

Comparative Standardization Study of Two Marketed Arjunchall Churna Formulation

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ABSTRACT

In the few Decades, there has been exponentially growth in the field of herbal medicines. Most of the traditional systems of medicine are effective but they lack standardization. So there is a need to develop a standardization technique. Standardization of herbal formulation is essential in order to assess the quality, purity, safety and efficacy of the drug. The Arjunchall churn is excellent remedy in case of heart problems, diarrhea, Asthma and cough. External application of Arjunchall churn helps manage various skin disorders like eczema, psoriasis, itching and rashes. The present research study deals with the Comparative Standardization Study of Two Marketed Arjunchall Churna Formulation from Sudarshan Herb and S. B. Herbo Pharmaceuticals. The standardization of this formulation, the organoleptic characters, physical properties, the various Physico-chemical properties such as, ash value, extractive values were carried out.

Keywords : Standardization, Arjunchall churn, Physico-chemical parameters

I. INTRODUCTION

India has a rich heritage of traditional medicine constituting with its different components like Ayurveda, Siddha and Unani. Traditional health care has been flourishing in this country for many centuries. Herbal medicines make up an important component of the trend toward alternative medicine. Tyler defines herbal medicines as crude drug of vegetable origin utilized for the treatment of diseases states, often of a chronic nature or to

attain or maintain a condition of improved health. Current demands for herbal medicines have resulted in an annual market of \$ 1.5 billion and increasingly widespread availability¹. Churna is one such ayurvedic formulation that is defined as a fine powder of drugs in ayurvedic system of medicine. The churna is free flowing and retains its potency for one year, if preserved in an air tight container. Standardization and quality control depends upon the nature of crude drug and compound drugs, its source i.e factors associated

with raw materials which are beyond of human like seasonal, geographical, age of the plant, time of collection, type of drying etc. Due to these natural conditions the percentage of chemical constituents of the drug does not remain uniform as our expectation. The need of quality of quality control for ayurvedic drug is due to the fact that the preparation of drug according to the ancient method has been reduced due to the commercialization of ayurvedic pharmacy. The individual plant powders of the formulation were subjected to various pharmacognostical parameters. Two formulations, from different manufacturer were procured and subjected to various physicochemical analyses²⁻³.

Advantages of Herbal Medicine

- They have better patient tolerance as well as acceptance.
- They have large amount of use.
- Improvements in the quality, efficacy and safety of herbal medicines with the development of science and technology.
- The medicinal plants have renewable source of cheaper medicines.
- Safety and efficacy.
- They are not harmful.
- They are cheap in cost.
- They are more effective than synthetic drug.

Through the world herbal medicines have provide many of the most potent medicines to the vast arsenal of drugs available to modern medical science, both in crude form as well as a pure chemical upon which modern medicines are constructed⁴.

Need of Standardization⁵

The quality control of herbal crude drug and formulation is important in justifying their acceptability in modern system of medicines. Standardization of synthetic drugs offers no

problem with very well defined parameters of analysis. It is not uncommon to have as many as five or more different herbal ingredients in one single formulation. The batch to batch variation starts from the collection of the raw materials itself in absence of any reference standard for identification. WHO has emphasized the need to ensure quality control of medicinal plants products and services are valuable User 'confidence builders' being perceived as

- Safe
- Healthy
- Secure
- High quality
- Flexible

Standardization brings important benefits to business including a solid foundation upon which to develop new technologies and an opportunity to share and enhance existing practices. Standardization also plays a pivotal role in assisting governments, Administrations, Regulators and the legal profession as legislation, regulation and policy initiatives are all supported by standardization.

SAMPLE

- **Arjun-Terminalia arjuna**

- **Scientific classification-**

Plant Profile Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Order: Myrtales

Family: Combretaceae

Genus: Terminalia

Species: T. arjuna

Zoological name: Terminalia arjuna

- **Bionominal name- Terminalia arjuna**

- **Synonyms-**

Dhavala

Svetavaha

Hrudrogavairi

Kukubha

Arjuna is the large size deciduous tree. The height of the Arjuna tree reaches upto 100 feet.

It is the evergreen tree with the yellow flowers and conical leaves. It has smooth gray bark.

It has a buttressed trunk and a vast spreading crown from which the branches drop downwards.

Habitat:

Plant of Arjuna is found in everywhere in India planes Such as from foot hills of Himalaya, Bihar, Bengal and Madhya Pradesh. Arjuna plant grows huge. Bark of Terminalia arjuna: It is simple, grey and smooth on external surface. The bark is thick, soft and of red color from inside

Bark of Terminalia arjuna:

It is simple, grey and smooth on external surface. The bark is thick, soft and of red color from inside.



