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PHARMACEUTICAL STUDY OF *ARDRAKA PAKA* – A HERBAL COMPOUND FORMULATION

N.NAYANA*[1], M.S. KRISHNAMURTHY[2], BANGERA TARIIKA S.[3]

ABSTRACT

Background: *Ardraka* (wet ginger) a well-known spice used as a condiment and medicine. *Ardraka Paka* (ADP) *is a* classical *Gudapaka* preparation with main ingredient as *Ardraka* and jaggery as the sweetening agent. The formulation mentioned *in Yogachintamani*, *Bharatha Bhaishajya Rathnakara and Ayurveda Sarasangraha.* It is indicated in *Shwasa, Kasa, Smritibhramsha, Swarabhanga, Arochaka, Hridroga, Grahani, Gulma*, *Shoola* and *Shopha*. **Aim:** To prepare *Ardraka Paka* as per classical guidelines **Materials and methods:** *Ardraka Paka* was prepared as per the classical reference *Bharatha Bhaishajya Rathnakara*, under hygienic condition. **Result:** Final yield of the preparation was 517g. Average loss of 28.51% was found. Temperature 90-110^{0}C was maintained throughout preparation. Preparation procedure took total duration of 2.45 hours under hygienic conditions with necessary precautions.

Key words: *Ardraka Paka, Guda Kalpana*, Pharmaceutical study, *Ardraka yoga*

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*[1,3]PhD Scholar, [2]Professor and HOD Dept. of Rasashastra and Bhaishajya Kalpana, Alvas Ayurveda Medical College and Hospital, Moodbidri, Karnataka, India.

Corresponding Email id: nayanapai79@gmail.com Access this article online: www.jahm.co.in

INTRODUCTION:

The semisolid preparations with *Guda* (*jaggery)* as main ingredient or sweetening agent are brought under the category of *Gudapaka Kalpana* (confectionaries with jaggery as base). *Guda Paka* preparations are one among the popular dosage forms having the advantages like palatability, high nutritional value and easy administration.

Ardraka Paka (ADP) is a classical *Guda Paka Yoga* mentioned in *Yogachintamani*[1], *Bharatha Bhaishajya Rathnakara*[2] *and Ayurveda Sara Samgraha*[3]*.* This formulation having *Ardraka* as main ingredient with jaggery as the sweetening agent and 13 minor ingredients like *Trikatu*, *Chaturjataka*, *Jeeraka dwaya*, *Pippali moola*, *Vidanga* etc. Cow's Ghee is used as a base for frying wet ginger. Formulation is indicated in *Shwasa* (dysponea), *Kasa*(cough)*, Smritibhramsha* (loss of memory), *Swarabhanga* (dysphonia)*, Arochaka* (anorexia), *Hridroga* (cardiac diseases), *Grahani* (irritable bowel syndrome*), Gulma*(tumor) *Shoola* (coliky pain) and *Shopha*(inflammation).

Pharmaceutical study of *Ardraka Paka*

OBJECTIVES OF STUDY:

To prepare *Ardraka Paka* as per classical reference

To setup SOP for *Ardraka Paka*

MATERIALS AND METHODS:

The main ingredient wet ginger procured from the cultivated local source from Moodbidri. *Purana Guda* (one year old Jaggery) was purchased from the local market, Moodbidri.

The *Prakshepa Dravya* (condiments) were collected from Alva Pharmacy, Mijar, Karnataka.

All the herbal ingredients were authenticated at *Dravyaguna* PG.Departmental Laboratory, Alva's Ayurveda Medical College, Moodbidri, Karnataka.

Preparation of *Ardraka Paka*:

Reference: *Yogachintamani, Bharatha Bhaishajya Rathnakara (Prathama Bhaga, Aakaaradi Avaleha Prakarana)* and *Ayurveda Sarasangraha.* The formulation was prepared in three batches by keeping each ingredient constant in all batches.

