

A PHARMACEUTICAL COMPARISON OF GUDUCHI GHRITA PREPARED FROM MALE AND FEMALE PLANTS OF *TINOSPORA CORDIFOLIA* (WILLD.) MIERS.

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ABSTRACT

Pharmaceutical study appreciates the importance of formulation preparation which ultimately determines the nature and magnitude of pharmacological activity expressed. Guduchi is one among the most important medicinal plants of India and various formulations of Guduchi ghrita are mentioned in different Ayurvedic classical texts. In the present study, a simple formulation of Guduchi ghrita which is used for treatment of chronic fever wherein no other ingredient except Guduchi was selected and a comparative pharmaceutical study of Guduchi ghrita prepared from male and female plants was carried out. The preparation of Guduchi ghrita formulations were carried out by adopting standard operative procedure. The result of this study shows that ghrita prepared from male plant yielded more quantity of finished product than that of female plant.

KEY WORDS: Guduchi ghrita, *Tinospora cordifolia*, Swarasa, Rasayana, dioecious.

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INTRODUCTION

Guduchi is one among the most important medicinal plants of India and has been used in Ayurvedic preparations for the treatment of various ailments since ancient times. The accepted botanical source of Guduchi throughout India is *Tinospora cordifolia* (Willd.) Miers., of the family Menispermaceae, but, this species of plant is dioecious, where male and female flowers are borne on separate plants. However, this factor is not given proper consideration while collecting the plant material for medicinal purposes.

Guduchi is considered as one of the most important Rasayana drug with proven anti-stress¹⁻⁴, adaptogenic⁵⁻⁶, antioxidant⁷⁻¹³ and immunomodulatory¹⁴⁻¹⁹ activities. Savrikar et al., (2010) had proved that ghrita prepared from Guduchi as single ingredient is having significant adaptogenic and anti-stress activity²⁰. Further, Ashok et al., have reported significant anti-pyretic and adaptogenic activity of Guduchi ghrita prepared from

male and female plants^{21,22}. However till date no report is available regarding a pharmaceutical comparison of Guduchi ghrita prepared from male and female plants which may throw some light on some difference which may exist during preparation of ghrita as well as outcome of finished product. Hence this study was designed to explore a comparative pharmaceutical aspect of Guduchi ghrita prepared from male and female plants of Guduchi.

MATERIALS AND METHODS

Plant Material

Fresh plants of both male and female varieties of *T.cordifolia* were collected from area adjacent to Ranjit Sagar Dam, 12 km from Jamnagar, the day prior to preparation of ghrita. The plants were collected when they are fully mature condition especially at the time of flowering in the month of November. The plant material was authenticated in the Pharmacognosy Laboratory.

Cow Ghee

Cow ghee was procured from Anand Bhava Ashram, Jamnagar, where pure ghee is prepared by the milk obtained from the cows maintained in Go-Shala attached to Ashram.

Water

Potable tap water from the local laboratory was used.

Method Of Preparation Of Guduchi ghrita

Various formulations of Guduchi ghrita are mentioned in different Ayurvedic classical texts. In almost all the formulations, Guduchi is supplemented with other co-ingredients for processing the ghee, however a simple formulation of Guduchi ghrita is used in treatment of chronic fever wherein no other ingredient except Guduchi, is used for processing ghrita. This particular formulation prescribed by Acharya Vagbhata in Ashtanga Hridaya was selected for this study²³.

Swarasa i.e. the expressed juice and paste of the stem of *T. cordifolia* was prepared as per methods prescribed by Ayurvedic classics was used for processing the ghrita in this formulation. Proportion of ingredients specific to this particular formulation of Guduchi ghrita is not prescribed, however standard proportion of ingredient material prescribed in general for preparation of Sneha-paaka (medicated oils) was used for preparation of Guduchi ghrita in this study²⁰.

Processing Of Guduchi Stem

The collected fresh stem of both male and female plants of *T. cordifolia* were cleaned thoroughly by removing outer flakes and washed with water. Then they were cut into smaller pieces and pounded to fine paste.

Preparation of Guduchi Swarasa

Ayurveda mentions some of plants which are always used in fresh. Guduchi is a plant which falls in this group²⁴. About 3kg of stem from both male and female plants was cut in to small pieces, crushed and soaked in six liters of water. The soaked pulp was thoroughly mixed in water and the contents were then filtered through a muslin cloth to obtain the filtrate devoid of any solid content. The filtrate was the Swarasa of Guduchi required for preparation of Guduchi ghrita.