Chemical Constituents

It was initially reported that the bark had 34% ash content consisting entirely of pure calcium carbonate.

The aqueous extract revealed 23% calcium salts and 16 % tannins, where as the alcoholic extract contained very little colouring matter and tannins. Later chemical analysis of the bark showed evidence of sugar, tannins (12%), colouring matter, a glycoside and carbonates of calcium, sodium and traces of chloride of alkali metals.

Uses-

- The Arjunchall churn is excellent remedy in case of heart problems, diarrhea, Asthma and cough.
- External application of Arjunchall churn helps manage various skin disorders like eczema, psoriasis, itching and rashes.

Scientific work done - Evaluation of Standardization parameters of Arjunchall Churna.

PLAN OF WORK ⁶

Comparative standardization of Arjunchall Churna formulated by Sudarshan Herb and S. B. Herbo Pharmaceuticals. The method used for the comparative standardization was planned to be carried out as follows:

1. Study of organoleptic characters

Development of Standardization Parameters for Arjunchall Churna

- 1) Colour
- 2) Odour
- 3) Taste

2. Determination of Physico-chemical parameters

Determination of Physico-chemical parameters

- 1) Total ash
- 2) Acid insoluble ash
- 3) Water soluble ash

- 4) Water soluble extractive
- 5) Alcohol soluble extractive

3. Qualitative estimation of selected Phyto-constituents.

4. Evaluation of Churna

Powder fitness

- 1) Bulk density
- 2) Tap density
- 3) Angle of repose
- 4) Compressibility
- 5) Hausner's ratio

5. Determination of pH

II. METHODS AND MATERIAL

Developments of standardization parameters for Arjunchall Churna

1) Study of Organoleptic Characters:

The polyherbal formulation is studied for organoleptic characters like colour, odour, and taste using the sensory organ of our body.

2) Physico-chemical Analysis:

Determination of loss of drying:

5 gm of sample (without preliminary drying) was weighed and placed in a tarred evaporating dish. It was dried at 105 ° C until the constant reading was obtained, and at 10 minutes interval

Determination of total ash:⁷⁻⁸

About 2 to 3 g of sample was accurately weighed in a tarred silica dish at a temperature not exceeding 450 °C until it was free from carbon. Then it was cooled and weighed. The percentage of total ash was calculated with reference to the air dried drug.

Determination of Acid insoluble ash:

The total ash obtained was boiled for 5 minutes with 25 ml of dilute hydrochloric acid; the insoluble matter obtained was collected on an ash less filter paper, Washed with hot water and

ignited to constant weight. The percentage of acid insoluble ash was calculated with reference to the air dried drug.

Water soluble ash:

The ash obtained in the determination of total ash was boiled for 5 minutes with 25 ml of water. The Insoluble matter was collected on an ash less paper and washed with hot water. The insoluble ash was transferred into a tarred silica crucible and ignited for 15 minutes at a temperature not exceeding 45°C. The weight of insoluble matter was subtracted from the weight of the total ash. The difference in weight was considered as the water-soluble ash was calculated with reference to the air dried drug.

Determination of water-soluble extractive:

5 g of test sample was weighed and macerated with 100 ml of chloroform water in a closed flask for twenty-four hours, shaking frequently during six hours and allowing standing for eighteen hours.

It was filtered rapidly, taking precautions against the loss of solvent. 25 ml of the filtrate was taken and evaporated to dryness in a tarred flat bottomed shallow dish, to constant weight and weighed the percentage of water soluble extractive was calculated with reference to the air dried sample.

Determination of alcohol soluble extractive:

Procedure for water soluble extractive was followed for the determination of alcohol soluble extractive but 90% ethanol was used instead of chloroform water.

3) Qualitative Phytochemical Screening:

Resins: To 2ml of chloroform or ethanol extract 5 to 10ml of acetic anhydride was added and dissolved by gentle heating. After cooling, 0.5 ml of H₂SO₄ was added. Bright purple colour was produced. It indicated the presence of resins.

4) Determination of physical characteristics:7-8

Bulk Density

It is the ratio of given mass of powder and its bulk volume. It is determined by transferring an accurately weighed amount of It is the ratio of given mass of powder and its bulk volume. It is determined by transferring an accurately weighed amount of powder sample to the graduated cylinder with the aid of a funnel. The initial volume was noted. The ratio of weight of the volume it occupied was calculated.

Bulk density= w/v_0 g/ml

Where,

W = mass of the powder

V₀ = untapped volume

Tapped density

It is measured by transferring known quantity (15 g) of powder into a graduated cylinder and tapping it for a specific number of times. The initial volume was noted. The graduated cylinder was tapped continuously for a period of 10-15 min. The density can be determined as the ratio of mass of the powder to the tapped volume.

