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COMPARATIVE PHARMACEUTICO ANALYTICAL STUDY OF *AMLAPITTAGHNA ARKA* AND *AMLAPITTAGHNA* SYRUP

SREELAKSHMI K[1], KADIBAGIL VR[2*] AND BHAT S[3]

[1]Research Fellow, Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheswara Ayurveda College & Hospital, Hassan, Karnataka, India

[2]Professor and HOD, Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheswara Ayurveda College & Hospital, Hassan, Karnataka, India

[3]Research Officer, Department of Research and Allied sciences Kuthpady, Udupi, Karnataka

***Corresponding Author: E Mail: Vinaykumar R Kadibagil drvinaykadibagil@gmail.com**

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ABSTRACT

Pharmaceutics is the branch of science which deals with the conversion of raw materials into different pharmaceutical dosage forms. There are different types of dosage form mentioned in Ayurvedic pharmaceutics as well as in modern pharmaceutics also. In modern pharmaceutics dosage forms like syrup, elixirs, tintures, gels, etc. In Ayurvedic classics also there are references of different dosage forms like *Swarasa* (juice), *Kalka* (paste), *Kwatha* (decoction), *Hima* (cold infusion), *Phanta* (hot infusion) *Arka* (distillate) etc. *Arka* preparation is distillate of drugs. *Amlapittaghna Arka* is one of the *Arka* mentioned by *Arka prakasha* in which *Guduchi* (*Tinospora cardifolia*), *Nimba* (*Azadiaracta indica*) *and Patola* (*Tricosanthes dioca*) are the ingredients which has having *Thiktha rasa* (bitter taste) which is unpalatable. So, in this study, an effort is made to convert *Arka* into syrup form to increase the palatability and shelf life. Both the samples of *Arka* and syrup subjected for different analytical parameters including chromatogrophical techniques and observed analytical parameters are compared. It is observed that there was increase in pH, specific gravity, refractive index, viscosity, total solids and number of peaks HPTLC. Considering stability and patient compilance modification of *Amplapittaghna arka* into syrup was benificial but the physico-chemical parameters shown non beneficial observations.

Keywords: *Amlapittaghna arka, Amlapittaghna* syrup, *Arka Kalpana*, Syrup, Ayurveda, *Amlapitta*

INTRODUCTION

Pharmaceutics is the branch of science which deals with the conversion of raw materials into different pharmaceutical dosage forms. Dosage forms are pharmaceutical drug products in the form in which they are marketed for use with a specific mixture of active components (excipients) in a particular configuration and apportioned into a particular dose. There are different types of dosage form are monophasic, biphasic.

Syrup is one of the modificatory monophasic dosage form. Medicament is uniformly distributed throughout the liquid **[1]**. Doses can be easily adjusted according to the need of the patient **[1]**. Syrups are the sweet, viscous, concentrated aqueous solutions of sucrose or other sugars in water or any other suitable aqueous vehicle **[2]**. According to new amendment shelf life of syrup was 3 yrs **[3]**.

There are different types of dosage forms mentioned by Ayurveda like *Swarasa* (juice), *Kalka* (paste), *Kwatha* (decoction), *Hima* (Cold infusion), *Phanta* (Hot infusion), *Arka* (distillate) etc. *Arka* is as a suspension of the distillate in water having slight turbidity and colour according to the nature of the drug or drugs used and smell of the predominant drug **[4]**. Dose of the drugs can be reduced by using *Arka* and is sterile also **[5]**. *Amlapittaghna Arka* is one of the *Arka* mentioned by *Arka Prakasha*. It contains *Guduchi (Tinospora cardifolia), Nimba (Azadiaracta indica), Patola (Tricosanthes dioca)* are the ingredients having *Thiktha rasa* (bitter taste) which is not palatable in nature so it was converted into syrup form **[6]**.

MATERIAL AND METHODS

The raw drugs required for the preparation of medicine was collected in the Herbal Garden of Sri Dharmasthala Manjunatheshwara College of Ayurveda Hassan. *Patola Patra* (*Tricosanthes dioca*) was collected from Tholur, Thrissur district. The authentication of all the drugs was done at the department of Dravya Guna, Sri Dharmasthala Manjunatheswara College of Ayurveda, Hassan.

