" CERTAIN MADHURA SKANDHA DRAVYA AND THEIR SOLUTION PROPERTIES "

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ABSTRACT

As per title of study " CERTAIN MADHURA SKANDHA DRAVYA AND THEIR SOLUTION PROPERTIES " I have taken Gokshura and Yashtimadhu from Madhuraskhandhadravya mentioned by Acharya Charaka. In present study I am going to calculate solution properties like Intrinsic viscosity,Hugging constant k,Apparent specific volumes andHydration numbers. And I am going to compare these value with the value given by Shamil.at.al for Sweet taste. So we can set some parameters for madhura taste as concerned with solution properties.

INTRODUCTION

Dravyaguna Vigyana is the branch of knowledge that deals with the *Dravyas* (Drug as well as Diet) helps in the maintenance health and alleviation of diseases in human body. It deals with properties, actions, dose, and time of administration and various preparations of these *Dravyas*.

In this branch of *Ayurveda; Dravya, Guna, Rasa, Virya, Vipaka* and *Prabhava* are studied. These are the fundamental principles of *Dravyaguna,* these six *Rasa* used to maintain health in healthy and to reverse the disease process back to health in the sick. [1]

Rasa plays an important role in the body therapeutically and in diagnosing a certain type of disease.[2]

On the basis of *Rasa* all drugs are classified into six groups. [3]

Even unknown drugs can be identified and will be used in treatment with the help of identification of *Rasa*. [4]

Rasa is the object of gustatory sense organ, which is located in tongue. It is not only perception of taste but also an indication of composition properties and probable action of drugs.

According to Acharya Charaka liquid water hydrates soluble molecules, this hydration is responsible for six types of gustatory senses. [5]

Recently the emphasis has been on the roll of water in mechanism of taste. [6]

The collapse of water structure and hence enhanced hydration, effectively allows the molecule to be transported to different layers of the taste epithelium, where it is thought the different receptor sides for bitter, sweet, sour and salty lies. Hence, to study *Rasa*, analysis of hydration properties like intrinsic viscosity, AMV/ASV and hydration number is very necessary. [7]

The parameter ASV as being broad determinant of taste quality, with the four basic taste occupying pre dominantly certain ranges of ASV as given by shamil et. al. 1987 [8]. This range may be helpful to find out taste of unknown molecule.

Previously many works has been carried out regarding *Rasa* of *Ayurvedic drugs*; only with the help of Organoleptic parameters [Sensory evaluation]. Volumetric analysis like hydration properties where not used in such work.

Hence, in this study certain *Madhura skandha Dravya* will be analyzed for their solution properties to establish relation between *Rasa* and solution properties.

Selection of Drugs:

To screen all drugs is difficult task, as so many drugs are controversial, so many are with more than one sapophore i.e. more than one *Rasa*. Try to keep drugs with one *Rasa* and no controversy; we have selected *Gokshur* and *Yashtimadhu* to evaluate solution properties.

Research Question:

Does ranges of ASV or other hydration properties of *Madhura skandha Dravya* are similar to ranges given by Shamil. et. al. ?

Hypothesis:

ASV ranges or other hydration properties of *Madhura skandha Dravya* are similar to ranges given by Shamil. et. al.

Null Hypothesis:

ASV ranges or other hydration properties of *Madhura skandha Dravya* are not similar to ranges given by Shamil. et. al.

AIM:

Study of solution properties of *Gokshur* and *Yashtimadhu.*

Objective:

1. To study physical evaluation of *Gokshur* and *Yashtimadhu*.
2. To study chemical evaluation of *Gokshur* and *Yashtimadhu*.
3. To study Taste Threshold of *Gokshur* and *Yashtimadhu*.
4. To study solution properties of *Gokshur* and *Yashtimadhu*.