Formulation composition of *Ardraka Paka* is summarized at Table No. 1

The actual quantity of ingredients was not specified in the classical reference. As per pilot study findings, the proportions of ingredients were decided.

Three batches of *Ardraka Paka* were prepared in the PG Departmental laboratory of *Rasa Shastra* and *Bhaishajya Kalpana* by following the classical guidelines. General standard operative procedures were adopted in all batches.

Table No. 1: Formulation Composition of *Ardraka Paka*

Ingredients	**Botanical name**	**Part used**	**Qty. taken(g) Batch I, II, III**
Ardraka (wet ginger)	*Zingiber officinale* Rosc.	Rhizome	500
Jaggery	-	-	500
Ghee	-	-	50ml
***PRAKSHEPA DRAVYA* -13**			
Shunti	*Zingiber officinale* Rosc.	Rhizome	1.5
Ajaji	*Cuminum cyminum* Linn.	Fruit	1.5
Maricha	*Piper nigrum* Linn.	Fruit	1.5
Nagakesara	*Mesua ferrea* Linn.	Stamen	1.5
Javitri	*Myristica fragrans* Houtt.	Aril	1.5
Ela	*Elettaria cardamomum* Maton.	Seed	1.5
Twak	*Cinnamomum zeylanicum* Blume.	Bark	1.5
Patra	*Cinnamomum zeylanicum* Blume.	Leaf	1.5
Pippali	*Piper longum* Linn.	Fruit	1.5
Dhanyaka	*Coriandrum sativm* Linn.	Fruit	1.5
Krishna jeeraka	*Carum carvi* Linn.	Fruit	1.5
Pippali moola	*Piper longum* Linn.	Root	1.5
Vidanga	*Embelia ribes.* Burm. F	Fruit	1.5

Equipment specifications:

1. **Copper bottom Stainless steel vessel**

   Size:

   Depth: 9 cm

   Diameter: 10 inches

   Capacity: 3 litres
2. **Stainless steel ladle:** Length: 10.5 inch
3. **Cotton cloth:** Length: 30 x 30 inches
4. **Measuring jar of Capacity** – 1litr.
5. **Heating device:** LPG with gas burner (14.5 Kg capacity)

Pharmaceutical preparation of *Ardraka Paka*:

Three batches of *Ardraka Paka* were prepared in the PG Departmental laboratory of *Rasa Shastra* and *Bhaishajya Kalpana.* Details of the preparation are as under:

Ardraka Paka	**Batch I**	**Batch II**	**Batch III**
Date of Commencement	11.01.2021	13.01.2021	15.01.2021
Date of Completion	12.01.2021	13.01.2021	15.01.2021

Pharmaceutical procedure was carried out stepwise as below:

1. **Preparation of *Prakshepa Choorna*:**

Total no. of *Prakshepa* drugs -13. All the *Prakhepa* drugs required for three batches were taken separately cleaned and powdered in mixer and passed through sieve number 85 to obtain fine powder. The fine powders of *Prakshepa* drugs were kept ready on first day of commencement of practicals.

2. Process of *Ardraka Bharjana*:

Fresh wet ginger weighing 500g was taken and washed with clean water. Outer skin was peeled and pieces were made approximately measuring 0.5cm. Ginger pieces were taken in a copper bottom stainless steel vessel and subjected to mild heat, temperature maintained between 90-95^{0}C over LPG stove. While frying required quantity of ghee was added as per the need. Frying was done till ghee started to separate from ginger pieces. After finishing the frying process, the *Bharjitha Ardraka* (fried ginger) was allowed to cool, later weighed and kept separately. Average weight of *Bharjitha Ardraka* was 203g and average time taken for frying was 48 min.