Preparation of Guduchi ghrita

The Guduchi ghrita was prepared by adopting classical method²⁵ with some modifications according to need. 250g of fine paste (Kalka) of Guduchi stem was prepared and was spread evenly on the inner side of the bottom of a stainless steel container. Four parts of cow ghee (1kg) in proportion to the Guduchi paste, was slowly spread over the paste without disturbing it. Four liters (four times of the cow ghee) of Guduchi Swarasa prepared as per the procedure described above was mixed with the

cow ghee in the container and thoroughly mixed without disturbing the Guduchi paste spread at the bottom. The container was then placed on a gas burner and heating was started on a low to moderate flame as per the requirement. The contents were constantly stirred and heating was continued till fifty percent of the Swarasa got evaporated, after which heating was discontinued and the contents were left to cool overnight. The heating was then resumed on the next morning observing the same precautions described above till all the water content evaporated from the ghee. The contents were frequently tested for completion of the process and to decide the termination of heating. Following tests were carried out in this regard:

- The paste at the bottom started accumulating in the center of the container forming a cohesive bolus as the end point reached.
- The ghee appeared to get separated from the paste as the end point reached.
- Midway between the heating, a frothy layer started appearing on the surface of ghee. This frothy layer started disappearing as the end point approached. The ghee became completely clear, transparent and devoid of any froth as soon as the end point was reached.
- The ghee at the end point, when sprinkled on fire, burned without any crackling noise.
- The paste collected from the bottom of the container when rolled in fingers formed a vick. This vick when lit on fire, burned silently without a crackling noise.

The heating was stopped as soon as the end point was reached. The container was then removed from the flame and left to cool on its own. The contents were filtered in warm condition through a muslin cloth. The filtrate i.e. Guduchi ghrita was collected in a clean autoclaved glass bottle and weighed.

RESULTS

Table-1 provides information about different parameters measured during the Guduchi ghrita preparation. The total quantity of ghrita obtained from male plant is 775g with loss of 22.5%, while ghrita obtained from female plant was 725g with loss of 27.5%.

DISCUSSION

Pharmaceutical study appreciates the importance of formulation preparation which ultimately determines the nature and magnitude of pharmacological activity expressed. One of the common practices of the earlier Ayurvedic physicians was to use Swarasa (fresh juice of herbs) for treatment. For the purpose of Rasayana various classics recommends Guduchi in the form of Swarasa only. However one may visualize some problems in the standardization of a Swarasa preparation

by usual chemical and spectroscopic methods without affecting its active ingredients. Further it may not be always possible to obtain and use fresh juice. It would be ideal if a formulation can be prepared which can be kept for longer period of time without losing its biological activity. At present administration of drugs in the form of liposome has become the focus of extensive research efforts. In Ayurveda use of drugs in the ghrita form is quite common.

While preparing ghrita formulations, the raw ghee was heated with the drug. During this process the raw ghee is expected to undergo alterations due to heat induced changes, oxidation changes due to open heating or changes brought about by the incorporation of fat soluble fractions from the drug. Improper preparation of ghee formulation leads to deterioration of the finished product due to changes in several analytical factors which in turn affects the pharmacological expression. Hence utmost precautions were taken during preparation of test formulation by adopting standard operating procedures.

The total quantity of Guduchi ghrita obtained at the end of pharmaceutical process is more in male in comparison to ghrita from female plant. The reason for this may be the presence of more mucilage in stem of female plant.

CONCLUSION

Present study revealed that ghrita prepared from male plant yielded more quantity of finished product than that of female plant, hence the male plant can be preferred over female plant for preparation of ghrita formulation for therapeutic utility.

