WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 9, Issue 15, 1193-1199. Research Article ISSN 2277– 7105

FORMULATION AND PHYSICO-CHEMICAL EVALUATION OF ARKA TAILA: AN AYURVEDIC OIL BASED MEDICINE

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Article Received on
12 October 2020,

Revised on 01 Nov. 2020,
Accepted on 22 Nov. 2020

DOI: 10.20959/wjpr202015-19343

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ABSTRACT

Arka (Calotropis gigantea linn.) is one of the *Upavisa* an important drug of Ayurveda known since Vedic period. *Upavisha* are the group of drugs which are less toxic in nature. *Arka* is one among the *Ekadasha Upavisha.*[1] Even though an acute poison can become an excellent medicine if administered properly & On other hand even most useful medicine can act like a poison if handled incorrectly.[2] *Arka* is a well-known medicinal plant with *Kandugna¸ Kushtagna, Vranaropana*, and *shothagna*[3] activities. It is also indicated in *Shvasa, Gulma* and *Krimiroga*. *Arka taila* is a anubhoota yoga used for external application in the management of *kushta* specially for *Paama, vicharchika.*[4] There is no evidence of scientific validation on the physical from of the study drug *Arka taila* and this study was aimed. The prepared *Arka taila* was subjected to analysis. The derivative physico-chemical parameters, HPTLC profiles serve as diagnostic parameters to identify this drug formulation. Since it is a anubhoota yoga, knowledge of its preparation and analysis of physical parameters and chemical parameters help in evaluating the drug, standardizing for purpose of quality control. Analytical parameters are important tools in establishing identity, purity and strength of finished product. Under analytical study, Physical parameters like Specific gravity, Viscosity, refractive index are dealt and under chemical parameters Acid value, Iodine value, Saponification value, Unsaponifiable matter, Peroxide value, HPTLC of *Arka taila* is studied.

KEYWORDS: *Kandugna¸ Kushtagna, Vranaropana*, and *shothagna.*

INTRODU CTION

Arka Taila is a anuboota yoga. The ingredients of *Arka taila* are *Arka leaves (Calotropis gigantea),* dried ginger (*Zingiber officinale*) and mustard oil (*Brassica nigra*). It is well known *Kushtaghna*, *Kandughna*, *paama*, *vicharchika*, *kachchu* and *shothagna* action. *Arka* leaves contain Calactin, calotoxin, caltropins D1 & D11 and Giganteol acid and therefore constitute a valuable remedy in skin diseases especially in *vicharchika*. *Taila Kalpana*[5] is a pharmaceutical process comes under the *Sneha Kalpana*. For globalization of Ayurveda, it is necessary to make the drug standardization. For this purpose analytical parameters are essential in recent time as a measure of quality control and standardization of finished product. Analytical parameters are important tools in establishing identity, purity and strength of finished product. Without analytical study, the drug study is incomplete. Analytical study of a product provides some standards to judge its quality.

AIM AND OBJECTIVES OF THE STUDY

1. Preparation of *Arka Taila*
2. Physical and chemical analysis of *Arka Taila*.
3. Elaboration on methods of physical and chemical analysis and their results of *Arka Taila*.

MATERIAL AND METHOD

The ingredients of *Arka taila* are *Arka leaves* (*Calotropis gigantea),* dried ginger (*Zingiber officinale*) and *mustard* oil (*Brassica nigra*).[6] *Arka leaves* were collected from Pannipitiya area, Colombo and dried ginger (*Zingiber officinale*) and mustard oil (*Brassica nigra*) were collected from Gebbos Lane, Colombo. All ingredients were purified individually as per Ayurveda literature and the formula was prepared as per the procedure mentioned in Ayurveda pharmacopoeia. The Authentication of raw drugs were done in the Department of *Dravyaguna* and *Arka taila* was prepared in the Department of *Dravyaguna vignana*, Institute of Indigenous Medicine, University of Colombo.

METHOD OF PREPARATION

All the ingredients were purified as per the purification method mentioned in *Ayurvedic* literature and in accordance with standard formulary of Ayurveda. Sri Lanka. Leaves of *Arka* weighing approximately 03kgs were taken. It is cleaned and dried. Then juice is prepared. To prepare juice, 03 kgs of leaves of *Arka* grind with 04 liters of water is added and kept on heating device. Heating was continued on *mandagni* till it reduced to 1/4th. After filtration one liters of *Arka* juice along with *ath kaha* (*Curcuma domestica*) (80 g) and mustard oil (320

ml) was taken for *snehapaka* and heating was continued on *mandagni*, till the *samyak siddha lakshana* obtained. Filtration was done when the sidda sneha is in warm condition. Later it was bottled and named as *Arka Taila*.