PREVIOUS WORK DONE:

1. Khander (Mrs.) M.B.,"Experimental measurement of *MadhuraRasa*".Dept. of D.G. Tilak Ayu. Mahavidyalaya Pune, 1995-96.
2. Changade J.V. "Experimental measurement of *Madhura Rasa*" Dept.of D.G. Tilak, Ayu. Mahavidyalaya, Pune, 1993-94.
3. Agashe B. K. " Experimental measurement of *Tikta Rasa* (Bitter Taste)" Dept.of D.G. Tilak, Ayu. Mahavidyalaya, Pune, 1996-97
4. Puranik D.B. "Experimental measurement of *kashaya Rasa* (Astringent Taste)". Dept. of D.G. Tilak Ayu. Mahavidyalaya Pune, 1997-2000.
5. Shamil S. Birch G.R., Mathouthi M. and Clifford, M.N. (1987).Apparent molar volumes and tastes of molecules with more than one sopophore. Chem.. Senses.12,397-409

Previous work had done by sensory analysis; as well as on pure chemicals. No work has been done on whole water extract of Glycyrrhiza glabra Linn[Yashtimadhu] and Tribulus terrestris Linn [Gokshur]. Therefore, this research topic is different from previous work done.

Review of literature:

Conceptual study of *Yashtimadhu* and *Gokshur* will be done with the help of following:

1. Ayurvedic Samhitas:- Charak Samhita, Sushrut Samhita, Vagbhat Samhita and all Nighantus.
2. Modern literature:- books related to Pharmacology, Pharmacognocy etc.
3. Study from World Wide Web database will be done.

PLAN OF WORK

Literary study of *Glycyrrhiza glabra Linn*[*Yashtimadhu*] and *Tribulus terrestris Linn* [*Gokshur*].

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Review of Pharmacognosy, Phytochemistry and other analytical methods

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Authentification of *Glycyrrhiza glabra Linn*[*Yashtimadhu*] and *Tribulus terrestris Linn* [*Gokshur*] and collection of useful parts

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Physical evaluation of *Glycyrrhiza glabra Linn*[*Yashtimadhu*] and *Tribulus terrestris Linn* [*Gokshur*].

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Chemical analysis of *Glycyrrhiza glabra Linn*[*Yashtimadhu*] and *Tribulus terrestris Linn* [*Gokshur*].

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Sensory analysis (Organoleptic study)

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Volumetric analysis (Solution properties)

Material and methods (Methodology)

Study design: Observational (Organoleptic) and analytical study (Volumetric)

Materials

Plant material:

Tribulus terrestris Linn [Gokshur] fruit will be self collected from field.Market sample of Glycyrrhiza glabra Linn [Yashtimadhu] will be used.Authentification of Glycyrrhizaglabra Linn [Yashtimadhur] and Tribulus terrestris Linn [Gokshur] will be done by taxonomist and with pharmacognostical characters.

TABLE NO.1

INFORMATION OF DRAVYAS

Plant	LatinName	Family	Guna	Rasa	Veerya	Vipaka
Yashtimadhu	*Glycyrrhiza glabra Linn*	Leguminosae	Guru, Snigdha	Madhur	Sheet	Madhur
Gokshur	*Tribulus terrestris Linn*	Zygophyllaceae	Guru ,Snigdha	Madhur	Sheet	Madhur

Methodology

1. Useful part of *Glycyrrhiza glabra Linn*[*Yashtimadhu*] and *Tribulus terrestris Linn* [*Gokshur*] will be collected, authentication will be done by Taxonomist.Useful part of *Glycyrrhizaglabra Linn*[*Yashtimadhu*] and *Tribulusterrestris Linn* [*Gokshur*] will be analyzed according to **API (Ayurvedic Pharmacopeia of India)** standards. [9]

A. Physical Tests:

1. Solubility

2. Moisture content
3. Ash value
4. Extractive values
5. PH of 5% W/v suspension.
6. Identity test (T.L.C.)

B. Chemical tests:

Quantitative: Following and other necessary tests.

1. Test for alkaloids.
2. Test for flavanoids
3. Test for terpenoids
4. Test for proteins.

C. Sensory Evaluation:

In this study, solution properties will be measured along with taste intensity. For that, taste threshold will be assessed by the combination of ascending-series method and a rating scale method. [Annexure 1] [10]

For the assessment of Taste Threshold, water soluble extract of *Gokshur* and *Yashtimadhu* will be used.

