WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 13, Issue 3, 1113-1122. Research Article ISSN 2277–7105

"EXPERIMENTAL EVALUATION OF KIRATATIKTADI KWATHA & KIRATATIKTADI ARKA IN ALBINO RATS"

Shubham Balbhadra[*1] and Vidyarani M.*[2]

[1]PG Scholar, Dept. of Rasa Shastra and Bhaishajya Kalpana, Ramakrishna Ayurvedic Medical College, Hospital and Research Centre, Bengaluru, Karnataka, India.

[2]Professor & HOD, Dept. of Rasa Shastra and Bhaishajya Kalpana, Ramakrishna Ayurvedic Medical College, Hospital and Research centre, Bengaluru, Karnataka, India.

Article Received on
16 December 2023,

Revised on 05 Jan. 2024,
Accepted on 25 Jan. 2024

DOI: 10.20959/wjpr20243-31239

***Corresponding Author**
Shubham Balbhadra
PG Scholar, Dept. of Rasa Shastra and Bhaishajya Kalpana, Ramakrishna Ayurvedic Medical College, Hospital and Research Centre, Bengaluru, Karnataka, India.

ABSTRACT

Bhaishajya kalpana is the branch of Ayurveda which deals with preparation and processing of medicines in this Kiratatiktadi kwatha is one of the preparations used for fever, but due to its bitter taste and less shelflife its acceptiblity is not much used here Kiratatiktadi Kwatha ingredients would be converted into Arka in this study. The prepared kiratatiktadi Kwatha & Arka Samples were tested in Albino rats for assessing its Antipyretic effect by Yeast induced Pyrexia method. Kiratatiktadi Kwatha & kiratatiktadi Arka was prepared Standard operative Procedures. There are the only slight variations in physicochemical parameters of Kwatha & Arka, and showed sustained anti-pyretic activity. So considering all the factors physicochemical parameters & experimental study of Kwatha & Arka, which shows that both the samples possesses similar qualities, and both can be used vice versa. But kiratatiktadi Arka is the best choice because of its quality, palatability and shelf life which would fulfil the patient acceptability.

KEYWORDS: Kiratatiktadi kwatha, kiratatiktadi arka, Experimental study.

INTRODUCTION

Fever is defined as a diseased state of system marked by increased heat, acceleration of pulse and a general disturbance of body function, including usually thirst and loss of appetite. According to Acharya Charaka Jwara[1] is the Santapa of body, mind and Indriyas. Due to

Mithya Ahara Vihara Jatharagni functions are impaired and leads to Aama. Aama is the root cause of Jwara. Kiratatiktadi kwatha[2] is a formulation used for Jwara. However, the bitter and pungent taste and its shelf life are the hindrance that arises in implementation of this formulation in prescriptions. There arises a need to overcome this drawback with modification of these Kwatha ingredients into a form which would render same results as that of the Kwatha. Here, Ghana vati, Syrup and Arishta have almost similar kind of extraction. These preparations however modified into different dosage form having more shelf life do not completely fulfill the patient compliance. Pancha Vidha Kashaya Kalpana are the primary preparations in Ayurvedic pharmaceutics.[3] Arka Prakasha describes Kalka, Churna, Rasa, Taila and Arka as Panchavidha Kashaya Kalpana. Among this Arka is said to be the most potent.[4] Arka is a liquid preparation obtained by distillation of certain liquids or of drugs soaked in water using the Arka Yantra or any convenient modern distillation apparatus.[5] This preparation was introduced to main stream pharmaceutical industry in the recent years. However, this preparation is to be taken with due regard because of its specificity in the preparation aspect with increased shelf life and reduced dosage in comparison with its counterparts. Arka Kalpana stability period is comparatively more than Swarasa, Kalka, Kwatha, Hima, Phanta and Churna. So here the ingredients of this Kwatha Churna was used for preparing into Arka (Water Distillate) which gains importance since this preparation is also a water extract, has good patient compliance and long shelf life.