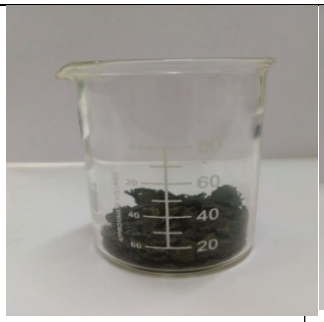
Analytical study was done by following parameters

- pH **[7]**
- Specific gravity **[8]**
- Refractive index **[9]**
- Viscosity **[10]**
- Total suspended solids **[11]**
- Microbial contamination **[12]**
- Volatile matter **[13]**
- Total acidity **[14]**
- Clarity test **[15]**
- Reducing and non reducing sugar **[16]**

Table 1: Details of preparation of *AmlapittaghnaArka* and *Amlapittaghna* syrup

	AmlapittaghnaArka	*Amlapittaghna* syrup
Total quantity of drug and water	**Drug -250gm Water -2500ml**	***Amlapittaghna Arka*-500ml Sugar -333.5ml(in volume) 268(in weight)**
Quantity obtained	**1348ml**	**610ml**
Temperature	**70^0 C**	**Initial stage-26.2^0 C Final stage -83.3^0 C**

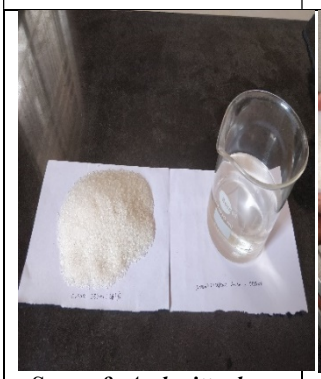
Guduchi Patra



Patola Patra

Nimba Patra

Distillation



Sugar & *Amlapittaghna Arka*

Addition of sugar

Temperature at initial stage-26.2^0 C

Temperature at final stage-$83.3^{0\ C}$

RESULTS

Analytical

Both *Amlapittaghna arka* and *Amlapittaghna s*yrup were subjected for analysis using standard parameters laid down by protocol for testing AYUSH drugs published by CCRAS. The observations of the analytical study are described as under **(Table 2, 3 and Figure 1)**.

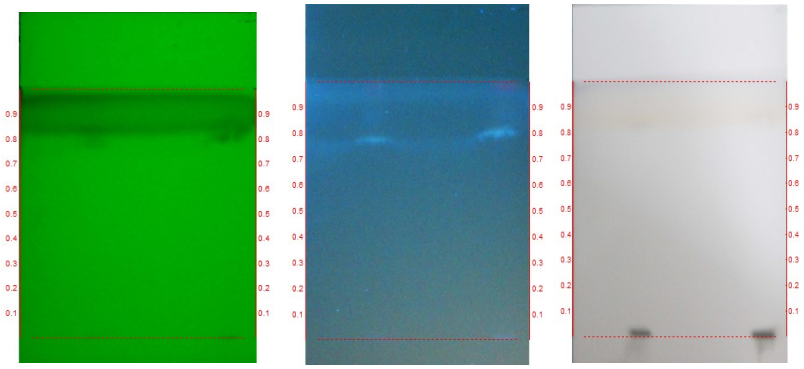
Only one peak was detected in *Amlapittaghna* syrup at short and long UV which were absent in *Amlapittaghna arka.* In post derivatisation no peaks were detected in both samples **(Table 4)**.

Table 2: Organoleptic characters of *Amlapittaghna arka* and *Amlapittaghna* syrup

AmlapittaghnaArka	*Amlapittaghna* syrup
Colorless	**Colorless**
Clear, transparent	**Viscous liquid**
Characteristic *Tikshna* smell	**Characteristics *Tikshna* smell**

Table 3: Physicochemical parameters of *Amlapittaghna arka* and *Amlapittaghna* syrup

Parameters	*AmlapittaghnaArka*	*Amlapittaghna*syrup
pH	6.80	5.87
Specific gravity	1.00079	1.26453
Viscosity	0.06696	1.16308
Refractive index	5.34	58.43
Total solids	6	58
Total sugar	-	23.99
Reducing sugar	-	3.81
Non-reducing sugar	-	20.18
Volatile matter	0.22%	-
Total acidity	0.021	-
Microbial contamination Total bacterial count	2.4×10^5 CFU/ml	228 CFU/ml
Total fungal count	4.0×10^2 CFU/ml	3.4×10^3 CFU/ml
Clarity test	Clear	-