Tapped volume= w/v_f g/ml

Where, W = mass of the powder

V_f = **tapped volume.**

a) Compressibility index

It is the propensity of the powder to be compressed. Based on the apparent bulk density and tapped density the percentage compressibility of the powder can be determined using the following formula.

Compressibility index= $[(v_0-v_f/v_0)] \times 100$,
 %compressibility= $[(\text{tapped density}-\text{bulk density})/\text{tapped density}] \times 100$

b) Hausner's ratio

It indicates that flow properties of the powder. The ratio of tap density to the bulk density of the powder is called Hausner's ratio.

Hausner 's ratio= Tapped density/bulk density

c) Angle of repose

The internal angle between the surface of the pile of powder and the horizontal surface is known as the angle repose. The powder is passed through funnel fixed to stand at height of 4 cm. The height and the radius of the pile were measured. Angle of repose of the powder was calculated using the formula.

Angle of repose= $\tan^{-1}(h/r)$

Where,

H = height of the piler

R = radius of the pile.

SCALE OF FLOW ABILITY

Table no: 1

Sr. no	Flow Properties	Angle Of Repose	Compressibility Index (%)	Hausner'S Ratio
1	Excellent	25-30	<10	1.00-1.1
2	Good	31-35	11-15	1.12-1.18
3	Fair	36-40	16-20	1.19-1.25
4	Possible	41-45	21-25	1.26-1.34
5	Poor	45-46	26-31	1.35-1.4
6	Very poor	55-56	32-37	1.46-1.59
7	Very very poor	>66	>38	>1.6

Determination of pH range:

The powder sample of Arjunchall churn was weighed to about 5 g 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 Later the supernatant solution was decanted into another beaker and the pH of the formulation was determined using a calibrated pH meter.

III. RESULT AND DISCUSSION

1) Determination of organoleptic Characters:

For the determination of organoleptic characters the colour, odour, and taste were carried out and results as follows. As shown in table no:2

Table no:2

Sr.no	Test	Sudarshan Herb	S.B.Herbo Pharma.
1.	Colour	Brown	Brown
2.	Odour	Characteristics	Characteristics
3.	Taste	Bitter	Bitter

2) Physicochemical Characters:

For the determination of physicochemical characters the ash value, loss on drying, water extractive values, Acid insoluble ash and alcohol extractive values were carried out and results as follows. As shown in Table no: 3

Table no: 3

Sr. No.	Test	Sudarshan Herb	S.B.Herbo Pharma.
1	Ash value%	22.15%	20.35%
2	Loss on drying %	0.64%	0.61%
3	Water Extractive values (%w/w)	15.70%	12.50%
4	Acid insoluble ash%	3.94%	2.90%
5	Alcohol Extractive(%w/w)	23%	21%

3) Qualitative analysis:

For the determination of qualitative analysis the test for alkaloids, Glycosides, tannins and saponins were carried out and results as follows. As shown in Table no:4

Table no:4

Sr.no.	Chemical constituents	Ethanollic extract
1.	Alkaloids	+
2.	Glycosides	++
3.	Tannins	+
4.	Saponins	+

The results of phytochemical tests were given in the above table. “++” this indicates the presence of more amounts of compounds.

4) Physical Characteristics of Powder

For the determination of physical characteristics the bulk density, tap density, car's index, hausner's ratio and angle of repose were carried out and results as follows As shown in Table no:5

Table no.5

Sr.no	Test	Sudarshan Herb	S.B.Herbo Pharma.
1	Bulk density	0.450	0.414
2	Tap density	0.658	0.622
3	Car's index	28.45	30.23
4	Hausner's ratio	1.46	1.50
5	Angle of repose	46.35	44.50

5) Determination of pH of sample

pH of both samples is carried out to determination of pH and results as follows. As shown in Table no:6

Table no:6

Sr. no	Test	Sudarshan Herb	S.B.Herbo Pharma.
1.	pH	4.57	4.50

IV. CONCLUSION

From the present investigation of various standardization parameters such as physicochemical standards like total ash, acid insoluble ash, water and alcohol soluble extractive values, loss on drying, Phytochemical analysis, flow properties, it can be concluded that the formulation of Arjunchall Churna contains all the good characters of an ideal churn and it was found to be harmless, more effective and economical. Using the above mentioned parameters, the two marketed samples were compared, and the results were satisfactory. The two marketed samples have been evaluated as above mentioned parameters which show satisfactory results, but the efficacy of the products can only be judged by doing the pharmacology of which is suggested as future scope of R & D. The study indicates that the content of formulation presents within the permissible limits as per WHO.

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