AIMS AND OBJECTIVES

- To evaluate the Antipyretic activity of Kiratatiktadi Kwatha and Kiratatiktadi Arka in Albino Wistar rat.

MATERIALS AND METHODS

Method of Preparation of Kiratatiktadi kwatha and kiratatiktadi Arka

Preparation of Kiratatiktadi Kwatha

Table No. 1: Ingredients of Kiratatiktadi kwatha churna.[6]

Drugs	Botanical Name	Parts used	Quantity	Water added
Kiratatikta	*Swertia chirayita*	Whole plant	1 PART	16parts
Musta	*Cyprus rotundus*	Rhizome	1 PART	
Guduchi	*Tinospora cordifolia*	Stem	1 PART	
Udichya	*Pavonia odorata*	Whole plant	1 PART	
Kantakari	*Solanum xanthocarpum*	Whole plant	1 PART	
Brihati	*Solanum indicum*	Moola	1 PART	
Gokshura	*Tribulus terrestris*	Fruit	1 PART	
Shalaparni	*Desmodium gangaticum*	Whole plant	1 PART	

Prishnaparni	*Uraria picta*	Whole plant	1 PART	
Shunti	*Zingiber officinalis*	Rizome	1 PART	

GENERAL METHOD OF PREPARATION[7]

All the drugs was coarsely powdwerd and 16th parts of water was added and kept in a clean container. The heating was done on Gas stove. The decoction started boiling in 15 minutes. When 1/8th reduction was checked by the level of the water by using a measuring scale, after the appropriate reduction, the kwatha was filtered using a thick cotton white cloth. The residue in the cloth is discarded. The color of the kwatha was brown.

Method of preparation Kiratatiktadi Arka

The Kiratatiktadi Arka was prepared with same kiratatiktadi kwath churna and the drug is soaked overnight and 10 parts of water added i.e, process of distillation was as per the reference of general method of preparation of Arka (1:10) mentioned in AFI.[8]

Procedure

After proper cleaning, the drugs mentioned in kiratatiktadi Kwatha Churna were taken in crude form, the drugs were soaked in sufficient quantity of Water for overnight, Next day morning it was transferred to distillation apparatus and remaining water was added and condenser was attached to it and closed properly. The apparatus was heated, initially at 60° C. i.e., moderate degree and after 10 minutes temperature was reduced to 40 °C and then maintained. After 40 minutes Arka started boiling and after 60 minutes started draining out and was dripping in the receiver. First 4 to 5 drops were not collected. Then once 60 % distillation completes heating was stopped.

Storage -The both samples of Kwatha & Arka were stored in airtight glass bottles.

EXPERIMENTAL STUDY

Selection of animals

Test System Species: Rat

Strain: Wistar

No. of groups: 4

No. of animals: group: 6

Body weight: 180-200 g

Identification: By cage card, crystal violet/picric acid color body marking.

Acclimatization: 1 Days

Preparation of Test Formulation for Administration

Test Drug

- Kiratatiktadi Kwatha
- Kiratatiktadi Arka

Schedule: Single dose per animal

Administration: The test formulation was administered through oral route at different dose levels to respective animal through oral feeding needle sleeved on to disposable syringe.

Route: Oral

Dose: 24ml/kg, 48ml/kg, 96ml/kg

Test substances were administered at the dose of 8.64ml/kg and 2.16ml/kg of Kiratatiktadi Kwatha and Kiratatiktadi Arka respectively and paracetamol at the dose of 50mg/kg orally. After 1 hour of injection of yeast corresponding test drug was administered orally to respective groups. Then the rectal temperature was recorded at 1hr, 2hr, 3hr, 4hr, and 24hrs, Significant antipyretic activity was observed in test drug and standard drug. In test drug antipyretic activity was observed and sustained from 4^{th} hour to 24^{th} hour, while in standard it was from 3^{rd} hour to 24^{th} hour, So the formulation was found to be safe to administer and from this two doses sere selected for antipyretic study.

