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Pharmaceutical Analysis of *Padmaka Agada* from *Sartha Vagbhata*

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Abstract: The development of pharmaceuticals has revolutionized human health. A medication must be genuine and devoid of contaminants in order to be therapeutically effective. Detecting and quantifying impurities is crucial to reduce administrative risks because they can appear at several stages, such as development, shipping, and storage. Thus, a thorough pharmaceutical analysis that includes standardisation and authenticity is essential. *Padmaka Agada* is one of the Ayurvedic compositions that need to be analysed using contemporary methods.

Hence, this study, "Pharmacological analysis of herbal formulation- *Padmaka Agada* from *Sartha Vagbhata*," aimed to conduct a comprehensive pharmaceutical analysis.

The raw medications were authenticated and standardised after being acquired from a reliable source. The formulation was then made by combining the powdered raw medications. Physicochemical analysis was then performed, and the findings were documented.

The organoleptic characteristics of the raw medications and the research drug satisfied predefined standards. The results of the standardization were consistent with the Ayurvedic Pharmacopoeia of India (API) norms. This study contributes to the accurate identification and standardization of crude medicine. These findings will be very helpful in standardizing *Padmaka Agada*.

Keywords: *Padmaka Agada*, Pharmaceutical analysis, Standardization, Physiochemical parameters, *Sartha Vagbhata*.

I. INTRODUCTION

Any medication must be pure and properly delivered in order to be therapeutically effective. It is necessary to detect and quantify impurities since they can arise during the development, transportation, and storage of a pharmaceutical and present administration risks. Therefore, a thorough pharmacological analysis of the medication is crucial[1]. Even though many Ayurvedic compositions have proven to be effective, they still need to be analysed using contemporary methods[2]. According to the ancient *Sartha Vagbhata, Padmaka Agada* is one such potent Ayurvedic remedy. This herbal remedy is recommended to cure *Keeta & Luta Visha*[3] .

Padmaka Agada is made out of various ingredients: *Priyangu* (Callicarpa macrophylla Vahl.), *Haridra* (Cucurma longa Linn.), *Daruharidra* (Berberis aristata DC), *Madhu, Ghrita*.

These unrefined medications have a number of established pharmacological properties, including antibacterial, anti-inflammatory, antineoplastic, analgesic[4], insecticidal action[5], antioxidant, antibacterial, and antifungal[6]. making them beneficial against a variety of illnesses.

There are currently no established standards for *Padmaka Agada*. Thus, the purpose of this study was to conduct a pharmacological investigation of *Padmaka Agada* by assessing its physicochemical and organoleptic characteristics.

Materials and Methods

Procurement of Raw Drugs: The raw materials, namely *Priyangu*, *Haridra*, *Daruharidra*, *Madhu*, *Ghrita*, were procured from APMC Market, Vashi, Navi Mumbai.

Authentication: The raw herbal drugs were authenticated at Alarsin Pharmaceuticals, Andheri (E), Mumbai.

Preparation of Study Drug: The *Padmaka Agada* formulation was prepared at the Pharmacy of the Department of *Ras Shastra and Bhaishajya Kalpana* at D.Y. Patil University, School of Ayurveda, Nerul, Navi Mumbai. Raw materials were cleaned and finely powdered. All individual drug powders were mixed in equal proportions (5g each). It was then passed through a 100-mesh sieve to obtain a fine powder (*sukshma churna*). The prepared drug was then stored in an airtight container. All the 3 powdered herbal drugs in *Padmaka Agada* were mixed in equal quantity. Honey and Ghee was added to it.

Standardization: The organoleptic parameters and physicochemical analysis for the standardization of both the raw materials and the prepared study drug were conducted at Alarsin Pharmaceuticals, Andheri (E), Mumbai.

Parameters for Assessment: Organoleptic and physicochemical parameters were studied. [7][8][9].

- **Organoleptic Parameters:** Appearance, Colour, Odour, and Taste were evaluated.
- **Physicochemical Parameters:**
  - **Moisture Content (Loss on drying)[10]:** In a tared evaporating dish, 10g of the drug was taken. It was dried in a hot air oven at 105˚C for 5 hours. Then it was weighed. The drying continued until the difference between two successive weights was less than 0.01 after cooling in desiccators. The moisture percentage was calculated from the weight of the sample.
  - **Total Ash[11]:** 2g of sample was incinerated in a tared platinum crucible at a temperature of 450˚C until carbon-free Ash was obtained. The percentage of Ash was calculated with reference to the weight of the sample.
  - **Acid-insoluble Ash[12]** 25ml of dilute HCl was added to the crucible containing total Ash. The insoluble matter was collected on Whatman 41 filter paper. Then it was washed with hot water until the filtrate was neutral. The filter paper containing the insoluble matter was transferred to the original crucible, dried on a hot plate, and ignited to constant weight. The residue was allowed to cool in a suitable desiccator for 30 min and weighed. Then, the content of acid-insoluble Ash was calculated with reference to the air-dried drug.