The details of *Ardraka Bharjana* process depicted in Table No. 2

Table No. 2: Details of *Ardraka Bharjana* Process:

Particulars	**Batch I**	**Batch II**	**Batch III**	**Average**
Quantity of *Ardraka* (g)	500	500	500	500
Weight after peeling of skin(g)	430	435	440	435
Weight after cutting into pieces(g)	425	430	432	429
Quantity of ghee added(ml)	25	30	30	28
Temperature maintained (^{0}C)	90-95	90-95	90-95	90-95
Total time taken for *Bharjana*(min)	45	50	50	48
Weight after *Bharjana*(g)	200	200	210	203
Organoleptic characteristics of *Bharjitha Ardraka*				
Appearance	Shrunken fibrous appearance			-
Colour	Brownish			-
Smell	Pleasant Characteristic			-
Taste	*Katu* (pungent)			-

Figure 1: *Ardraka Bharjana*

3. Preparation of *Ardraka Paka*:

Specified quantity of jaggery was taken in a copper bottom S.S vessel and required amount of water (40ml) added to liquify it. The contents were subjected to mild heat over LPG stove till jaggery got dissolved completely. The mixture was filtered through a double folded clean cotton cloth to remove physical impurities if any. The filtered jaggery solution was then transferred to another stainless steel vessel. Moderate heat was applied. After attaining *Tantumatvam* (thread consistency) and *Darvi pralepa lakshana* (sticking to ladle) the fried ginger pieces were added to jaggery solution and heated over moderate flame maintaining the temperature between 90-110^{0}C. Stirring was continued till the mixture attains 2-3 thread consistency. After attainment of *Paka Kalina Guda Paka Siddhi Lakshana* (features of attainment of proper consistency stage) like *Apsumajjana* (sinking in water), *Patitastu na Sheeryate* (remain stable), heating was stopped. Then specified quantity of *Prakshepa Choorna* were added when the temperature was 80^{0}C and mixed thoroughly to make a homogenous blend. After complete cooling product was weighed and stored in air tight containers. Total time duration took 2 h 45 min for the preparation and yield of the preparation was 517 g. Average loss of 28.51% was found. All the three batches of *Ardraka Paka* were dominated with *Katu Pradhana Madhura Rasa.*

The batchwise *Ardraka Paka* preparation details are depicted in table No. 3

Table No. 3: Details of *Ardraka Paka* preparations:

Parameters	Batch I	Batch II	Batch III	Average
Qty. of Jaggery(g)	500	500	500	500
Qty. of *Bharjitha Ardraka*(g)	200	200	210	203
Qty of *Prakshepa Choorna* (g)	19.5	19.5	19.5	19.5
***Asana Paka* temp(^{0}C)**	105	105	105	105
***Siddi lakshana* temp(^{0}C)**	110	110	110	110
Temp. at which *Prakshepa* added(^{0}C)	80	80	80	80
Time taken for the preparation	2 h 50 min	2h 40min	2h 45min	2 h 45 min
Total yield (g)	517	515	518	517
Percentage of Loss (%)	28.14	28.42	28.99	28.51

Figure 2: Jaggery Syrup consistency

Figure 3: Addition of Ardraka

Figure 4: Addition of Prakshepa Choorna

Figure 5: Ardraka Paka

Precautions during the procedures:

Continuous stirring is necessary throughout the preparation to avoid charring of the contents.

Mild heat should be maintained during the procedure to get quality product.

Consistency of *Prakshepa Choorna* should be very fine (#85) for the proper blending of the formulation.

Addition of *Prakshepa Choorna* should be little by little and vigorous stirring is required to get homogenous mixture.

Observations made during the preparation:

1.Process of *Ardraka Bharjana*:

Light green coloured wet ginger turned to brown colour after frying.15% loss was found in wet ginger after cleaning, peeling of outer skin and cutting process. Throughout the frying process the temp. maintained between 90-95^{0}C.Continuous stirring was needed to avoid charring during frying. During last stage of frying the wet ginger pieces became light facilitating easy movement of spatula. The completion of frying process was assessed by oozing of ghee from the surface of ginger pieces. Green fleshy ginger pieces turned to brownish, fibrous shrunken with ghee smell. Total time taken for frying was 45 minutes.

