

EXPERIMENTAL EVALUATION OF GUDUCHI-SATWA, GHRITA AND KASHAYA WITH SPECIAL REFERENCE TO HYPERACIDITY

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ABSTRACT

In the present modern era, due to fast and hectic life style, mental stress and incompatible food habits, everyone is prone to various diseases; Amlapitta is one amongst them due to the vitiation of pitta dosha. Sour belching and heart burn is the most common and earliest symptom found in this disease. Three formulations of Guduchi i.e. Satwa, Ghrita and Kashaya were selected and their efficacy over hyperacidity was evaluated through experimental model. In the present study, Pylorus ligated (Shay) rat model method was followed. The statistical results show high significance in Guduchi Kashaya and Ghrita, while mild significance in Guduchi Satwa against hyperacidity. Amongst the three trial groups, Guduchi Kashaya provided highly significant relief, Ghrita moderate, while Satwa provided mildly significant relief.

KEY WORDS: Amlapitta, Guduchi, Satwa, Ghrita, Kashaya, Hyperacidity.**INTRODUCTION**

Ayurveda, the Upaveda of Atharveda, has emphasized on the principle of protecting the health in a healthy individual and eradicating disease in the diseased. The present generation is in the midst of a global paradigm shift in health care. Tikta rasa pradhana dravya has been advised to be given for Amlapitta in Bhaishajya Ratnavali 'Amlapittadikara'¹. In view of this, Guduchi, being a Tikta rasa pradhana dravya, which is easily available, was chosen for the experimental study in three various formulations i.e. Satwa, Ghrita and Kashaya. The need for less dose and high efficacy gave rise for the invention of Satwa kalpana. Satwa can be extracted from the plants, which contains high concentration of starch. Sneha kalpana, an upakalpana of both Kashaya kalpana and Kalka kalpana, is the process where the active principles of the drug are absorbed into the Sneha (Ghee or Oil) after the process.

Kwatha or Kashaya is the decoction obtained after crushing and boiling the drug in specified amount of water and reducing it to 1/4th. By this process, the active principles present in the drug are transferred into the water².

Aims and Objectives of the study

- To evaluate the efficacy of Guduchi in three different forms of preparations i.e. Satwa, Ghrita and Kashaya in hyperacidity.
- To determine the most effective form of preparation amongst the three.

MATERIALS AND METHODS**Pharmaceutical Study**

Guduchi (*Tinospora cordifolia* Willd), the raw drug needed for the preparation of Guduchi Satwa, Ghrita and Kashaya, was collected from local surroundings of Moodabidri, Karnataka and the drug was certified by Botanist before the preparation of the medicine. The study was carried as per the textual reference³.

Practical name - Guduchi Satwa**Ingredients**

- Guduchi - 8 kgs
- Water - 32 ltrs.

Procedure

- 8 kgs of fresh and healthy Guduchi was collected to prepare the Satwa. It was washed thoroughly and outer brownish white colored peel was removed.
- Guduchi was cut into small pieces and then slightly pounded in the pounding machine.

- The crushed drug was taken in a clean vessel and 4 times of water (i.e.32 ltrs) was added to it. This mixture was kept undisturbed for 24 hours.
- On the next day, Guduchi, which was kept in water, was rubbed well with hand till foam appeared on water and became slimy. The water appeared brownish colored.
- Water was transferred to another vessel after filtering through a clean cloth.
- The filtrate was kept undisturbed in the vessel for 24 hours.
- On the next day, the water was slowly decanted from the vessel without disturbing the bottom layer.
- After the water was decanted, greenish white colored Satwa was seen.
- The Satwa was collected and again half-liter water was added (to remove the greenish tinge of Satwa) and kept undisturbed for another 2 hours.
- The water was decanted; Satwa was collected and dried under sunlight for 2 days.
- White colored Satwa was stored in airtight container.

Result

- Color - White
- Taste - Bitter
- Consistency - Powder
- Initial weight of Guduchi- 8kg
- Satwa obtained -100grams.
- Total yield -1.25%

Practical name - Ghrita Moorchna**Ingredients**

The following ingredients were used in the process of Ghrita moorchna⁴.

- Ghrita - 1100gms
- Haridra (*Curcuma longa* Linn.) - 70gms
- Musta (*Cyperus rotundus* Linn.) - 70gms
- Haritaki (*Terminalia chebula* Retz.) - 70gms
- Vibitaki (*Terminalia belerica* Roxb.) - 70gms
- Amlaki (*Emblica officinalis* Gaertn.) - 70gms
- Matulunga (*Citrus medica* Linn.) rasa - 70ml
- Water - 4.4 liters

Procedure

- Ghrita was taken in a vessel and heated over mild fire.

- Coarse powder of Haridra was added to the Ghrita along with 1.1litr of water.
- This mixture was heated over mandagni, till the water content is lost.
- Matulunga rasa along with 1.1 litre of water was added and heated till water content was lost.
- Later coarse powder of Musta and Triphala were added along with 2.2litrs of water to the ghrita and heated over mandagni till 'Samyak Ghrita paka' lakshanas were observed.
- This ghrita was filtered using a cloth and stored in a container after cooling.

