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A COMPARITIVE PHARMACEUTICO- ANALYTICAL STUDY OF GOMUTRASAVA W.S.R TO GOMUTRA OF DIFFERENT BREEDS OF COW

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ABSTRACT

Asava and *Arista* are considered as unique preparation of Ayurveda due to their indefinite shelf life, better absorption, quicker action and easy palatability. Ayurveda has been using cow urine for betterment of physical and mental health of mankind since thousands of years ago. We find the references of benefits of *Gomutra* in Atharvaveda, Charaka Samhita, Sushruta Samhita, Astanga Hrdaya, Bhavaprakash etc. Commonly there are several forms of intake of *Gomutra* as crude, distillate, *Ghrita* preparation, *Gomutrabasti*, *Nasya*, *Ghanavati* and *Asava* form. *Gomutrasava* is a unique preparation where *Gomutra* is used as the main drug for *Asava* preparation. In India urine of different breeds of cow are used in medicinal preparation as per geographical area, there is no as such uniformity in its use in pharmaceutical industries. So here I have planned to evaluate the pharmaceutico-analytical changes in samples of *Gomutrasava* prepared by *Gomutra* of different breeds of cows- *Malnad gidda*, *Jersy*, *Amritmahal*, *Hallikar* and *Gir*. Conclusion: Based on the output of the pharmaceutical study and analytical study reports it can be concluded that there is no any significant changes in terms of pharmaceutico-analytical study among the 5 samples of *Gomutrasava* prepared.

KEYWORDS: *Gomutra*, *Gomutrasava*, *Asava*, comparative study, Analytical Study.

INTRODUCTION

Ayurvedic system of medicine consists of different types of dosage form, among which Arista (fermented decoction) and Asava (fermented infusion) are considered as superior to other doses forms due to their easy palatability, better absorption, quicker action, longer shelf life, accelerated therapeutic action and enhanced drug concentration.[1,2] It also potentiates the products pharmaceutically and therapeutically.

The merits of *Sandhana Kalpana* (Biomedical Fermentation): Undesirable sugars are removed from the plant materials by fermentation process and make the product more bio-available by eliminating side effects such as gas and bloating. As the fermentation process undergoes a gradient increase of alcohol level, it extracts a wide range of active ingredients from the herb than any other methods of extraction. Yeast acts as natural cleansing system because of natural binding of yeast cell wall with the heavy metals and pesticide residue.

Gomutra: Indian system of medicines, especially Ayurveda, has been using *Gomutra* (cow urine) for betterment of physical and mental health of mankind since thousands of years ago. Cows were regarded as wealth and were the backbone of the economy of ancient Indians.

Cow is considered as mother in Indian tradition. *Gomutra* (cow urine) is used in treatment since time immemorial. It as a single medicine is capable of curing diseases like *Kandu* (pruritis), *Kilasa* (skin disorder), *Shoola* (pain), *Gulma*, *Atisara* (diarrhea), *Vaatroga*, *Kaasa* (cough), *Kustha* (skin disorders), *Krimi* (worm infestation), *Pandu* (anaemia) and *Udararoga* (abdominal distention). *Gomutra* (cow urine) is extensively used in various Ayurvedic preparations like *Gomutra Haritaki*, *Sanjeevani Vati* etc. Recent studies have proved efficacy of *Gomutra* (cow urine) in diseases like diabetes, blood pressure, cancer etc.

Biochemical Analysis of *Gomutra* the biochemical estimation of cow urine has shown that it contains sodium, nitrogen, sulphur, Vitamin A, B, C, D, E, minerals, manganese, iron, silicon, chlorine, magnesium, citric, succinic, calcium salts, Aurum hydroxide, phosphate, lactose, carbolic acid, uric acid, enzymes, creatinine and hormones etc.[3] The above mentioned contents of *Gomutra* on an analysis are found to be very useful in balance of body constituents. Apart from high medicinal values, panchgavya is also used in agriculture, organic farming as natural manure pesticides, fertilizer, pest repellants and as alternate energy

resources.[4] This work will put forward the Pharmaceutico- analytical Study of *Gomutrasava* with special reference to different breeds of *Gomutra*.