Inclusive Criteria

1. Healthy albino rats of either sex were included in the study
2. Weighing about 150g-250g

Exclusive Criteria

1. Less than 150g and more than 250g
2. Pregnant and diseased rats
3. Rats which are under trail of other experiments

Route of Administration

Yeast solution was injected through subcutaneous route.

Test drugs and standard drug were administered through oral route by using syringes.

Table No. 2: Group Allocation & Dose for study.

SL. No.	Group	Treatment	Dose
1	Standard control	Paracetamol	50mg/kg
2	Test control	Kiratatiktadi Arka	2.16ml/kg
3	Test control	Kiratatiktadi Kwatha	8.64ml/kg
4	Control	Water	1ml

Rats were housed in each cage of polypropylene with stainless steel top grill. The dry paddy husk was used as bedding material and was changed every morning.

1. Environment: The animals were exposed to 12hours light and 12hours dark cycle with relative humidity 50 to 70 % and the ambient temperature was 22±030 c.
2. Diet: Sai Durga brand rat pellet feed was provided throughout the study period. The drinking water was given and libitum in polypropylene bottles with stainless steel sipper tube.

EXPERIMENTAL DESIGN

Pyrexia was induced by subcutaneous injection of 15% yeast solution in normal Saline solution. The drug was administered after 18th hour of yeast administration. The rectal temperature was recorded by using digital tele-thermometer for consecutive 4 hours and 24 hours of drug administration. A 15% suspension of Brewer's yeast in 0.9% saline was prepared (Baker's Yeast purchased from New Diana Stores, K.M Marg, Udupi) and kept in incubator for 48 hours at 37˚C. Groups of 6 male or female Albino rats with a body weight of 150g - 250g were used.

By insertion of a thermocouple to a depth of 2cm into the rectum the initial rectal temperatures were recorded. The animals made pyretic by injection of 10 ml/kg of Brewer's yeast suspension subcutaneously in the back below the nape of the neck. The site of injection was massaged in order to spread the suspension beneath the skin. The room temperature is kept at 22–24 °C. Immediately after yeast administration, food was withdrawn. 18-hour post challenge, the rise in rectal temperature was recorded. Only animals with a body temperature of at least 37 to 380 C were taken into the test. The animals receive the test compound or the standard drug by oral administration. Rectal temperatures were recorded again 1, 2, 3, 4 and 24 hrs post dosing.

Evaluation

The differences between the actual values and the starting values are registered for each time interval. The maximum reduction in rectal temperature in comparison to the control group was calculated. The results were compared with the effect of standard group.

1) Observations after Induced Pyrexia

Initial normal body temperature of all the rats on an average was recorded. After the administration of Brewer's yeast all the animals were observed for their behaviour and changes. All the symptoms mentioned below confirmed that rats were suffering from fever.

- Temperature of all Albino rats increased.
- Trembling is noted after 1 hour of Brewer's yeast administration
- Fur erected
- Face of all animals bend down

II. Observations

After administering corresponding drug to each group hourly rectal temperature of each rat will be noted for 4 hours and after 24 hours and the data is reported in

Statistical Analysis

Average of all the data were compiled and SEM were calculated. All the data were compiled using one-way ANOVA followed by Dunnett's multiple comparison test.

P values ≤0.05 were considered as stastically significant.

RESULTS

- In test drug group gradual increase in temperature was noted from 1st hour to till 3rd hour and then gradual reduction in temperature was noted from 4th hour and 24 hr. In standard drug group gradual reduction in temperature was noted from 3rd hour and 24h
- Kiratatiktadi Kwatha and Kiratatiktadi Arka both produced very good antipyretic activity, the observed activity was almost like that in paracetamol treated group
- The Kiratatiktadi Kwatha and Kiratatiktadi Arka revealed marked anti-pyretic activity in yeast induced rats.5

Table No. 4: Effect of kiratatiktdi kwatha & Arka in pyrexia in wrister Albino rats.

