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PHARMACEUTICAL STUDY OF THRIPHALA ARKA

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ABSTRACT

Bhaishajya Kalpana is the branch of different kinds of dosage forms and their therapeutic utility. Among the large number of formulations specified by *Acharyas*, the *Panchavidha Kashaya Kalpanas* are basic dosage forms from which other secondary dosage forms are prepared. *Triphala Arka* is an important formulation which is used in treating the diseases like *Prameha, Kustha, Jwara* and various *Paitika Rogas*[7]. Till today no pharmaceutical work has been carried out on *Triphala Arka*. *Triphala Arka* will be prepared as per the reference of *Arka Prakasha*[7] Various textual references of *Arka Kalpana*, method of preparation of *Arka*. Drug review on *Triphala* explained in classics and various contemporary sciences. Details regarding *Triphala Arka* are collected and discussed.

For the present study a critical evaluation on preparation of *Triphala Arka* by following the Standard Operating Procedure (S.O.P) will be done by considering suitable phyto- chemical parameters which may add considerable input to the existing knowledge.

Key Words: *Bhaishajya Kalpana, Panchavidha Kashaya Kalpana, Arka Kalpana, Triphala Arka, Standard Operating Procedure*

INTRODUCTION:

Pancha Vidha Kashaya Kalpanas like *Swarasa, Kalka, Kwatha, Hima* and *Phanta* are the basic or primary preparations of *Bhaishajya Kalpana*[1]. According to *Ravana* the author of

Arka Prakasha, *Arka Kalpana* is considered one among the *Pancha Vidha Kashaya Kalpanas*[2]. *Arka* is a unique preparation in which water soluble active principles and essential oils from the herbal drugs are extracted through drugs soaked in water using the *Arkayantra* or any convenient modern distillation apparatus[3,4]. *Arka* being a water distillate it has its Shelf Life for 1year[5] increased potency and palatability[6]. *Triphala* is an important compound formulation which is used in the form of *Kalka, Kwatha*, and *Arka*. *Kalka* and *Kwatha* have shelf life of one day, whereas *Arka* has a shelf life of 1 year[5].

Since the origin of materialistic world, *Ayurveda* is serving the ailing as well as healthy humanity of Indian subcontinent in general and India in particular. This unique system of medicine encompasses the entire spectrum of human health and contribute to the positive holistic health according to individual one.

As a science of Life and Health, the different branches of *Ayurveda* have evolved over the long period as health being mainly concerned with keeping the body fit and preventing as well as curing the diseases, which were its main objective. Logically therefore, there has been a constant research on therapeutic agents that keep the body fit, increase its capacity to combat a disease and bring it back to normal. These therapeutic agents are termed as drugs.

Bhaishajya Kalpana is the branch of kinds of dosage forms and their therapeutic utility. Among the large number of formulations specified by *Acharyas*, the *Panchavidha* primary or basic dosage forms from which other secondary dosage forms are prepared.

Triphala Arka is an important formulation which is used in treating the diseases like *Prameha, Kustha, Jwara* and various *Paitika Rogas*[7]. Till today no pharmaceutical work has been carried out on *Triphala Arka*. *Triphala Arka* will be prepared as per the reference of *Arka Prakasha*[7] Various textual references of *Arka Kalpana*, method of preparation of *Arka*. Drug review on *Triphala* explained in classics and various contemporary sciences. Details regarding *Triphala Arka* are collected and discussed.

For the present study a critical evaluation on preparation of *Triphala*

Arka by following the Standard Operating Procedure (S.O.P) will be done by considering suitable phyto-chemical parameters which may add considerable input to the existing knowledge.

ANALYTICAL SYUDY

Analytical study of *Ayurvedic* drugs has become the need of present hour. In ancient days, the drugs were prepared by the physicians himself, with the help of experienced, assistants in their own pharmacies attached to their clinics. Now a days the trends have been entirely changed. The demand of *Ayurvedic* drugs have been increased by many folds and availability of raw materials are limited. So, there are of chances of production of low quality drugs for the commercial benefits.

The increasing demand for *Ayurvedic* drugs have made it necessary that some sort of uniformity in the manufacturing of *Ayurvedic* medicine should be brought out. The need has also been felt for statutory control to ensure standards of *Ayurvedic* drugs.

The quality of final products depends on the raw material used, intermediate process as well as on the pharmaceutical procedure adopted.

Chemical analysis of any drug should be known well before experimental and clinical trials. Chemical study ensures not only chemical constituents but also suggests us standards of any preparation. It not only gives standards of the products but indirectly gives suggestions for further advancement if required.