Total quantity of ginger obtained after frying was 200g. with 60% loss.

2. Preparation of *Ardraka Paka*:

After dissolving the jaggery the colour of the solution was golden brown. Effervescence was observed in the liquid and it was subsided after continuous stirring. After mixing the fried ginger pieces to jaggery syrup the colour changed to dark brown. The syrupy consistency turned to semi solid form. Pleasant ghee mixed ginger smell was prominent after the mixing. Continuous stirring was required throughout the preparation to avoid the charring of the contents. After cooling the semi solid consistency changed to little hard consistency with small pieces of ginger blended in the product. The colour of the final product was brownish.

The various findings observed during the pharmaceutical preparation of *Ardraka Paka* is depicted in the Table No. 4 and comparative organoleptic characteristic of *Ardraka Paka* batches depicted in Table No. 5

Table No.4: Observations during preparation of *Ardraka Paka*

Parameters	**Batch I**	**Batch II**	**Batch III**
Qty of Jaggery taken(g)	500	500	500
Initial temperature (^{0}C)	40	40	40
Water added for melting of jaggery	40ml	40ml	40ml
Time taken for melting of Jaggery	8 min	10min	10min
Colour of jaggery solution	Golden brown	Golden brown	Golden brown
Boiling of jaggery Solution (Temp ^{0}C) and Colour	99 Golden brown	100 Golden brown	100 Golden brown
Single thread formation (Temp^{0}C)	110	108	110
Colour change after addition of *Bharjitha Ardraka*	Brown	Brown	Brown
2-3 thread consistency (Temp ^{0}C)	110	112	110
Apsumajjana ((Temp ^{0}C)	112	112	112
Temp.at which *Prakshepa* added(^{0}C)	80	80	80
Colour after addition of *Prakshepa*	Dark brown	Dark brown	Dark brown

Table No. 5 Comparative Organoleptic Characteristics of *Ardraka Paka*

Particulars	**Batch I**	**Batch II**	**Batch III**
Consistency	Semisolid blended with *Ardraka* Pieces	Semisolid blended with *Ardraka* Pieces	Semisolid blended with *Ardraka* Pieces
Colour	Dark brown	Dark brown	Dark brown

Taste	*Katu, Madhura*	*Katu, Madhura*	*Katu, Madhura*
Odour	Characteristic	Characteristic	Characteristic

DISCUSSION:

The classical reference of *Ardraka Paka* mentioned in *Yogachintamani, Bharatha Bhaishajya Rathnakara and Ayurveda Sarasangraha.*

The pharmaceutical procedure mentioned in classical texts are same. Original reference from *Yogachintamani* and *Bharatha Bhaishajya Rathnakara* text mentioned only about the equal proportion of wet ginger and jaggery. Specific quantity of ginger and jaggery not mentioned and proportion of *Prakshepa dravya* also not specified. However, when pilot study preparation carried out by adopting the approximate quantity of ingredients as per text *Ayurveda Sarasangraha,* the product found to be very spicy and interfering with the palatability of the medicine. Hence the proportion of the *Prakshepa choorna* was reduced.

In frying process, the media used for frying was *Naveena Gogritha*(Cow's ghee stored less than one year duration) The lipophilic action of the ghee helps to facilitates transportation to a target organ and final delivery inside the cells. Cow's ghee is the oil that can bond with lipid soluble nutrients and herbs to penetrate the lipid-based cell walls of the body. Thus, it increases the potency of the herbs by carrying the active components to the interior of the cells. It is also used as a carrier of the nutrients to be absorbed across the cell membranes.[4]