Result

- Color -Yellow
- Odor - Sugandha
- Total Moorchita Ghrita obtained - 950grams
- Loss -150grams (14% loss)

Practical name –Guduchi Ghrita

Ingredients

- Moorchirita Ghrita -950gms
- Guduchi Kalka - 240gms
- Water -3800ml

Procedure

- Fresh Guduchi was collected and the peel was removed.
- Guduchi Kalka was prepared in khalwa yantra.
- Moorchita ghrita was taken in a vessel and slightly heated.
- Guduchi Kalka and water were added to the ghrita.
- This mixture was heated over mandagni for 2hrs.
- On the next day the Sneha paka was continued over mandagni.
- Continuous stirring of the mixture with a spatula is needed in order to prevent the carbonization of the Kalka dravyas (by sticking to the bottom of the vessel)
- Heating was stopped after 'Samyak Ghrita paka' lakshanas were observed.
- The Ghrita was filtered using a clean cloth and stored in a sterile airtight container after cooling.

Result

- Color - Yellow
- Odor - Sugandha
- Taste -Tikta rasa
- Total Guduchi Ghrita obtained - 900gms
- Loss - 50gms (5.5% loss)

Practical name - Guduchi Kashaya

Ingredients

- Guduchi - 500 gms
- Water - 2 ltrs.

Procedure

- Fresh Guduchi was collected.
- The Guduchi was cut into small pieces and then crushed in khalwa yantra.
- Guduchi was taken in a vessel and 4 parts of water was added to it.
- The mixture was heated over madyamagni with intermittent stirring in the later stage to prevent sticking of the drug to the bottom of vessel.
- The water content was reduced to 1/4th i.e.500ml.
- The Kashaya was filtered using a clean cloth.

Result

- Color – Black
- Odor – Sugandha
- Taste – Tikta rasa
- Guduchi Kashaya obtained -500ml.

Experimental Study

In the present study, Pylorus ligated (Shay) rat model method was followed⁵.

Selection of rats

- Albino rats of either sex, weighing in between 150-250gms were selected randomly. Rats less or more than the described weight, pregnant and diseased rats were excluded from the study.
- The selected rats were grouped into four, with six rats in each group.
- The rats were kept under standard laboratory conditions and fed with standard food and water.
- Gastric juice was collected from the stomach and analyzed for volume, pH value, free acidity and total acidity.
- Ulcer score was calculated.

Dose fixation

The dose fixation of drug for rats is calculated as:

Rat dose= Human dose x 0.018 x 5/kg body wt.

Hence dose of

Satwa = 18mg

Ghrita = 0.865ml

Kashaya = 1.73ml

Investigation methods

- 1) **Volume:** The gastric juice was collected in a graduated test tube to measure the total volume.
- 2) **pH:** The pH was calculated using the pH meter.
- 3) **Free and total acidity:** These were estimated as described by Varley (1962).
- 4) **Ulcer score:** The incidence and grading of ulcer were done according to the method described by Lawrence and Bacharach⁹⁷. Stomach was cut opened along with the greater curvature. The mucous was washed under slow running tap water. Ulcers were examined under a magnifying lens.

RESULTS

The animal experiment produced the following results, which is presented statistically in table no. 2-4 below. As the animals were sacrificed during the experiment, the control group served as before treatment (BT) reading, while the trial groups are presented as the after treatment (AT) reading⁶.

Paired 't' test formula was used to calculate the readings⁷.

The trial drug Guduchi Satwa provided insignificant result (P>0.1) in gastric juice volume, insignificant result (P<0.1) in total acidity and ulcer score. It provided mild result (P<0.050) in free acidity and moderate result (P<0.010) in reducing the pH of gastric juice.

The trial drug Guduchi Ghrita provided highly significant result (P<0.001) in the reduction of gastric juice volume, free acidity and total acidity. It provided moderately significant result in reduction of gastric pH and ulcer score. (P<0.01)

The trial drug Guduchi Kashaya provided highly significant result (P<0.001) in all the parameters, except ulcer score, where moderate significance with a 'P' value of <0.01 was observed. In order to find the most effective trial drug amongst the three groups, 't' test is used statistically. The results for different parameters are shown below in table no.5:

By evaluating the tables below, it can be concluded that trial drug 3 i.e. Guduchi Kashaya provided highly significant result (P<0.001) over other two trial drugs in reducing the gastric juice volume. It provided moderate result (P<0.050) over Guduchi Ghrita in reducing the gastric pH and mild result (P<0.020) over Guduchi Ghrita in reducing the total acidity. Trial drug 2 i.e. Guduchi Ghrita provided moderately significant result (P<0.050) over Guduchi Satwa in reducing the gastric juice. The results for other parameters are not significant for Guduchi Ghrita over Guduchi Satwa (P>0.01).