REFERENCES

- Sarma DN.K, Khosa RL, Chansauria, JPN, Ray AK. Effect of *Tinospora cordifolia* on brain neurotransmitters in stressed rats. *Fitoterapia* 1995; 5: 421-22.
- Sarma DN.K, Khosa RL, Chansauria, JPN, Sahai M. Antiulcer activity of *Tinospora cordifolia* Miers and *Centella asiatica* Linn. extracts. *Phytotherapy Research* 1995; 9:589-90.
- Patil M, Patki P, Kamath HV, Patwardhan B. Antistress activity of *Tinospora cordifolia* (Wild) Miers. *Indian Drugs* 1997;34 (4): 211-15.
- Rawal AK, Muddeshwar MG, Biswas SK. *Rubia cordifolia*, *Fagonia cretica* and *Tinospora cordifolia* exert neuroprotection by modulating the antioxidant system in rat hippocampal slices subjected to oxygen glucose deprivation. *BMC Complementary and Alternative Medicine* 2004;4:11.
- Rege NN, Thatte UM, Dahanukar SA. Adaptogenic properties of six *Rasayana* herbs used in Ayurvedic medicine. *Phytotherapy Research* 1999;13 (4): 275-91.
- Bafna PA, Balaraman R. Anti-ulcer and antioxidants activity of Pepticare - a herbo-mineral formulation. *Phytomedicine* 2005; 12:264-70.
- Prince PSM, Menon VP. Antioxidant action of *Tinospora cordifolia* root extract in alloxan diabetic rats. *Phytotherapy Research* 2001; 15: 213-18.
- Prince PSM, Menon VP. Short communication: Hypoglycaemic and hypolipidaemic action of alcohol extract of *Tinospora cordifolia* roots in chemical induced diabetes in rats. *Phytotherapy Research* 2003;17:410-13.
- Prince PSM, Menon VP, Gunasekaran G. Hypolipidaemic action of *Tinospora cordifolia* roots in alloxan diabetic rats. *Journal of Ethnopharmacology* 1999;64: 53-57.
- Prince PSM, Padmanabhan M, Menon VP. Short communication: Restoration of antioxidant defense by ethanolic *Tinospora cordifolia* root extract in alloxan-induced diabetic liver and kidney. *Phytotherapy Research* 2004; 18: 785-87.
- Subramanian M, Chintalwar GJ, Chattopadhyay S. Antioxidant properties of a *Tinospora cordifolia* polysaccharide against iron mediated lipid damage and gamma-ray induced protein damage. *Redox Reports* 2002;7:137-43.
- Goel HC, Prem Kumar I, Rana SV. Free radical scavenging and metal chelation by *Tinospora cordifolia*, a possible role in radioprotection. *Indian Journal of Experimental Biology* 2002;40:727-34.
- Maryamma KI, Ismail PK, Manomohan CB, Rajan A. Ameliorating effect of *Amrutha* (*Tinospora cordifolia*) in aflatoxicosis of ducks. *Journal of Veterinary and Animal Sciences* 1990;21 (2): 93-96.
- Thatte UM, Dahanukar SA. Comparative study of immunomodulating activity of Indian Medicinal plants, lithium carbonate and glucan. *Methods and findings in experimental and clinical pharmacology* 1988; 10 (10): 639-44.
- Thatte UM, Dahanukar SA. Immunotherapeutic modification of experimental infection by Indian Medicinal Plants. *Phytotherapy Research* 1989; 3:43-49.
- Thatte UM, Kulkarni MR, Dahanukar SA. Immunotherapeutic modulation of *Escherichia coli* peritonitis and bacteraemia by *Tinospora cordifolia*. *Journal of Postgraduate Medicine* 1992; 38 (1):13-15.
- Chintalwar G, Jain A, Sipahimalani A, Banerji A, Sumariwalla P, Ramakrishnan R, Sainis K. An immunologically active arabinogalactan from *Tinospora cordifolia*. *Phytochemistry* 1999;52: 1089-93.
- Mathew S, Kuttan G. Antioxidant activity of *Tinospora cordifolia* and its usefulness in the amelioration of cyclophosphamide induced toxicity. *Journal of Experimental and Clinical Cancer Research* 1997;16: 407-11.
- Kapil A, Sharma S. Immunopotentiating compounds from *Tinospora cordifolia*. *Journal of Ethnopharmacology* 1997; 58: 89-95.
- Shriram S Savrikar, Vilas Dole, B., Ravishankar, Vinay J., Shukla., 2010. A comparative investigation of three samples of Guduchi ghrita for adaptogenic activity against forced swimming induced gastric ulceration and haematological changes in albino rats, *International Journal of Ayurveda Research* 1 (2), 67-72.
- Ashok BK, Savitha D Bhat, Prajapati PK, Ravishankar B. Antipyretic activity of Guduchi ghrita formulations in albino rats. *AYU*, July-SEP 2010; 31(2): 373-77.
- Ashok BK, Savitha D Bhat, Prajapati PK, Ravishankar B. Adaptogenic and Anti-Ulcer Activity of Guduchi Ghrita Prepared from Male and Female Plants of *Tinospora cordifolia* (Willd.) Miers., *Inventi Impact: Ethnopharmacology* 2011; 1 (1) 47-53.
- Ashtanga Hridaya, commentaries Arunadatta Sarvanga Sundara and Hemadri Ayurveda Rasayana edited by Harishastri Paradakar, 1982, seventh edition, Choukhamba Orientalia, Varanasi, Chikitsa Sthana, chapter 1, Shloka 94.

24. Sharangadhara, 2000. Sharangadhara Samhita, commentaries by Aadhamalla Dipika and Kashiram Gudarth- Dipika, Fourth edition, Choukhambha Orientalia, Varanasi, Prathama Khanda, chapter 1, Shloka 45-46.
25. Sharangadhara, Sharangadhara Samhita with Adhamalla and Kansiram commentary In: Vidyasagar PS, Choukhambha Orientalia, Varanasi, India, 1983, 137 and 214 .

Table 1: Different parameters measured during the ghee (*ghrita*) preparation

Observation	<i>Guduchi ghrita</i> from male plant	<i>Guduchi ghrita</i> from female plant
Initial quantity of cow ghee (g)	1000	1000
Quantity of <i>Guduchi ghrita</i> obtained (g)	775	725
Initial quantity of <i>Kalka</i> (g)	250	250
Weight of <i>Kalka</i> after filtration (g)	540	640
Colour of <i>Kalka</i>	Light brown	Dark brown
Consistency of <i>Kalka</i>	Coarse	Mucilaginous
Total loss of <i>ghrita</i> (g)	225	275
Percentage of loss of <i>ghrita</i>	22.5	27.5

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