, taste and texture of drug to touch were performed and noted down.

Pharmaceutical Evaluation

These parameters are Bulk density, Tapped density, Carr's index,Hausner's ratio and Angle of repose were determined as per standerd protocol.

- Determination of bulk density and tapped density :BD is a mass of many particales of material devided by total vol. they occupy.
- TD is the term used to described the bulk density of a powder after consolidation/compression prescribed in terms of "tapping" the container of powder a measured number of times, usually from a predetermined height.
- The terms "bulk density" and "tapped density" relate to measurements used to indicate how densely particles or granules are packed, respectively..
- Bulk Density =wt. of powder taken/Bulk volume of powdr.

- Tapped Density =wt. of powder taken/Tapped vol. of powder.

Determination of Carr's Compressibility Index: The compressibility of a powder can be determined via the Carr index. It's an additional oblique technique for estimating the powder flow using bulk and tapped density.

Formula for calculation:

Carr's Index = Tapped Density-Bulk Density/Tapped Density multiply by 100.

Determination of Hausner's Ratio: Because inter-particle friction and Hausner's ratio are connected, it is possible to anticipate the characteristics of how powder flows..

Formula for calculation:

Hausner's Ratio=Tapped Density/Bulk density.

Determination of Angle of Repose: One factor used to gauge a powder's flowability is the angle of repose. It is described as the greatest angle that may be formed between the powder pile's surface and the horizontal. Low angles of repose powders flow smoothly, whereas high angles of repose powders flow poorly.

Formula for calculation: $\tan \theta = h/r$.

Where , θ = Angle of repose

h = Height of pile

r = tan vv is the pile's base's radius.

Angle of Repose	Carr's Index	Hausners's Ratio	Flow properties
25-30	<10	1.00-1.11	Exacellent
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	>1.60	Very very poor

Table no. 1: Angle of Repose, Carr's Index, and Hausner's Ratio and Powder Flow Characteristics.

Physico-Chemical Evaluation

Physical-chemical characteristics such as foreign matter, moisture content, pH, total ash, and acid All three samples' extractive values for insoluble ash, water-soluble extractive, and alcohol-soluble extractive were calculated in accordance with procedure. 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 The foreign stuff was separated and weighed in the open air under daylight conditions with unassisted eye (or with a 6x or 10x magnifying glass). Based on the drug sample, the proportion of foreign matter was computed..

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

Determination of Total Ash: A precisely weighed 3g of the material was placed in a silicon plate or crucible that had already been lit and tartered. In a muffle furnace, the material was uniformly distributed and ignited by progressively raising the temperature to between 450 and 600 °C until carbon-free ash could not be produced. The air-dried powdered medication material was used to compute the total ash value.

Formula for calculation:

%Total ash = wt. of Ash/wt.of sample taken and multiply by 100.

Determination of Acid Insoluble Ash : Before being filtered through ash-free filter paper, the ash collected above was heated for 5 minutes with 25 millilitres of 1M hydrochloric acid.. Hot water was used to wash away any insoluble material that had been retained on the filter paper before it was burned in a muffle furnace to a uniform weight. In order to quantify the proportion of acid-insoluble ash, the air-dried powdered medication material was used.

Formula for calculation:

% of acid-Insoluble =Weight of a insoluble residue/ Weight of sample taken ×100%.

Determination of Water Soluble Ash: The insoluble material from 1g of the whole ash experiment was collected on an ashless filter paper, which was then rinsed with hot water and burned for 15 minutes at a temperature no higher than 450 °C in a muffle furnace. As the difference between the weights of ash and insoluble matter indicates the value, this difference in weight was calculated. When calculating the proportion of water-insoluble ash, the air-dried powdered medication material was used as a reference..

Formula for calculation:

% of water soluble Ash=Weight of water soluble residue/ Weight of sample taken multiply by 100.

Determination of pH Value: About 5g of triphala churna powder was weighed out and placed in a beaker with 100 ml of water. Aluminium foil was used to seal the beaker, which was then left out at room temperature for 24 hours. A calibrated digital pH metre was used to determine the formulation's pH after the solution had been decanted into another beaker.

Phytochemical Evaluation: In order to conduct a preliminary phytochemical screening, the aqueous and alcoholic extracts of the corresponding formulations were produced. These analyses show the existence of a number of secondary bioactive metabolites, which may be the basis for their therapeutic properties.