Group	Animal no	Body temp in c					
		At 0hr	1hr post-treatment	2hr post treatment	3hr post treatment	4hr post treatment	24hr post treatment
Positive control	1	33.8	35.7	35.2	33.8	33.5	33.2
	2	33.6	36.4	34.1	34.6	33.7	33.6
	3	32.4	35.8	35.7	33.7	32.6	32.3
	4	32.8	36.9	34.6	33.8	33.5	32.9
	5	32.8	36.8	35.6	33.2	33.2	32.8
	6	33.6	35.7	36.4	33.9	33.2	33.5
Mean	**Mean**	**33.17**	**36.22**	**35.27**	**33.83**	**33.28**	**33.05**
SEM	**SEM**	**0.23**	**0.23**	**0.34**	**0.18**	**0.16**	**0.20**
K Arka	7	33.5	36.4	36.2	35.8	34.1	33.3
	8	32.6	36.7	36.5	36.3	34.5	32.2
	9	33.2	35.7	36.2	36	34.8	33.2
	10	32.5	35.8	36.8	36.2	34.8	34.6
	11	32.6	35.7	36.7	36.4	34.3	33.2
	12	33.8	36.7	36.2	36.1	35.6	33.7
Mean	**Mean**	**33.03**	**36.17**	**36.43**	**36.13**	**34.68**	**33.37**
SEM	**SEM**	**0.22**	**0.20**	**0.11**	**0.09**	**0.22**	**0.32**
K Kwata	13	33.6	35.4	36.2	36.1	35.2	33.8
	14	32.5	36.7	36.8	36.5	33.6	33.1
	15	33.7	35.3	36.2	35.8	34.2	33.2
	16	33.5	35.8	36.3	36.2	35.7	34.9
	17	32.4	36.7	36.9	36.2	35.7	34.2
	18	33.2	36.8	37.2	37.1	36.5	33.2
Mean	**Mean**	**33.15**	**36.12**	**36.60**	**36.32**	**35.15**	**33.73**
SEM	**SEM**	**0.23**	**0.28**	**0.17**	**0.18**	**0.44**	**0.29**
Disease control	19	33.2	36.7	36.5	36.8	38.6	34.6
	20	32.6	36.8	36.8	36.8	37.8	33.1
	21	33.8	36.4	36.7	36.9	38.2	32.7
	22	32.8	35.6	36.2	36.7	38.6	33.4
	23	33.4	35.4	36.2	36.5	37.9	33.1
	24	33.1	35.7	36.4	36.8	38.1	31.9
Mean	**Mean**	**33.15**	**36.10**	**36.47**	**36.75**	**38.20**	**33.13**
SEM	**SEM**	**0.17**	**0.25**	**0.10**	**0.06**	**0.14**	**0.36**