To evaluate the quality of finished products, it becomes necessary to subject the drugs for various analytical studies. The drugs should be understood and interpreted in the light of advanced chemistry to provide scientific background. For the present study, Preparation of *Triphala Arka* classical reference of *Arka Prakasha*[7] was followed as mentioned below.

Analysis were carried out at Central Laboratory, Bhagavathi Ana Labs Pvt. Ltd., Industrial Estate, Sanathnagar, Hyderabad. .

The analytical study was undertaken with an aim to suggest suitable parameters and their expected values for routine quality control of the below samples

Sample 1. *Triphala Churna*

Sample 2. *Triphala Arka*

Analytical Parameters:

The 2 samples were analyzed by using the following parameters:

I. Organoleptic characters:

- Colour - *Rupa*
- Odour - *Gandha*
- Consistency - *Sparsha*
- Taste - *Rasa*

II. Physico-chemical parameters:

- Determination of Foreign Matter of Triphala
- Loss on drying at 110^0 c
- Determination of pH
- Determination of Specific Gravity
- Ash Value (Water insoluble)
- Ash Value (Acid insoluble)
- Water Soluble Extractive
- Alcohol Soluble Extractive

I. Organoleptic parameters:

The *Sparsha* (Consistency), *Rupa* (Colour), *Rasa* (Taste) and *Gandha* (Odour) of both samples were noted. These characters correspond to the *Panchagyanedriya Pariksha* of *Ayurveda*. These various organoleptic characters provides an idea regarding the genuinely of the sample both to the physician and patient. These give a primary idea about the quality of different formulations without using any chemical tests.

II. Physico-chemical parameters:

1) Determination of foreign matter[8]:

Raw drugs should be free from moulds, insects, animal fecal matter and other contaminations such as earthen, stones and extraneous material. Any matter not covered by the description of the drug in the monograph shall be regarded as a non- extraneous foreign matter.

Foreign matter is material consisting of any or all of the following:

(i) In particular, parts of the organ or organs from which the drug is derived other than the parts named in the definition or for which a limit is prescribed in the individual monograph.

(ii) Any organ or part of organ, other than those named in the definition and description.

It was determined by taking the 100 gm weighed quantity of Sample 1 i.e Raw *Triphala* and was spread in a thin layer. Foreign matter or foreign organs was separated out and weighed and percentage was calculated out.

2) Loss on drying at 110^0 C[9]

This test was conducted to find out the moisture content in the samples.

About 1g, accurately weighed samples 1 and 2 were taken in a previously

dried and weighed dish and heated in a hot air oven at 110°C till constant weight. It was cooled and the weight was noted. Difference between the weights was calculated and taken as the loss on drying. The loss on drying of the sample was expressed as % w/w.

3) Determination of pH[10]

The pH value conventionally represents the acidity or alkalinity of an aqueous solution. In the pharmacopoeia, standards and limits on pH have been provided for these pharmacopoeial substances in which pH as a measure of the hydrogen activity is important from the stand point of stability or physiological suitability.

The measurement of pH is generally done with a suitable potentiometric meter known as the pH meter fitted with two electrodes, one constructed of glass and sensitive to hydrogenation activity and the other a calomel reference electrode. The determination i. carried out at temperature of 254° ± 2°, un less otherwise specified in the individual monograph.

Apparatus: The pH value of a solution is determined potentiometrically by means of a glass electrode, a reference electrode and a pH meter either of the potentiometric or of the deflection type.

Operate the pH meter and electrode system according to the manufacturer's instructions. Calibrate the apparatus using buffer *solution D* as the primary standard, adjusting the meter to read the appropriate pH value given in the Table I, corresponding to the temperature of the solution. Where provision is made for setting the scale, use a second reference buffer solution, either *buffer solution A, buffer solution E* or *buffer solution* G. In this case a check is carried out with a third referene buffer solution of intermediate pH, when the reading of the intermediate solution must not differ by more than 0.05 pH unit from the corresponding value indicated in the Table. Where there is no provision for setting the scale with a second reference buffer solution, checks should be made with two reference buffer solutions, the readings for which must not differ by more than 0.05 pH unit from the value corresponding to each solution.

4) Determination of Specific gravity[11]

Weight per milliliter – The weight per millilitre of a liquid is the weight in g of 1 ml of a liquid when weighed in air at 25º, unless otherwise specified.

