IJAPC

Volume 11 Issue 2,
2019

www.ijapc.com

2350-0204

GREENTREE GROUP PUBLISHERS

Int J Ayu Pharm Chem

RESEARCH ARTICLE

www.ijapc.com

e-ISSN 2350-0204

Physico-chemical Analysis of *Darunakaroganashaka Arka* (*Amrabeejadi Arka*).

Radhika Panicker[1*], Arun Mohanan[2] and Abhaya Kumar Mishra[3]

[1-3]Dept of Rasashastra & Bhaishajaya Kalpana, Amrita school of Ayurveda, Amritapuri, Amrita Vishwavidyapeetham, India

ABSTRACT

Darunaka is a common scalp disorder affecting more than half of the world population. Different kinds of antidandruff products are available in the market and modern pharmaceutical companies are spending millions of dollars each year for introducing new antidandruff products. But most of the time many of these products are not economical, less efficacy, and has high reoccurrence rate. Different remedies are mentioned in our classics for the prevention and curative aspects of *Darunaka*. *DarunakaroganashakaArka* is *Arka* prepared out of *Haritaki*, *Amrabeejamajja* and *Ksheera* mentioned in *Arkaprakasha* for the treatment of *Darunaka*. *Arka* is a liquid preparation prepared by distilling the drug using Arkayantra or by modern distillation apparatus. The first historical references of *Arkakalpana* was available in *Ravanas Arkaprakasha,*where he include it under *Panchavidha Kalpanas*. *Arka* is considered as more potent than other *kalpanas* where the volatile content of a drug is extracted. The physicochemical analysis of *Darunakaroganashakaarka* was found to be at the standard limit.

KEYWORDS

Darunaka, Dandruff, Arkakalpana, Darunakaroganashakaarka

Greentree Group Publishers

Received 10/07/19 Accepted 08/08/19 Published 10/09/19

INTRODUCTION

Darunaka is a common scalp disorder affecting large number of population that negatively affect the quality of life of a person.*Ayurveda* includes the condition of *Darunaka*under the classification of *Kshudra roga*[1]. It's a *KaphaVata* predominant condition. The symptoms include *Twaksputana* (cracking of the skin), *Kandu*(itching), *Keshachyutti* (falling of hair), *Keshabhoomirukshata* (dryness of scalp). Based on the symptoms it can be compared with dandruff of modern medical science. For the treatment of *darunaka* many formulations are mentioned in our classics. But the practice of this formulation in modern era is practically difficult. So keeping this in mind use of *arka* which has got an increased shelf life, more potency,easy absorption and better patient compliance for the treatment of *Drunaka. Arka* is a liquid preparation prepared by distilling the drug using *Arkayantra* or by modern distillation apparatus.

Darunakaroganashakaarka is mentioned in *Arkaprakasha* for the management of *Darunaka*[2]. This *arka* is prepared out of *Amrabeejamajja*(Mangiferaindica), *Haritaki*(Terminaliachebula) and *Ksheera* (cows milk). *Haritaki* has anti-microbial, antioxidant action. *Amrabeeja* has anti-microbial, anti-helmintic, prohealing and analgesic effect. Milk gives smoothness hence reduces dryness of the scalp. Because of all these properties *arka* prepared out of it will be effective in the treatment of *darunaka*.

AIMS AND OBJECTIVES

Pharmaceutical study of *Darunakaroganashakaarka*

To evaluate the Organoleptic character of the *Arka*

To assess the Physicochemical parameter of the *Arka.*

MATERIALS AND METHODS

Collection and authentication of raw drugs;

Amrabeejamajja(seed kernel of Mangiferaindica) was collected from the rural area of Haripad, Kerala and *Haritaki* (fruit pulp of Terminaliachebula) has procured from crude drug market of haripad and authenticated.