ANALITICAL STUDY

In the present study analytical evaluation of *Arka Taila* is carried out to develop preliminary standards. The derivative physico-chemical parameters, HPTLC profiles serve as diagnostic parameters to identify this drug formulation useful as tool for authentication, standardization and quality control assessment of the *Arka taila*. Analytical study was carried out at Industrial Technology Institute. Sample of prepared *Arka Taila* was analyzed using following parameters as per the references available in protocol for testing published by CCRAS.[7]

1. Organoleptic characteristics.
2. Physical parameters –Refractive index, specific gravity, viscosity.
3. Chemical parameters- Acid value, Iodine value, Saponification value, Unsaponifiable matter, Peroxide value, Sample preparation for HPTLC.

Organoleptic characters

Organoleptic characters of the *Arka taila* were noted using sensory organs. Organoleptic parameters such as *varna* (color), *gandha* (odor), *ruchi* (taste) were analyzed and recorded.[8] Physico-chemical characteristics of *Arka taila* samples were analyzed by quantitative analysis for Refractive index, Specific gravity, acid-value, Viscosity, Saponification value, Iodine value, Peroxide value and unsaponifiable matter. as per standard techniques.[9]

OBSERVATION AND RESULTS

The observation of the organoleptic evaluations was reported in Table 01 where it was found that formulation was brownish-colored with a characteristic odor and acrid taste.

Table 1: Organoleptic characters of *Arka taila.*

Parameters	***Arka taila***
Color	Brown
Odour	Characteristic
Taste	Acrid

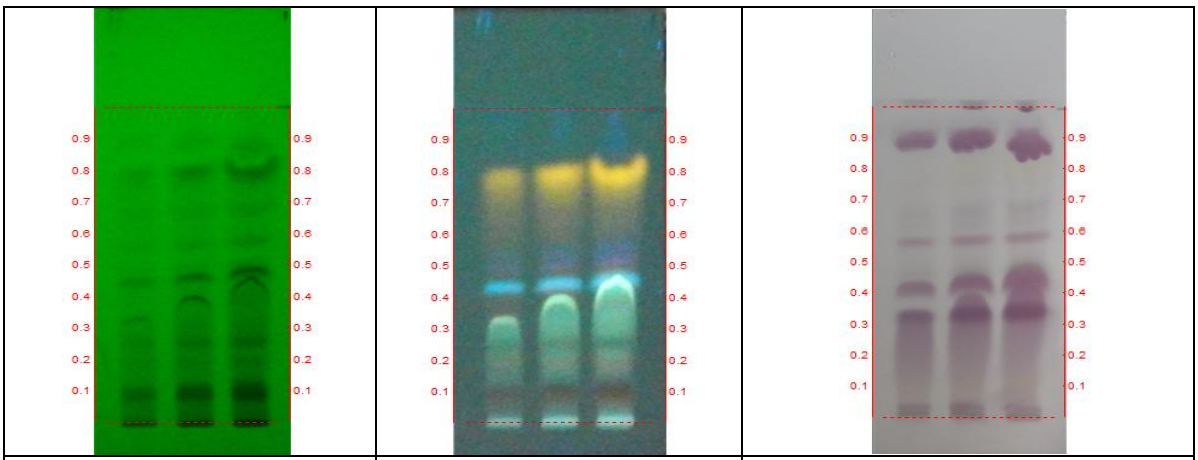
The observation of physico-chemical values was shown in table 02. Quantitative physico-Chemical analysis for the Arka taila samples was performed for the parameters like Refractive index, Specific gravity, acid-value, Viscosity, Saponification value, Iodine value,

Peroxide value and unsaponifiable matter. It was found that formulation have all the value within the standard limits.

Table 02: Standardization parameters for *Arka taila.*

Parameters	***Arka taila***
Refractive index	1.47032
Specific gravity	0.9385
Viscosity	58.08
Acid value	1.04
Saponification value	162.30
Iodine value	10. 73
Peroxide value	1.58
Un-saponifiable matter	1.82

The HPTLC photo documentations colour bands visible under UV 254 nm, 366 nm after developed with solvent system are presented are shown in figure 01. HPTLC fingerprint profile is a systematic representation of all the constituents of sample resolved in the given chromatographic system. On analyzing under densitometer at 254nm, the chromatogram showednine peaks. While at 336nm, the chromatogram showed eight peaks. It gives a semi-quantitative sketch of the chemical profile of the sample. In the present work, developed simple, convenient, and time-saving HPTLC methods for chromatography with Toluene: Ethyl Acetate.