During the frying process of wet ginger continuous stirring was required so as to avoid the sticking of ginger pieces to bottom of the vessel. In the initial stage the fumes with hissing sound was observed which is due to evaporation of the water content from the wet ginger. After 25 minutes of frying profuse fumes with prominent ginger smell was observed and there was change in the colour ie. the light green colour started to fade away. The assessment of completion of frying process done by observing the features like oozing of the ghee from the surface of the ginger pieces, easy movement of spatula while stirring and lightness and reduction in the bulkiness of ginger pieces due to evaporation of the water content. The colour of wet ginger changed from light green to brownish due to frying. The taste of wet ginger before frying was *Katu* (pungent) after frying, the taste even though was *Katu* the spiciness was reduced. The odour of *ginger* before frying was characteristic ginger smell after frying pleasant characteristic ghee smell was observed. Fleshy fresh appearance of ginger after frying, turned to fibrous and hard due to frying. Total loss of

60% was there in the final yield of fried ginger. Out of 60% loss, 15% loss was found after cleaning, peeling of outer skin and cutting process, rest of the loss was due to the evaporation of the water content present in wet ginger.

During the preparation of jaggery syrup, the colour of the jaggery solution was golden yellow and after 1 hour of boiling effervescence was observed in the jaggery solution due to boiling of the solution. As boiling was continued gradually colour turned to brownish.

After 1 h 20 min *Darvi Pralepa* (sticking to ladle) and *Tantumatvam* (one thread consistency) was observed. *Darvi Pralepa* and one thread consistency of syrup will be observed first during *Asanna Pakakala* (nearing to proper consistency stage) and it's the guiding parameter to add the fried ginger pieces to the jaggery for proper blending of the mixture.

The *Paka Kalina Siddhi lakshana* (features of attainment of proper consistency stage) such as *Apsumajjana* (sinking in water) and *Patitastu nashiryate* (non spreading) and two thread consistency were observed during final stage of *Paka*. *Apsumajjana* and *Patitastunashiryate* are the parameters which guides about the consistency of final product. Characteristic sweet odour of jaggery was observed during *Pakakala.*

The two-thread consistency of preparation indicates the percentage of sugar around 70% and less moisture content which is most important criteria for shelf life. when two-three thread consistency was observed, heating was stopped and vessel was removed from the fire and *Prakshepa Choorna* were added slowly with continuous stirring when the temperature was 80^0C so as facilitate to get the homogenous blend. Once the whole contents cooled down the mixing process will become difficult as the consistency of *Guda Paka* preparations tend to become harder after cooling.

Total time duration took 2 h 45 min for the preparation and yield of the preparation was 517 g Average loss of 28.51% was found. The reason for the loss was due to reduced quantity of ginger after frying 60% weight of ginger was lost after frying. Some percentage of loss was due to sticking of the formulation to the vessel while storing in air tight containers.

CONCLUSION:

Guda Paka formulations having the wide range of acceptability due to its palatability, fixed dose and longer shelf life. In the present study, the final yield of *Ardraka Paka* was 517g and total time taken 2.45 hours under maintained temperature 90-110^0C. Constant monitoring, precautions and hygienic practices are required to get quality product with stability.

REFERENCES:

1. Keerti Shree Harsha(editor). Yogachintamani with Mathurimanjusha commentary, by Dattaram Chaubhe, Chapter 1, Mumbai; Khemaraja Shrikrishnadas Bombay Publication; 2003, P.No.43.
2. Bhattacharya Nivarana Chandra(editor). Gupta Gopinath Pandit, Bharatha Bhaishajya Rathnakara, Prathama Bhaga, with Bhava Prakashika commentary, Reprint ed. New Delhi;B. Jain publishers Pvt. Ltd; 2012, P. No- 140.
3. Anonymous. Ayurveda Sara Sangraha, 21st ed. Nagpur; Shree Baidyanath Ayurved Bhawan Pvt. Ltd.; 2009, P.No - 531.
4. Ankita et al. American Journal of Drug Delivery and Therapeutics 2014,1:1, 028-034. http://www.pubicon.com

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