DISCUSSION

The present experimental study was done on albino rats against hyperacidity (Shay et.al.1945 model). In Ayurvedic classics 'Tikta rasa' pradhana dravyas are repeatedly stressed in the management of this condition. Guduchi being a tikta rasa pradhana dravya, having madhura vipaka was taken up for the study in its three formulations i.e. Satwa, Ghrita and Kashaya.

In the experimental study, 24 healthy albino rats of either sex were selected and grouped into 4. Shay et. al. method 1945 was followed to induce hyperacidity. 5 parameters i.e. Total volume, pH, Free acidity, Total acidity of gastric juice and ulcer score were calculated to find out the most effective formulation of Guduchi. The results were analyzed statistically using paired 't' test and inter group comparison was done using 't' test.

As per table no.25, the results concluded that trial drug 3 i.e. Guduchi Kashaya provided highly significant result ($P<0.001$) over other two trial drugs in reducing the gastric juice volume. It provided moderate result ($P<0.020$) over Guduchi Ghrita in reducing the total acidity.

Trial drug 2 i.e. Guduchi Ghrita provided moderately significant result ($P<0.050$) over Guduchi Satwa in reducing the gastric juice. The results for other parameters are not significant over Guduchi Satwa ($P>0.10$).

CONCLUSION

Guduchi, in its three formulations showed good results against hyperacidity. The parameters followed to calculate the efficacy were- Volume, pH, Free acidity, Total acidity of gastric and ulcer score.

In the intergroup comparison, Guduchi Kashaya provided highly significant result ($P<0.001$) over other two trial groups, in reducing the gastric juice volume.

It provided moderate result ($P<0.050$) over Guduchi Ghrita in reducing the gastric pH and mild result ($P<0.020$) over Guduchi Satwa in reducing the total acidity.

Guduchi Ghrita provided moderately significant result ($P<0.050$) over Guduchi Satwa in reducing the gastric juice.

In the present study, Guduchi Kashaya is the most effective drug against hyperacidity, followed by Guduchi Ghrita and Guduchi Satwa.

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Table No.01-Various trial groups

Group I	Control
Group II	Trial drug- Guduchi Satwa
Group III	Trial drug- Guduchi Ghrita
Group IV	Trial drug- Guduchi Kashaya

Table No.02-Group 1 - Guduchi Satwa.

Sl.No	Parameter	Mean X (in ml)	SD	SE	't' value	'P' value
1.	Volume	0.4166	0.584	0.238	1.745	>0.1
2.	pH	1	0.5477	0.2235	4.474	<0.01
3.	Free acidity	2.666	2.338	0.954	2.79	<0.05
4.	Total acidity	2.50	2.50	1.024	2.439	<0.1
5.	Ulcer score	0.833	0.983	0.401	2.075	<0.1

Table No.03- Group 2 - Guduchi Ghrita

Sl.No	Parameter	Mean X (in ml)	SD	SE	't' value	'P' value
1.	Volume	1.083	0.204	0.083	12.996	<0.001
2.	pH	0.916	0.376	0.153	5.961	<0.01
3.	Free acidity	1.166	0.408	0.166	6.996	<0.001
4.	Total acidity	1.833	0.408	0.166	10.998	<0.001
5.	Ulcer score	1.33	0.516	0.210	6.322	<0.01

Table No.04- Group 3 - Guduchi Kashaya

Sl.No	Parameter	Mean X (in ml)	SD	SE	't' value	'P' value
1.	Volume	2.083	0.376	0.153	13.55	<0.001
2.	pH	1.333	0.258	0.105	12.64	<0.001
3.	Free acidity	1.166	0.516	0.210	7.902	<0.001
4.	Total acidity	2.666	0.516	0.210	12.645	<0.001
5.	Ulcer score	1.50	0.547	0.223	6.70	<0.01

Table No.05-Inter group comparison

Sl.No.	Parameters	Groups	't' value	'P' value	Remarks
1.	Volume	G2 & G1	2.629	<0.050	G2>G1
		G3 & G1	5.875	<0.001	G3>G1
		G3 & G2	5.726	<0.001	G3>G2
2.	pH	G2 & G1	0.309	>0.10	G2=G1
		G3 & G1	1.335	>0.1.	G3=G1
		G3 & G2	2.230	<0.050	G3>G2
3.	Free acidity	G2 & G1	1.541	>0.10	G2=G1
		G3 & G1	1.020	>0.10	G3=G1
		G3 & G2	1.83	<0.10	G3=G2
4.	Total acidity	G2 & G1	0.644	>0.10	G2=G1
		G3 & G1	0.153	>0.10	G3=G1
		G3 & G2	3.079	<0.020	G3>G2
5.	Ulcer score	G2 & G1	1.096	>0.10	G2=G1
		G3 & G1	1.452	>0.10	G3=G1
		G3 & G2	0.553	>0.10	G3=G2

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