Method

Select a thoroughly clean and dry pycnometer. Calibrate the pycnometer by filling it with recently boiled and cooled *Water* at 25º and weighing the contents. Assuming that the weight of 1 ml of *water* at 25º when weighed in air of density 0.0012 g per ml, is 0.99602 g. Calculate the capacity of the pycnometer. (Ordinary deviations in the density of air from the value given do not affect the result of a determination significantly).

Adjust the temperature of the substance to be examined, to about 20º and fill the pycnometer with it. Adjust the temperature of the filled pycnometer to 25º, remove any excess of the substance and weigh. Substract the tare weight of the pycnometer from the filled weight of the pycnometer. Determine the weight per milliliter dividing the weight in air, expressed in g, of the quantity of liquid which fills the pycnometer at the specified temperature, by the capacity expressed in ml, of the pycnometer at the same temperature.

Specific gravity –The specific gravity of a liquid is the weight of a given volume of the liquid at 25º (unless otherwise specified) compared with the weight of an equal volume of water at the same temperature, all weighings being taken in air**.**

Method

Proceed as described under Wt. Per ml. Obtain the specific gravity of the liquid by dividing the weight of the liquid contained in the pycnometer by the weight of water contained, both determined at 25º unless otherwise directed in the individual monograph.

Determination of Total Ash[11]

Incinerate about 2 to 3 g accurately weighed, of the ground drug in a tared platinum or silica dish at a temperature not exceeding 450º until free from carbon, cool and weigh. If a carbon free ash cannot be obtained in this way, exhaust the charred mass with hot water, collect the residue on an ash less filter paper, incinerate the residue and filter paper, add the filtrate, evaporate to dryness, and ignite at a temperature not exceeding 450º. Calculate the percentage of ash with reference to the air-dried drug.

5) Determination of Acid Insoluble Ash[12]

Boil the ash obtained in (2.2.3) for 5 minutes with 25 ml of *dilute hydrochloric acid;* collect the insoluble matter in a Gooch crucible or on an ash less filter paper, wash with hot water and ignite to constant weight. Calculate the percentage of acid-insoluble ash with reference to the air dried drug.

6) Determination of Water Soluble Ash[13]

Boil the ash for 5 minutes with 25 ml of water; collect insoluble matter in a Gooch crucible, or on an ash less filter paper, wash with hot water, and ignite for 15 minutes at a temperature not exceeding 450º. Subtract the weight of the insoluble matter from the weight of the ash; the difference in weight represents the water-soluble ash. Calculate the percentage of water-soluble ash with reference to the air-dried drug.

7) Determination of Water soluble extractive[14]

This test was carried out to evaluate the water-soluble principles of the samples. 5g of sample was weighed accurately, 100 ml of distilled water was added to it and it was kept overnight. Next day, it was filtered. 20 ml of the filtrate was transferred to a dried and weighed evaporating dish. The solvent was evaporated on a water bath, dried till constant weight, cooled and weighed immediately. From the weight of the residue, the percentage of water-soluble extractive was calculated and expressed as %w/w.

8) Determination of Alcohol Soluble Extractive[15]

Macerate 5 g of the air dried drug, coarsely powdered, with 100 ml of Alcohol of the specified strength in a closed flask for twenty-four hours, shaking frequently during six hours and allowing it to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tarred flat bottomed shallow dish, and dry at 105º, to constant weight and weigh. Calculate the percentage of alcohol-soluble extractive with reference to the air-dried drug.

OBSERVATIONS AND RESULTS:

Table no. 1- Showing Organoleptic Parameters of both the samples

	Colour	Odor	Consistency	Taste
Sample 1 Triphala Yavakut Churna	Brownish	Peculiar Triphala Odor	Coarse powder	*Kashaya Pradhana*
Sample 2 Triphala Arka	Transparent and clear	Strong Triphala Odor	Liquid	*Kashaya Pradhana*

Above **Table no 1** reveals the organoleptic parameters of

Sample 1 i.e. *Triphala Churna* was having brownish color coarse powder with peculiar *Triphala* odor having *Kashaya Pradhana* taste

Sample 2 i.e. *Triphala Arka* was transparent and clear liquid with strong *Triphala* odor, having *Kashaya Pradhana* taste.