DISCUSSION

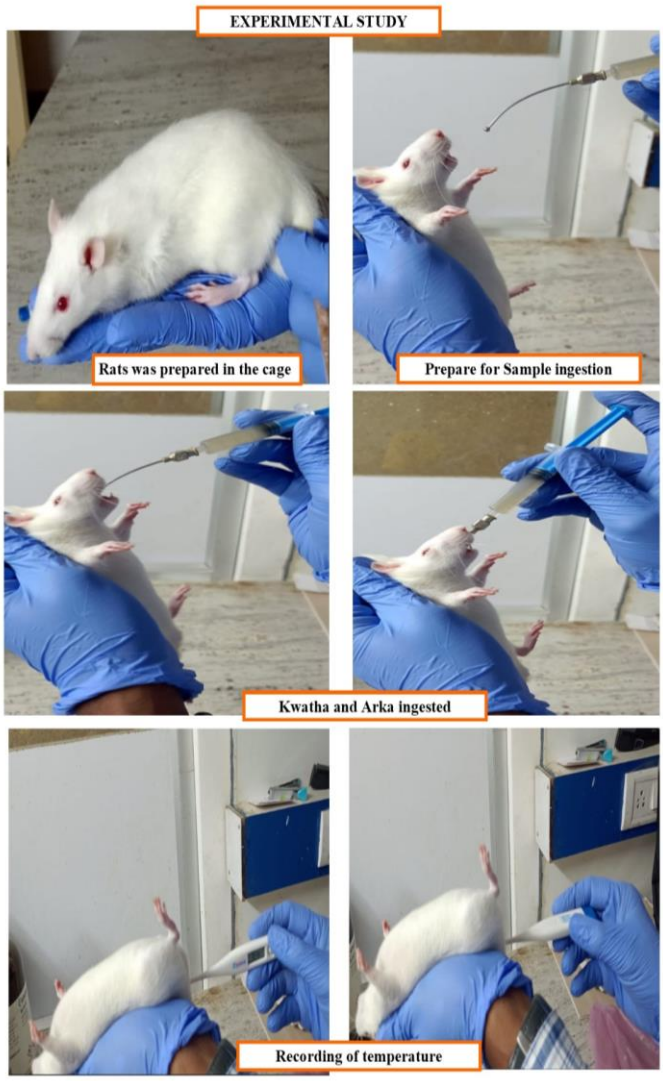
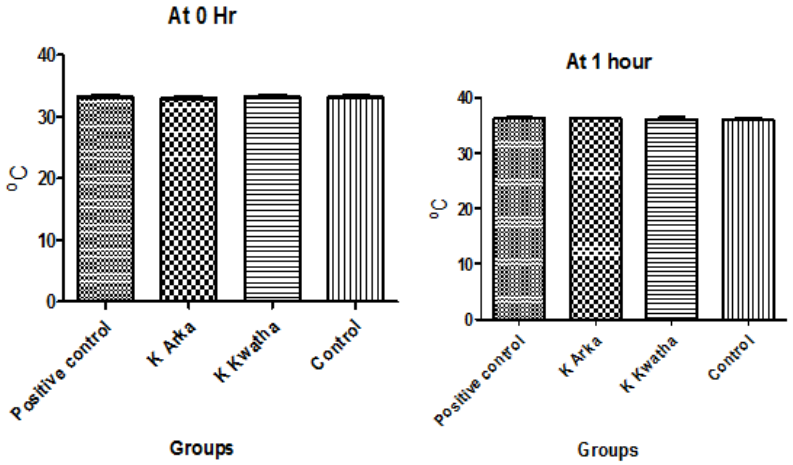


Fig. 1: kiratatiktdi kwatha & Arka administration in wrister Albino rats.