S.No.	Phyto-constituents	Name of Test	Procedure	Observation
1.	alkaloids	Mayers's Test	2ml extract + few drop of HCl + Mayer's reagents	Cream ppt.
		Hager's Test	2ml extract + few drop of HCl + Hager's reagents	Yellow ppt.
		Wagner's Test	2ml extract + few drop of HCl + Wagner's reagents	Reddish brown ppt.
2.	Carbohydrates	Molish Test	2ml extract + 2 drop of molish reagent + few drop of Conc. H2SO4	Voilet or reddish color
3.	Reducing sugars	Fehling's Test	1ml exctract+1ml Fehling sol. (A /B)	1yellow then brick red ptt.
4.	Flavonoids	Leadacetate test	2ml. + few drop of lead aceetate sol.	Yellow ppt.
5.	Saponin	Foam test	2ml. Extract + 3ml.distilled H2O Mix well and shake vigorously	Foam formation
6.	Tnnins	Braymer's Test	2ml. extract + 2ml H2O +2-3 Drop of 5% FeCl3	Black green or bluish color
7.	Amino acids	Ninhydrin test	3ml. of extract + 3drop 5% Ninhydrin sol. Keeping water bath boiling for 10 min.	Purple or bluish color appears
8.	Terpenoids	Copper acetate test	2ml. extract dissoved in water + 3-4 drop of copper acetate sol.	Emerald green color

Table-2: Preliminary Phytochemical Tests for Plant Extracts.

Determination of Heavy Metals (Lead and Cadmium)

Method (Direct Calibration Method): Three reference solutions of the element being examined having different concentrations were prepared covering the range recommended by the instrument manufacturer. Separately the corresponding reagents were added for the test solution and the blank solution was prepared with the corresponding reagents. Separate measurements were taken to determine the absorbance of the reference solutions and the blank solution. The average value of three measurements of each concentration on the ordinate and the matching concentration on the abscissa were used to create a calibration curve. According to the instructions in the monograph, a test solution of the material under investigation was created. The concentration was changed to fit within the reference solution's concentration window. Three measurements of the absorbance were made, and the results were recorded and averaged. To calculate the element's concentration, the calibration curve's mean value was interpolated.

Parameters	**Pb**	**Cd**
Wavelength (nm)	217	228.8
Slit width (nm)	1.0	0.5
Light source	Hollow Cathod Lamp	Hollow Cathod Lamp
Flame	Air / C2H2	Air / C2H2
Current	10	3.5
AAS Technique	Flame	Flame

Table-3: Instrumental Conditions for Analysis of lead and Cadmium.

Preparation of Lead standard solution From stock solutions, lead standard solutions were created. Standard solutions of 2, 4, 6, 8 and 10 ppm concentrations were created. Using an air acetylene blue flame and a hollow cathode lamp as a light source, the absorption of a standard solution was measured at 217 nm. Spectrophometer.

Preparation of Cadmium standard solution: Cadmium standard solutions were prepared from Stock solution Standard solutions of concentrations 0.2, 0.4, 0.6, 0.8 and 1.0ppm was prepared. The absorption of standard solution measured at 228.8nm using hallow cathode lamp as a light source & air acetylene blue flame on Atomic absorption Spectrophometer.

Preparation of Test solution Accurately weigh roughly 0.5g of the substance's coarse powder, put it to a Casparian flask, and then add 5–10 ml of the 4:1 solution of nitric acid (HNO3) and perchloric acid (HCIO4)**.** add Add a tiny hopper to the flasktop, let it macerate for the night, heat it to slake on the electric hot plate, keep it just shy of boiling, and if it becomes brownish-black, add more of the mixture, continuously heat till the solution becomes clear and transparent, then raise temperature, heat continuously to thick smoke, till white smoke disperseThe slaked solution cools and turns colourless, clear, or slightly yellow. It is then transferred into a 50 ml volumetric flask. The flask is then washed with a 2% solution of nitric acid (HNO3). The washing solution is then added, and the volume of the solution is diluted with the same solvent. Prepare the reagent blank solution simultaneously with the previous steps..

Determination: Measure accurately 1ml of the test solution and its corresponding reagent blank solution respectively, add 1 ml of solution containing 1% NH4 H2 PO4 and 0.2% Mg(NO3)2 , shake well, pipette accurately 10-20µl to determine the absorbance.

Sample analysis: Using an Atomic Absorption Spectrophotometer (EC Electronics Corporation of India limited AAS Element AS AAS4141), the digested samples were analysed for Lead and Cadmium**..**

RESULTS

Organoleptic Evalution

The observations for the organoleptic evaluation marketing churna and lab churna formulation of Triphala Churna are reported in Table 4.

S . No.	Properties	Marketed Preparation	Lab Preparation
1.	Apearance	Powder	Powder
2.	Color	Yelowish brown	Brown
3.	Oder	Characteristic	Characteristic
4.	Taste	Salty and sour	Bitter
5.	Texture	Fine powder	Moderatley fine powder

Pharmaceutical Evaluation

The observations for the pharmaceutical evaluation marketing churna and lab churna formulation of Triphala Churna are reported in Table 5

S. No.	Properties	Marketing	Lab
1.	Bulk density	0.657	0.45
2.	Tapped density	0.822	0.76
3.	Hausner's ratio	1.25	1.68
4.	Carr's index	20.07%	0.45
5.	Angle of repose	31.60	38.028

Table – 5 : Result for pharmaceutical evaluation of marketing churna and lab churna.