Table no. 2- Showing Phyto chemical Parameters of both the samples

Parameters	Sample 1	Sample 2
Determination of Foreign Matter % w/w	5 %	----
L.O.D at 110^0 C w/w	8.7	99.98
pH	3.0	3.9
Specific Gravity	0.5060	1.0028
Water Soluble Ash % w/v	4.2	<0.1
Acid Insoluble Ash % w/v	1.6	<0.1
Water Soluble Extractive % w/v	74	----
Alcohol Soluble Extractive % w/v	55	----

(Appendices)

Table no. 2 reveals that in *Raw Triphala* there is 5% of foreign matter, which reveals the adulteration, is less and within its normal limit. Loss on drying was found less in sample 1 and more in sample 2. pH was less in sample 1 and more in sample 2. Specific Gravity was less in sample 1 and more in sample 2. Water soluble ash was found more in sample1 and least in sample 2. Acid insoluble ash was found more in sample 1 and least in sample 2. Water soluble extractive was found up to 74% in sample 1. Alcohol soluble extractive was found 55% in sample 1.

DISCUSSION

The present research work was planned with an aim to establish

Standard Operating Procedure (S.O.P) for *Triphala Arka*. To find out the phyto-chemical properties of *Triphala Churna* and *Triphala Arka*. We went through the whole literature on *Triphala* available from *Vedic* period to the advancement of present time. To achieve the goal of present study, the work has been divided in three major parts – Conceptual study which includes Arka Kalpana and Drug review, Pharmaceutical study, Analytical study. Analysis and results of each study are discussed in this section.

Analytical study of *Ayurvedic* drugs has become the need of present hour. In ancient days, the drugs were prepared by the physicians himself, with the help of experienced, assistants in their own pharmacies attached to their clinics. Now a days the trends have been entirely changed. The demand of *Ayurvedic* drugs have been increased by many folds and availability of raw materials are limited. So, there are of chances of production of low quality drugs for the commercial benefits.

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I. Organoleptic characters:

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- Consistency - *Sparsha*
- Taste - *Rasa*

Table no 5.1 reveals the organoleptic parameters of *Triphala Churna* was having brownish color coarse powder with peculiar *Triphala* odor having *Kashaya Pradhana* taste. *Triphala Arka* was transparent and clear liquid with strong *Triphala* odor, having *Kashaya Pradhana* taste.

Table no. 5.2 reveals that in *Raw Triphala* there is 5% of foreign matter, which reveals the adulteration, is less. Loss on drying was found less in *Triphala Churna* and more in *Triphala Arka*. pH was less in *Triphala Churna* and more in *Triphala Arka*. Specific Gravity was less in *Triphala Churna* and more in *Triphala Arka*. Water soluble ash was found more in *Triphala Churna* and least in *Triphala Arka*. Acid insoluble ash was found more in *Triphala Churna* and least in *Triphala Arka*. Water soluble extractive was found up to 74% in *Triphala Churna*. Alcohol soluble extractive was found 55% in *Triphala Churna*.

CONCLUSION:

- *Arka Kalpana* is a very unique formulation in *Bhaishajya Kalpana*, owing to its method of preparation and efficacy.
- It is considered one among the *Pancha Vidha Kashaya Kalpana* by *Ravana*.
- The pharmaceutical aspects of this formulation have not been reviewed much in *Ayurveda*
- The main authentic text which explains the procedures involved in the manufacture of *Arka Kalpana* is *Ravana's Arka Prakasha.*
- 60% of the distillate should be obtained.
- Mild heat in between 60 to 80^0c should be maintained.
- There are a number of factors which have a significant role in the preparation of *Arka* starting from the equipments required like the *Arka*

Yantra, *Arka Patra*, the specific woods, the drugs for the preparation of *Arka* and the *Agni* to be used along with the duration.

- The odor of *Arka* is more than the *Churna*
- *Arkas* are *Laghu Paki, Vyavayi* and *Vikasi*, and thus assimilates quickly in the body
- The analytical parameters suggest that *Arka* is having more properties than the *Churna*.
- By converting *Arka* the Shelf Life of the formulation can be increased
- Highly palatable and easy to consume for people of all ages.
- To prove these concepts further studies can be conducted by experimental and clinical study.

REFERENCES:

1) Sharangadhara, Sharangadhara Samhita, Adhamalla Dipika Tika, Pandit Kashirama. Gudhartha Dipika. 7th ed, Chaukhambha Orientalia, Varanasi, 2008, Madyamakhanda 1/1, 137pp.
2) Lankapati Ravana, Arka Prakasha, Hindi Yika By Indradeva Tripathi, 1st Edititon, Chaukhambha Sanskrit Series, Varanasi, 1995, 1/46, 9pp.
3) Lankapati Ravana, Arka Prakasha, Hindi Yika By Indradeva Tripathi, 1st Edititon, Chaukhambha Sanskrit Series, Varanasi, 1995, 1/52-54, 11pp.
4) Ayurvedic Formulary of India, Part 1, Part B, Published by G. O. I., Ministry of Health and Family Welfare, 2003, 102pp.
5) Gazette of G.O.I, D. and C. act 161B, w.e.f. from 2010.
6) Lankapati Ravana, Arka Prakasha, Hindi Yika By Indradeva Tripathi, 1st Edititon, Chaukhambha Sanskrit Series, Varanasi, 1995, 1/49, 29pp.
7) Lankapati Ravana, Arka Prakasha, Hindi Tika By Indradeva Tripathi, 1st Edition, Chaukhambha Sanskrit Series, Varanasi, 1995, 4/7, 58pp.
8) Dr S.C.Malhotra, Phytochemical Investigations of Certain Medicinal Plants Used in Ayurveda, CCRAS, G.O.I., New Delhi, First Edition, 1990, Pp-190
9) Acharya Bhavamishra, Bhavaprakasha Nighantu, Savimarsh Hindi Vyakhya by Dr Krishnachandra Chunekar, 10th edition, Chaukhamba Bharti Academy, Varanasi, 1995, Haritakyadi Varga Sloka 36, Pp-9
10) Acharya Bhavamishra, Bhavaprakasha Nighantu, Savimarsh Hindi Vyakhya by Dr Krishnachandra Chunekar, 10th edition, Chaukhamba Bharti Academy, Varanasi, 1995, Haritakyadi Varga Sloka 37, Pp-9
11) Acharya Bhavamishra, Bhavaprakasha Nighantu, Savimarsh Hindi Vyakhya by Dr Krishnachandra Chunekar, 10th

edition, Chaukhamba Bharti Academy, Varanasi, 1995, Haritakyadi Varga Sloka 38, Pp-10

12)Acharya Bhavamishra, Bhavaprakasha Nighantu, Savimarsh Hindi Vyakhya by Dr Krishnachandra Chunekar, 10th edition, Chaukhamba Bharti Academy, Varanasi, 1995, Haritakyadi Varga Sloka 40, Pp-10

13)Acharya Bhavamishra, Bhavaprakasha Nighantu, Savimarsh Hindi Vyakhya by Dr Krishnachandra Chunekar, 10th edition, Chaukhamba Bharti Academy, Varanasi, 1995, Haritakyadi Varga Sloka 38, Pp-10

14)Muralidhar R., P. K. Prajapati, A. K. Choudhary,. Ravishankar B, Subrata De, "A comparative Pharmaceutico-Pharamco-Clinical study of different samples of Shirisharishta and its Shwasahara effect", March 2004, M.D. Thesis, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar.

15)The Ayurvedic Pharmacopoeia of India (Ministry of health & family welfare Gov. of India), Part 1, Vol. I, 1st Edition-1999, Published by The, controller of publication Delhi-54, Appendix-2, Pg. 213(2.2.2).

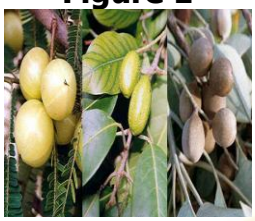
16)The Ayurvedic Pharmacopoeia of India (Ministry of health & family welfare Gov. of India), Part 1, Vol. I, 1st Edition-1999, Published by The, controller of publication Delhi-54, Appendix-2, Pg. 214(2.2.9).

17)The Ayurvedic Pharmacopoeia of India (Ministry of health & family welfare Gov. of India), Part 1, Vol. I, 1st Edition-1999, Published by The, controller of publication Delhi-54, Appendix-2, Pg. 230 (3.3).

18)The Ayurvedic Pharmacopoeia of India (Ministry of health & family welfare Gov. of India), Part 1, Vol. I, 1st Edition-1999, Published by The, controller of publication Delhi-54, Appendix-2, Pg. 236(3.7).

Photographs

Figure 1



Triphala

Figure 2

Triphala Fruits

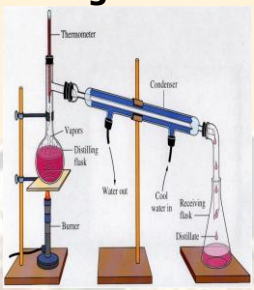
Figure 3

Triphala

Figure 4

Triphala Yavakuta Churna Saoked

Figure-5

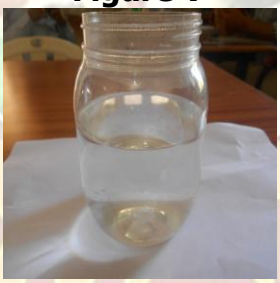


Distillation Apparatus Diagrammatic Presentation

Figure-6

Distillation

Figure-7



Triphala Arka

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Conflict of Interest : None declared

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