At short UV **At long UV** **Post -derivatisation**

Figure 1: HPTLC photo documentation of sample of *AmlapittaghnaArka* and *Amlapittaghna* syrup
Track 1: *AmlapittaghnaArka- 4µlTrack 2: Amlapittaghna syrup - 4µl*
Track 3*: Amlapittaghna Arka-* 8µlTrack 4:*Amlapittaghna*syrup- 8µl
Solvent system: Toluene: Ethyl aetate: Acetic acid: water (3.0: 2.0: 0.8: 0.2)

Table 4: Rf values of sample of *Amlapittaghna arka* and *Amlapittaghna* syrup

Short UV		Long UV		Post derivatization	
Amlapittaghna arka	*Amlapittaghna* syrup	*Amlapittaghna arka*	*Amlapittaghna* syrup	*Amlapittaghna arka*	*Amlapittaghna* syrup
-	0.78 (D. green)	-	0.78 (F. blue)	-	-

DISCUSSION

Amlapittaghna arka was prepared by using 250g of drug and 2500 ml of water with average temperature of 70^0C and yield was 1348 ml. 500ml *Arka* was added with 333.5ml of sugar in volume or 268g in weight. 610 ml of syrup was obtained.

The influence of sugar was significant in all the organoleptic characters of syrup. The colourless *Arka* was changed to creamy white colour. Taste was changed to *Thiktha Katu (bitter, acrid taste)* Rasa to *Madhura Katu (sweet, acrid taste*) Rasa which is due to the addition of sugar.

Amlapittaghna arka and *Amlapittaghna* syrup are mild acidic in nature. pH of gastric juice is in between 1.5 to 3.5.If medicine is very acidic or very alkaline cause irritation to the tissues. Both the test drugs neutralise the gastric pH.

Amlapittaghna arka has pH near to neutral i.e. 7 which is contributed in anti-ulcer activity.

Increase in Refractive index and specific gravity of syrup was due to addition of sugar in the *Arka.* The total solids are the measure content of all inorganic and organic substances contained in a liquid. The solute content determines the number of constituents in a given sample of a drug.

The total solids of *Amlapittaghna* syrup was increased compared to *Arka* which was due to addition of sugar. Sugar that undergo reduction reaction or oxidizes is called reducing sugar. Sugar group having aldehyde or ketone is considered as reducing sugars. Reducing sugar of *Amlapittaghna* syrup was 3.81. Sugar which do not undergo reduction reaction i.e. sugars which do not contain aldehyde or ketone group. Non reducing sugar value of *Amlapittaghna* syrup was 20.18. Total sugar value of *Amlapittaghna* syrup was 23.99.

Peaks were detected only in syrup at short and long UV and absent in post derivatisation. The detected peak in short and long UV in syrup may be due to addition of sugar to *Arka.*

Mild bacterial and fungal count was observed in both samples i.e. *Amlapittaghna arka* and *Amlapittaghna* syrup. Contamination may be due to containers and handling of samples. *Amlapittaghna arka* was clear and does not shown any precipitate and turbidity.

CONCLUSION

Genuine raw drugs of study formulations are easily and abundantly available. There is no pharmaceutical restraint in preparation of *Amlapittaghna Arka.* For preparation of *Amlapittaghna* syrup*, Arka* was just heated and sugar was added to avoid the crystallisation and vaporisation of volatile principles. Colourless *Arka* has changed to creamy white colour. Change in colour and analytical parameters was due to modification of arka into syrup. Analytical studies including HPTLC which leads to generate preliminary standards for both *Arka* and syrup. In clarity test, *Amlapittaghna Arka* was found clear and devoid of turbidity. Increase in pH, specific gravity, viscosity, total suspended solids, refractive index and detection of peak in HPTLC report was due to the addition of sugar. Considering stability and patient compilance modification of Amplapittaghna arka into syrup was benificial but the physico-chemical parameters shown non beneficial observations.

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Department of Research and Allied sciences Kuthpady, Udupi, Karnataka.

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