Preparation of *Darunakaroganashakaarka*

Simple distillation was used for the preparation of *arka.* Fourtygms each of coarsely powdered *Amrabeejamajja* and *Haritaki* was taken in a vessel. To that 800ml of cow's milk was added and soaked for 3 days. After 3 days the soaked material along with the liquid part was transformed

to a round bottom flask. And the apparatus was setup for distillation. About 430 ml of distillate was collected and when cooled was stored in airtight container.

Table:1 Organoleptic character of *Darunakaroganashakaarka*

Parameter	***Arka***
Colour	Colourless
Odour	Characteristic
State	Liquid
Taste	Bitter

RESULTS

Table:2 Physico chemical values of *Darunakaroganashakaarka.*

Parameters	***Arka***
pH	4.5
Specific gravity	1.002
Refractive index	1.335

Result of Thin layer Chromatography (TLC).

To compare the chemical constituents present in *Haritaki* and *Amrabeeja* with *Arka.* Mobile phase used was Toluene and Ethyl acetate with ratio 9:1. After developing the TLC plate it was visualized in UV cabinet.

Under UV short

For the alcoholic extract of *Haritaki* one spot was observed with an R_f value of 0.2. For alcoholic extract of *Amrabeeja* one spot was observed with an R_f value of 0.28. For *Arka* two spots where observed with an R_f value of 0.2 and 0.28.

Results of Gas Chromatography Mass Spectroscopy (GC-MS) study.

GC-MS analysis was carried out in CARE KERALAM Ltd.

Table 3 Chemical compounds in higher concentration

Sl. No	**Chemical name**	**Chemical formula**	**Molecular weight(g/m)**	**Retention time**	**Peak area**
1.	Acetic acid	CH_3COOH	60.052	3.761	26321
2.	Hentriacontane	$CH_3(CH_2)_{29}CH_3$	436.85	37.662	204901
3.	Oxalic acid, 2-ethyl hexyl isohexyl ester	$C_{16}\ H_{30}\ O_4$	286.412	0.901	125971
4.	2,2-Dimethyl 1-3-heptene trans	$C_9\ H_{18}$	126.243	22.462	1496
5.	Cyclohexane, 1,2,4-trimethyl	$C_9\ H_{18}$	126.2392	22.702	11470
6.	4-Isopropyl-1,3-cyclohexanedione	$C_9H_{14}O_2$	154.209	22.936	27165
7.	Diethyl phthalate	$C_{12}H_{14}O_4$	222.24	29.943	75933
8.	Isopropyl Myristate	$C_{17}H_{34}O_2$	270.457	35.126	113653
9.	Eicosane	$C_{20}H_{42}$	282.556	38.643	122930
10.	Heptacosane	$C_{27}H_{56}$	380.745	41.578	187749
11.	Hexanedionic acid bis(2-ethyl hexyl) ester	$C_{22}H_{42}O_4$	370.5665	45.493	182868
12.	Tetracosane	$C_{24}H_{50}$	338.664	45.698	122930
13.	Tetratriocontane	$C_{34}H_{70}$	478.934	48.454	122930
14.	Octadecane-3-ethyl 5-(2 ethylbutyl)-	$C_{26}H_{54}$	366.718	51.72	180779
15.	Tetrasiloxane, decamethyl	$C_{10}H_{30}O_3Si_4$	310.687	51.945	143629
16.	Methyltris (trimethylsiloxy) silane	$C_{10}H_{30}O_3Si_4$	310.687	51.989	143629
17.	Silanetrimethyl (5-methyl) -2-(1-methylethyl)phenoxy	$C_{13}H_{22}OSi$	222.403	54.604	76239
18.	Benzo[h]quinoline,2,4-dimethyl	$C_{15}H_{13}N$	207.276	58.538	64841