- **Alcohol soluble extract [13]:** In a closed flask, 5 grams of the air-dried drug was soaked with 100ml of ethanol for 24 hours, shaken frequently for 6 hours, then it was allowed to stand for 18 hours. Then it was filtered. 25ml of the filtrate was evaporated to dryness in a tarred flat bottomed dish, dried at 105˚C to constant weight, and weighed. The percentage of an alcohol-soluble extract with reference to the air-dried drug was calculated.
- **Water soluble extract:** In a closed flask, 5 grams of the air-dried drug was soaked with 100ml of chloroform water for 24 hours, shaken frequently for 6 hours, then it was allowed to stand for 18 hours. Then it was filtered. 25ml of the filtrate was evaporated to dryness in a tarred flat-bottomed dish, dried at 105˚C to constant weight, and weighed. The percentage of a water-soluble extract with reference to the air-dried drug was calculated.
- **Determination of Volatile Oil in Drugs:** The determination of volatile oil in a drug was made by distilling the drug with a mixture of water and glycerine, collecting the distillate in a graduated tube in which the aqueous portion of the distillate was automatically separated and returned to the distilling flask, and measuring the volume of the oil.
- **Determination of pH values:** The common logarithm of the reciprocal of the hydrogen ion concentration is known as the pH value. It is expressed in g per litre. It provides a quantitative indication of the acidity or alkalinity of a solution which has an effect on the decomposition of the drug. If it is very acidic or less alkaline, there will be more decomposition of the drug. pH influences the rate of oxidation. When the pH is low, the system is less readily oxidized. The pH value of a liquid can be determined potentiometrically using a glass electrode, a reference electrode, and a pH meter, either of the digital or analog types.

Observation and Results:

Authentication Results (Table No.1):

The authentication of the raw drugs was confirmed as follows:

Drug Name	**Latin Name**	**Family**	**Parts Used**
Priyangu	Callicarpa macrophylla Vahl.	Verbineceae	Flower
Haridra	Curcurma longa Linn.	Zingiberaceae	Rhizome
Daruharidra	Berberis aristata DC	Berberidaceae	Stem
Madhu	-	-	-
Ghrita	-	-	-

Standardization Results:

Organoleptic Characters of *Padmaka Agada* (Table No.2):

Sr no.	Drug Name	Appearance	Colour	Odour	Taste
1	*Priyangu*	Dry fruits	Brown	No Characteristic	Astringent
2	*Haridra*	Rhizome	Yellow	Pleasant Characteristic	Characteristic
3	*Daruharidra*	Stem	Light Yellowish Brown	Faint	Bitter
4	*Madhu*	Thick Syrup Liquid	Yellowish	Pleasant	Sweet
5	*Ghrita*	Oily or Semisolid Liquid	Light Yellow	Characteristic Pleasant	Pleasant
6	*Padmaka Agada*	Thick paste	Yellowish Brown	Characteristic	Sweet & Acrid

Physicochemical Analysis for Herbal contents (Table No.3):

Sr.no	Drug Name	Moisture content (%)	Ash value (%)	Acid Insoluble Ash (%)	Alcohol Soluble Extractive Value (%)	Water Soluble Extractive Value (%)	Volatile oil (%)
1	*Priyangu*	2.86	4.28	0.45	3.80	11.16	-
2	*Haridra*	4.10	6.40	0.65	8.26	12.91	4
3	*Daruharidra*	3.65	9.15	1.38	6.79	8.60	-
4	*Madhu*	-	0.41	-	-	-	-
5	*Ghrita*	0.28	-	-	-	-	-
6	*Padmaka Agada*	6.65	-	-	-	-	-

The pH value of *Padmaka Agada* was 6.7 .