Physico-Chemical Evaluation : Physical and Chemical Analysis: The results of the physico-chemical analysis of Triphala Churna's marketing churna and lab churna formulation were given. in Table 6

S. No.	Properties	Marketing	Lab	Standerd (IP)
1.	Total Ash Value	0.035	0.4	NMT 8.0%
2.	Water soluble extractive	49.6%	1.6%	NLT 35.0%
3.	Alcohol soluble extractive	28.0%	1.56%	NLT 25.0%
4.	Ph	3.2	2.5	-
5.	Loss of drying	11.86%	10.07%	NMT 12.0%
6.	Foreign matter	Nil	2.4 %	NMT 3.0%

Table -6: Result for physico-chemical evaluation of marketing churna and lab churna.

phytochemical Screening churna

S. NO.	PROPRTIES	Lab churna	Marketing churna
1.	Total tannins	5.32	4.93
2.	Total phenolics	4.15	3.25
3.	Total alkaloid	1.45	1.07
4.	Total flavanoid	0.48	0.33
5.	% Iron	43.3	34.1

Table -7: Result for phyto-chemical evaluation of marketing churna and lab churna.

Detemination of heavy metals (lead and cadmimum)

S .No.	Properties	Marketing	Lab	Standard (API)
1.	Lead	3.567	2.897	10ppm
2.	Cadmium	0.227	0.232	0.3ppm

Table -8: Result for determination analysis of heavy metal of marketing churna and lab churna.

The two formulations' aforementioned parameters are in accordance with the strands. Poor flow characteristics exist. A preliminary phytochemical analysis found many bioactive components to be present. The content of tannins and flavonoids is primarily high in water extract, which also has strong antioxidant properties. As a result, Triphala extracts can be employed in a variety of Ayurvedic treatments for long-term conditions including cancer.

DISCUSSION

The triphala churna used in marketing was sold as a fine powder with a yellowish brown colour, a distinctive odour, and a salty-sour flavour. This preparation's pH value was 3.2 and its weight loss while drying was 11.86%. The preparation had extractives that were soluble in alcohol and water at levels of 28.0% w/w and 49.6% w/w, respectively. The powder had a bulk density and tapped density of 0.657 and 0.822, respectively. With a Carr's Index of 20.07% (Fair), Hausner's ratio of 1.25 (Fair), and an Angle of Repose of 31.604° (Good), the powder flow was fair to good. Its total ash content was 3.52% weight-per-weight, and its acid-insoluble and water-soluble ash contents were 28.0% and 49.6%, respectively. 11.86% w/w loss on ignition was discovered. Lead and cadmium concentrations were discovered to be 3.567 and 0.227, respectively, which were both below the permitted limits. Carbohydrates, Steroids, Flavonoids, Tannins, Phenols, and Ascorbic Acid were all found in both extracts, however Saponins were only found in the aqueous extract, according to phytochemical screening..

And for other formulation of Triphala churna which was prepared in laboratory that was an powder form of Brown color with a characteristic odor and better taste. This preparation had pH value of2.5, and Loss on drying value of 10.07% w/w. Preparation had Alcohol soluble extractives and Water soluble extractives values of 1.56%w/w and 2.05%w/w respectively. The concentrioThe powder had a bulk density and tapped density of 0.45 and 0.76, respectively. With a Carr's Index of 0.045% (Fair), Hausner's ratio of 1.68 (Fair), and an Angle of repose of 38.028° (Good), the powder flow was fair to good. The amount of total ash was 0.4% weight-for-weight, while the amounts of acid insoluble ash and water soluble ash were 1.43% and 1.6%, respectively. Lead and cadmium concentrations were discovered to be 2.897 and 0.232, respectively, which were below the permitted limits. In both the extracts and the aqueous extract solely, phytochemical analysis found the presence of carbohydrates, steroids, flavonoids, tannins, phenols, and ascorbic acid..

From the heavy metal test it is concluded that Marketed Triphala Churna of Ayurveda and Lab made formulation are free from heavy metals.

CONCLUSION

In this study we concluded that , all the parameters of marketing and lab perpration of Triphala Churna had differences in their values and were compared with the standard values mentioned in the Pharmacopoeias except that there was a considerable difference between the flow properties of the powder of both formulations (marketing and lab churna). Hence, from the overall results it can be concluded that phytochemical and analytical evaluation of all the formulations should be done analytically on both batch so as to optimize the final product according to the Pharmacopoeial standards which probably has an impact on the therapeutic activity of the product and that was marketing formulation. The results obtained from the study could be utilized as a reference for setting limits for the reference standards for the quality control and quality assurance of these drugs.

Physicochemical criteria such total ash, acid insoluble ash, water and alcohol-soluble extractive values, loss on drying, phytochemical analysis, flow characteristics, and safety assessment were carried out from the current inquiry., it can be concluded that the formulation of Triphala churna contains all good characters of an ideal churna and it was found to be harmless, more effective, and economic. The comparison between marketed samples and lab-made churna have been done on the basis of the above mentioned parameters which shows satisfactory results, but the efficacy of the products can only be judged by doing the pharmacology of which is suggested as the future scope of R & D.

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