Short UV	**Long UV**	**Under white light (after derivatisation)**

Track 1- ***Arka taila*** – 4µl

Track 2- ***Arka taila*** – 8µl

Track 3- ***Arka taila*** – 12µl

Solvent system – Toluene: Ethyl Acetate (9:1)

Figure 1: HPTLC photo documentation of chloroform extract of *Arka taila.*

Table 3: Rf value of sample of *Arka taila.*

254nm	366nm	Post derivatisation
-	-	0.04 (D. purple)
0.09 (Green)	0.09 (FD. brown)	-
0.20 (Green)	0.20 (FL. brown)	-
0.25 (Green)	0.25 (D. green)	-
0.33 (Green)	0.33 (D. green)	0.33 (D. purple)
-	-	0.42 (D. purple)
0.45 (D. green)	0.45 (F. blue)	-
-	-	0.47 (L. purple)
-	0.49 (FD. brown)	-
0.56 (Green)	-	0.56 (D. purple)
-	-	0.62 (L. purple)
0.67 (Green)	-	0.67 (L. purple)
-	0.78 (Yellow)	-
0.80 (D. green)	-	0.80 (D. Yellow)
0.89 (Green)	-	0.89 (D. purple)

*F – fluorescent; D – dark

DISCUSSION

Analytical study provides the objective parameters to fix up the standards for quality of finished products. To establish preliminary standards quality control over a drug, analytical study is necessary. Hence analytical study of *Arka taila* was carried out. The main aim of the analysis is to check the quality of *Arka taila*, in order to obtain therapeutic effect. Finished product of *Arka taila* is standardized on the ground of organoleptic characters, physical and chemical parameters. the organoleptic characteristics showed green colour, Characteristic like odour and acidic in taste of the *Arka taila*.

Refractive index of *Arka taila* is 1.47032. It indicates density of sample compared to air and liquid media. Due to addition of active component Calotroposide and Calactin of leave juice of *Arka* to *taila* which have led to increase in density of the oil. Viscosity is an index of a liquid to flow. The higher viscosity of a liquid, the greater is the resistance to flow. If viscosity of the oil isincreased, the rate of absorption decreases. If the oil is less viscous the rate of absorption is very high. Hence the oil is better absorbed into skin.

In this study, during analysis it is found that the viscosity of *Arka taila* is 58.08. It can be understood that *Arka taila* is having better absorption power. The specific gravity of sample is 0.9385. The specific gravity indicates the presence of solute content in the solvent. Here

the solvent is *Arka taila* and the solute is to extraction of active principles. Due to presence of more solute particles of *Arka taila* which have led to increase in specific gravity.

The Saponification value of *Arka taila* is found to be 162.30. The saponification value indicates the average of long chain of all fatty acid present. The long chain fatty acids found in fats have a low saponification value. *mustard* oil is base of the *Arka taila*. *mustard* oil contains oleic acid, linolenic acid, erucic acid and saturated fatty acids which are indigestible for human organisms.[10] Sample of *Arka taila* have high saponification value, which may be due to presence of short chain fatty acid in *Arka taila*. Unsaponifiable matter of *Arka a* is 1.82. The unsaponifiable matter indicates the non-fatty matter of the substance present in a *Arka taila*. Acid value of *Arka taila* is 1.04. The acid value indicates the presence of free fatty acids[11] in *Arka taila.* The free fatty acid responsible for rancidity of compound. The Iodine value of *Arka taila* is 10.73. It indicates the degree of unsaturation, which denotes the rancidity of *taila.* Non-saturated fatty acids like linoleic and oleic acid contain in *Arka taila* which may be reasons for low iodine value.[12] The peroxide value is the number of milliequivalents of active oxygen that expresses the amount of peroxide contained in oil.

Arka taila is popular *taila* in Ayuveda. It was observed that the degree of heat and constants of the drug affects the physical and chemical constants such as organoleptic character of *Arka taila* was green colour and acidic in taste. Specific gravity, Viscosity and refractive index were observed in physical parameters. These showed help to better absorption value. Chemical parameters such as Acid value, Iodine value, Saponification value, Unsaponifiable matter, Peroxide value, Sample preparation for HPTLC are done and showed better absorption power.

CONLUSION

The present work was carried out for the formulation and standardization of *Arka Taila*. The developed and validated HPTLC methods are simple, precise, and accurate, and can be used for the quantification of solvent in herbal raw materials as well as in their formulations. Hence, these quality-control parameters and the developed HPTLC methods may be considered as a tool for assistance for scientific organizations and manufacturers in developing standards. Considering all the data recorded, it has been proved that the process of *Arka taila* analysis has high significance in today's scenario of globalization and the urge for better therapeutic efficacy.

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