Discussion: Herbal remedies are known to be effective in treating a wide range of ailments. Despite of the fact that their therapeutic utility has been shown throughout history, a number of issues regarding their efficacy and safety are frequently brought up. Controlling the quality of herbal remedies is still difficult. Therefore, before using that medication, a thorough analysis of it is necessary. Closely similar species of the same genus or allied genera of the same family can distinguish thorough pharmacological investigation of the plant.

Padmaka Agada is one of the old Ayurvedic scriptures described in *Sartha Vagbhata*, this formulation's raw materials were acquired from reliable suppliers. Authentication was done from authentic laboratory before preparation of study drug. The raw pharmaceuticals' and the study drug's organoleptic qualities, such as appearance, colour, aroma, and taste, met the requirements. Every raw medication was verified in accordance with the species found in the classics.

A pharma-cognostical study was done to standardise the raw drugs & study drug. The outcomes were compared with the API's standard values. As a result, the sample satisfies requirements, adheres to the standards of Ayurvedic pharmacopoeia & demonstrates the authenticity of the drug selection.

Following authentication, all of the crude medicines were combined in equal amounts to create the study drug. To assess the quality of the research medication and raw materials, physiochemical measures were used. Numerous research findings make it clear that the drug's physicochemical characteristics affect its solubility, absorption, transmission through barriers, binding affinity, metabolism, and excretion.

Moisture content affects a product's processability, shelf-life, usability, and quality. It should be minimized in order to prevent the decomposition of crude drugs, either due to chemical change or microbial contamination. The percentage of moisture content ranging from 10-20% shows an ideal range for minimum bacteria as well as for fungal growth. The moisture content of *Padmaka Agada* was found to be 6.65%.

Ash value means the residue remaining after the incineration of the drug. It usually represents the inorganic residues such as phosphates, carbonates, and silicates of sodium, potassium, calcium, and magnesium present in herbal drugs. It is the criterion to judge the quality as well as purity of herbal medicine. A high ash value can be an indication of calcium, aluminium, manganese or iron deposition on the activated carbon. Acid-insoluble ash value shows how many fine soil and sand particles are present in the drug. In this formulation, it was 1.42%. Various components have their solubility in particular media. The solubility of Ash finds out the impurities in the drug. Here soluble principles of the drug were seen in water (18.95%) and alcohol (8.22%).

Oils that evaporate readily are known as Volatile oils. It occurs in aromatic plants, to which they give odour and other characteristics. It showed the different kinds of biological activities including antibacterial, antioxidant, antiviral, insecticidal, etc. In this formulation volatile oils were found in Cucurma longa Linn. (4%).

pH value of the GI tract can affect oral drug absorption and bioavailability. It has a significant influence on the dissolution, solubility, release, stability, and intestinal permeability of the drug. Different regions of the GI tract have different drug-absorptive properties. The pH of *Padmaka Agada* was 6.7.

Priyangu, Haridra and Daruharidra are the main ingredients of *Padmaka Agada*. Here, *Madhu and Ghrit* are mixed in *Padmaka Agada* as an *Anupaan*. *Padmaka Agada* is effective in *Keeta Visha and Loota Visha*. *Padmaka Agada* can be used as *Lepa* (Local administration). Many of the symptoms of *Keeta & Luta Visha* are manifested on skin. Symptoms of *Keeta Visha* includes *Ruja* (pain), *Daha* (burning), *Raga* (redness), *Shotha* (inflammation) etc. *Keeta Visha* is *Manda, Nati Ushna, Bahu Vata-Kapha*. Symptoms of *Luta Visha* include *Sotha*(Oedema), *Jwara* (Fever), *Toda*(Pricking Pain), *Kandu*(Itching), *Cimicima*(Tingling Sensation) etc. Most of these drugs have *Tikta, Katu and Madhur Rasa, Katu Vipaka, Ushna Veerya and Vishghna, Shothhar, Twakdoshhar, Raktashodhak Karma*. Pharmacologically these drugs are Anti inflammatory, Anti-bacterial, Antioxidant, Anti-fungal activities. So it can be used in the cases of insect bites. It may be useful in some of the skin diseases too. But further research and clinical trials are needed[14] .

Conclusion: Until now, standards were not available for *Padmaka Agada*. Hence, this study has been performed with the aim of its pharmaceutical analysis by assessing its Organoleptic and Physiochemical Parameters. The raw and studied drugs match the standards as per Ayurvedic pharmacopoeia. Thus, it indicates the authenticity of the drug. This work can be helpful for providing referential information for the correct identification and Standardization of *Padmaka Agada* for future studies.

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