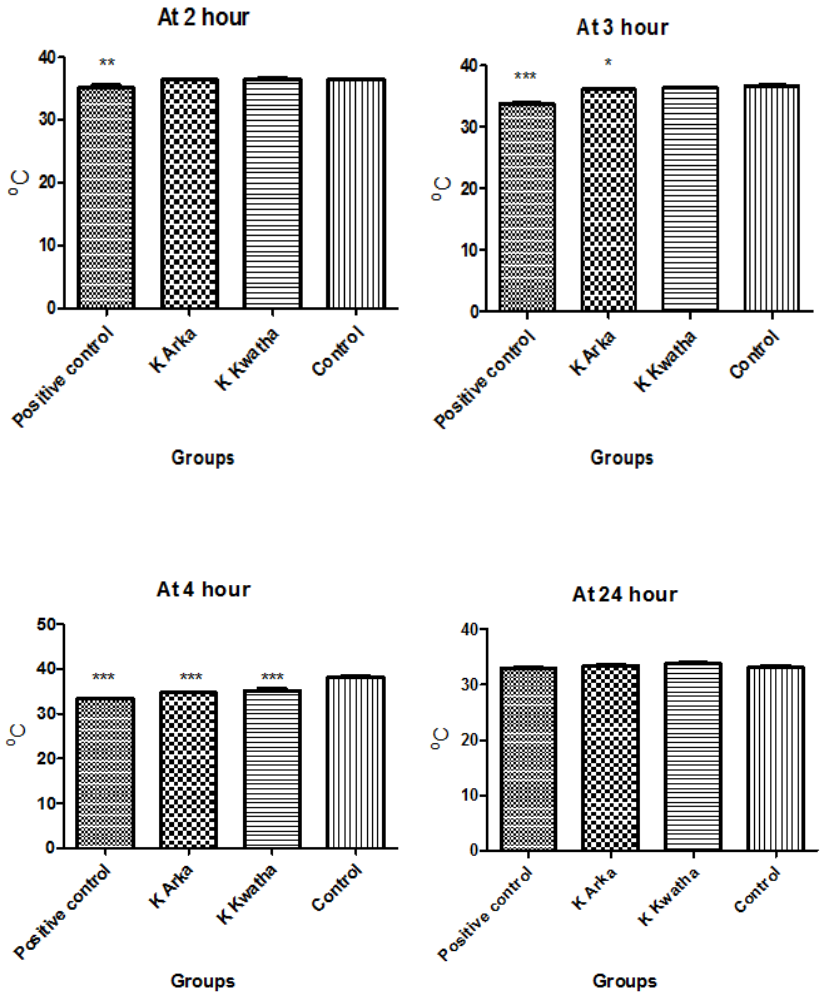


Fig. 2: Effect of kiratatiktdi kwatha & Arka in pyrexia in wrister Albino rats.

Antipyretic activity was carried out in rats by yeast induced hyperpyrexia method. In test drug group gradual increase in temperature was noted from 1st hour to till 3rd hour and then gradual reduction in temperature was noted from 4th hour and 24hr. In standard drug group gradual reduction in temperature was noted from 3rd hour and 24h. Kiratatiktadi Kwatha and Kiratatiktadi Arka both produced very good antipyretic activity, the observed activity was almost like that in paracetamol treated group. The Kiratatiktadi Kwatha and Kiratatiktadi Arka revealed marked anti-pyretic activity in yeast-induced rats. In general, nonsteroidal anti-inflammatory drugs produce their antipyretic action through inhibition of prostaglandin synthesis within the hypothalamus. The antipyretic effect of the test drug may be due to presence of flavonoid compounds, as some flavonoids are predominant inhibitors of cyclooxygenase or lipoxygenase.

Paracetamol > Kiratatiktadi Kwatha and Kiratatiktadi Arka.

CONCLUSION

The Antipyretic activity of Kiratatiktadi Kwatha and Kiratatiktadi Arka was studied in Albino Wistar rat by administering the test substance orally. Significant antipyretic activity was observed in test drug and standard drug. In test drug antipyretic activity was observed and sustained from 4th hour to 24th hour, while in standard it was from 3rd hour to 24th hour. Kiratatiktadi Kwatha and Kiratatiktadi Arka has shown significant and sustained antipyretic activity. So, considering all the factors physicochemical parameters of Kwatha & Arka, which shows the Kwatha and Arka possesses similar qualities, and both can be used vice versa.

ACKNOWLEDGEMENT

Author is thankful to the department of Rasashastra and Bhaishajya Kalpana, RAMC, Bengaluru, for their support and valuable suggestions.

REFERENCE

1. Vaidya Yadavji Trikamji. Charaka samhita. Varanasi: Chaoukambha orientalia, 2009. chi. 3. p.398.
2. Sharma P.V, Cakradatta. English translation, 1st ed. Chaukahambha orientalia, 1994; 10.
3. Vaidya Yadavji Trikamji. Charaka samhita. Varanasi: Chaukhambha orientalia; 2009. Su. 4. p.32.
4. Angadi R. A Text Book of Bhaishajya Kalpana Vijnana. 1st ed. Varanasi: Chaukhamba Surbharati Prakashan, 2009; 61.
5. CCRAS. The Ayurvedic Formulary of India. 2nd ed. New Delhi: Govt. of India, Ministry of Health and Family Welfare, 2003; 27.
6. Sharma P.V, Cakradatta. English translation, 1st ed. Chaukahambha orientalia, 1994; 10.
7. Angadi R. A Text Book of Bhaishajya Kalpana Vijnana. 1st ed. Varanasi: Chaukhamba Surbharati Prakashan, 2009; 119.
8. PathakRamrakshak. Ayurveda Sarasamgraha. Allahabad: ShriBaidyanatha, Ayurveda Bhavan Ltd, 2002; 15.