DISCUSSION

Analytical studies

In distillation four steps are involved ie, *churna* (powdering), *plavana*(soaking), *kwatana*(boiling), *prisruta*(liquification).[3] All these steps have its own importance in the preparation of *Arka*. Crushing of drug helps in dissociating the active principle to liquid. Soaking helps in increase the contact time of drug with water. Boiling helps in transferring the water soluble principle to liquid and help in converting the liquid to vapour. Liquification helps in converting the vapour to distillate form. While analysing the organoleptic and analytical parameters of *darunakaroganashakaarka* it is colourless and clear with characteristic taste and odour. The pH of *arka* was found to be 4.5 indicate that the *arka* is acidic in nature. Human hair has a pH balance of between 4.5 to 5.5. So this *arka* will not alter the pH balance of hair. The specific gravity is found to be 1.002. The specific gravity indicates the presence of solute in a solvent. The presence of dissolved substance in the sample changes the value of specific gravity[4]. Here the solvent is milk and solutes refer to extracted active principle of *haritaki* and *amrabeejamajja*. Refractive index of *arka* was found to be 1.335. The consistency of media and solute present in media brings change in refractive index[5]. Refractive index of water is 1.33 which means light travels 1.33 times slower in water than in vacuum.

TLC study

The developed TLC plate was visualised under UV and alcoholic extracts of *Haritaki* shows R_f of 0.2 and *Amrabeeja* shows R_f of 0.28. Arka shows two spots with R_f of 0.2 and 0.28 corresponding to the spots of *Haritaki* and *Amrabeeja.*

GC-MS study

The GC-MS profile of *Darunakaroganashakaarka* confirmed the presence of 56 chemical compounds. Among these 18 compounds were found to be in higher concentrations.Out of 18 compounds Acetic acid possesses antifungal and antibacterial activity. Hentriacontane has antioxidant and antibacterial activity and widely used in skin care products. Oxalic acid, 2-ethylhexylisohexyl ester and Hexacosane possesses antimicrobial activity. Tetracosane also possesses antibacterial and antimicrobial activity. Hexanedionic acid bis(2-ethyl hexyl) ester is a cleanser, lubricant, and a conditioning agent. Diethylphthalate and Iso - propyl myristate are proven lubricants used widely in cosmetic industry. Diethyl phthalate is also used in hair products to reduce cracking of hair by making them less brittle. Isopropyl myristateis skin enhancer and have

antibacterial property. Silanetrimethyl (5-methyl) -2-(1-methylethyl)phenoxy are widely used in cosmetic industry in hair treatments. All these above properties help in reducing the symptoms like *Twaksputana*(cracking of the skin), *Kandu*(itching), *Keshachyutti* (falling of hair), *Keshabhoomirukshata*(dryness of scalp) in the condition of *darunaka.*

CONCLUSION

Arka is considered as a unique formulation in *Bhaishajya kalpana* owing to its method of preparation. All the organoleptic and physico chemical parameters were found to be standard. After GC-MS analysis chemical components which possess the properties like antibacterial, antifungal, antimicrobial, antioxidant and lubricants are identified which helps in reducing the symptoms of *darunaka*. Further clinical study has to be done to prove the efficacy of this *arka* in *darunaka.*

REFERENCES

1.Sri Dalhanaacharya, Sushrutan Samhita with commentary Nibandha Sangraha, Varanasi, Chaukhamba Sanskrit Sansthan. Nidhana Sthana .Reprint 2013. chapter 13. sloga no 3.pp318.

2.Lankapathiravana, Arkaprakasha, Varanasi, Chaukambha, Krishnadas academy. 1995. 1st ed.

3.K. Priya, Hussain Gazala, Pharmaceutico analytical study of Vacha Arka, Journal of Biological and scientific Opinion.2013. Volume 1(4).

4.NarayanaBavalatti, Manjusharajagopala. A Phytochemical Study on the Poly herbal Ayurvedic Eye Drop. RGUHS Journal of AYUSH Sciences 2012; 28-31.

5.Aparna Sharma, Pharmaceutico-analytical comparison of Daruharidra arka and kvatha as ascotana drug. Int. J. Res. Ayurveda Pharm. 2017;8 (Suppl 3): 141-144.