D. VolumetricAnalysis:

Sample: Dry water soluble extract of *Gokshur* and *Yashtimadhu* will be used to measure the solution properties. According to sensory evaluation, different concentration of water soluble extract in distilled water will be used.

Intrinsic viscosity will be derived with the help of Schott AVS 400 viscometer. A triple extrapolation procedure will be applied for the accurate determination. [11]

Hugging constant k' will be obtained from Huggins equation. [12]

Apparent specific volumes will be calculated using Paar densitometer.

Hydration numbers will be estimated according to Herkovitz and Kelley. [13]

OBSERVATION AND RESULT :-

It will be noted during whole study of certain *Madhura Skandha Dravya* and their solution properties.

DISCUSSION :-

It will be done on the basis of observation made during study.

CONCLUSION :-

Conclusion will be drawn on the basis of observations, discussion and statistical analysis at the end of study.

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Annexture 1

PRINCIPLE

It is ascending and rating scale method. [10] Before main experiment, a pilot study will be carried out with solutions of water extract of drugs, in a range of concentrations from well above the reported threshold. This will help to decide the dilution range of drugs.

PREPARATION OF THE EXTRACTS

The extracts will be prepared using DI water as a solvent. 10g of the sample will be homogenized with 100ml of DI water. The crude preparation will left overnight in the shaker at room temperature and then centrifuged at 4000rpm for 20mins. The supernatant containing the plant extract then transferred to a pre weighed beaker and the extract was concentrated by evaporating the solvent at 60°C. The crude extract will used in Sensory and Volumetric analysis.

Preparation of Drug Solutions:

Usually drug will administrate in two dosage forms: cold infusion and hot infusion.

Cold infusion: 5 gms of sample will soaked in 100ml of distilled water, stirred for thirty minutes. It will filter with filter paper and will used for experiment.

Hot infusion: 5gms of sample will soaked in 100 ml of hot distilled water and stirred for thirty minutes. The filtrate will used for the experiment.

Selection of Volunteers:

The M.D. scholars and UG students having knowledge of Rasa perception, of female sex either in pre-ovulatory and post-ovulatory period will selected. The volunteers having health problems like fever, acute rhinitis etc. or having addiction of smoking, chewing tobacco, will excluded. The study will carried out in six female volunteers for each drug. (n=6x2=12)

PROCEDURE

Assessment of taste threshold:

The taste threshold of the drug determine by following method of dilution (S.C.Dhyani 1977) with slightly modification. It is ascending and rating scale method.Before commencing the main experiment, pilot study will be carried out in five volunteers to decide the range of dilution for each drug.

Dilution preparation:

The cold and hot infusion of each drug sample will be serially diluted. Dilution will be made by adding 1ml of filtrate of cold infusion in 25ml of water which will numbered as 1:25 dilution, like wise further dilutions will made with the difference of10-20 ml, till the taste disappeared, which will considered as threshold point of that drug. The same method will be followed for the hot infusion doses form of the drug.

Threshold detection:

The volunteers will ask to refrain from tea, coffee or any food items before half an hour of the experiment. They will be instructed to rinse the mouth with water. Each volunteers will subjected for tasting approx. 1 ml of each dilution starting form lower concentration to higher concentration. They will advice to note down their expressions based on Likert Scale and characteristics of *MadhuraRasa* . The gradation of Scale is described below in the table. By applying this scale starting point and end point or threshold point of the taste perception will be decided. These two dilutions and dilutions between them with difference of 10ml vol. will be used in Volumetric analysis.

Response	**Likert (numerical values used in analysis)**
1	Same as water
2	Doubtful if pure water
3	A very faint taste, can't say
4	A very faint taste (*MadhuraRasa*)
5	A faint taste (*MadhuraRasa*)
6	A weak taste (*MadhuraRasa*)
7	Clear taste (*MadhuraRasa*)