In Ayurvedic literature, we come across with words viz *Kusta, Twaghata roga, Shvitra* which give almost the same meaning. These conditions, can be compared to the word Skin diseases with symptoms like pain, redness, swelling, itching, skin discoloration and skin lesions. *Kusta* is the commonest problem faced many a times by several people. The skin lesions are mentioned as a *pradhana vyadhi* as well as an *upadrava* in Ayurvedic classics. Here in this present study an effort has been made to establish the importance of *Sandhana Kalpana* in a very commonly seen disease condition.

There are many formulations available in the classics which are effective in the treatment of *Kusta* and *Switra*. Here, a very popular formulation *Gomutrasava* was selected, being *Gomutra* as the main ingredient.

Thus here an attempt is made to evaluate the pharmaceutico-analytical changes in samples of *Gomutrasava* prepared by *Gomutra* of different breeds of cows- *Malnad gidda, Jersy, Amritmahal, Hallikar* and *Gir.*

AIMS AND OBJECTIVES OF THE STUDY

Aim: To evaluate the pharmaceutico-analytical changes among the samples of *Gomutrasava* prepared by *Gomutra* of different breeds of cow.

OBJECTIVES

- Collection of urine of different breeds of cow.
- To prepare *Gomutasava* A/c to *Astanga hrdaya* reference by *Gomutra* of different breeds of cow.

Sample 1: *Gomutrasava* prepared by the *Gomutra* of *Malnadgidda.*

Sample 2: *Gomutrasava* prepared by the *Gomutra* of *Jersy.*

Sample 3: *Gomutrasava* prepared by the *Gomutra* of *Amritmahal.*

Sample 4: *Gomutrasava* prepared by the *Gomutra* of *Hallikar.*

Sample 5: *Gomutrasava* prepared by the *Gomutra* of *Gir.*

- Comparative analysis of the different parameters among the samples of *Gomutrasava.*

MATERIALS AND METHODS

The *Gomutrasava* was prepared as per the reference of *Sandhana Kalpana nirmana vidhi,* explained by Acharya sharangadhara in sharangdhara Samhita.

Table no. 1: showing the details of the Raw Drugs.

Sl.no	Drug name	Latin name	Proportion
1	***Gomutra* of** *1. Malnad gidda* *2. Jersy* *3. Amritmahal* *4. Hallikar* 5. *Gir*	Bos Taurus indicus	6.14 L each
2	*Chitraka*	PLUMBAGO ZEYLANICA	120GMS
3	*Shunti*	ZINGIBER OFFICINALIS	120GMS
4	*Maricha*	PIPER NIGRUM	120GMS
5	*Pippali*	PIPPER LONGUM	120GMS
6	*Madhu*	HONEY	1.2 L

Place of pre-processing of the drug like collection, pounding was done at Dept. of Rasashastra and Bhaishajya Kalpana (RSBK) ALN Rao Memorial Ayurveda college and hospital, Koppa.

The Gomutrasava formulation reference was taken from *Shwitra–krimi chikitsa* of Astangahrdaya.[5]

गव्यं मूत्रं चित्रकव्योषयुक्तं सर्पिःकुम्भे स्थापितं क्षौद्रमिश्रम् ।

पक्षादूर्ध्वं श्वित्रिणा पेयमेतत् कार्यं चास्मै कुष्ठदृष्टं विधानम्॥

Cow urine mixed with (powder of) *citraka* and *vyoṣā* (*Shunti, Maricha, Pippali*) and added with honey is poured into a pot smeared with ghee in its interior and kept undisturbed for a fortnight. Then after it should be consumed by the patient of leuco-derma and treatments prescribed for leprosy adopted.

Collection of cow urine

The Samples of cow urine was procured from Sri Thirumala trust Sri Dattashrama Gaurigadde Koppa taluk, Chikkamagaluru dist., Krishnamoorthy's cattle Farm Theertahalli and Panchajanya Ayurveda Ashrama, Kudregundi Koppa taluk, Chikkamagaluru dist.

METHOD OF PREPARATION

- 5 porcelain jars (capacity- 10 lt) were selected for 5 different samples.

- Dhupana of the jars were done using dhupana dravyas (*Agaru, Chandana, Marica, Haridra, Mamsi, Guggulu,* and *Karpura* each 10 gm).
- Jars were placed in the husk to maintain required temperature.
- 100 gm of *ghrita* was applied and smeared covering the entire inner surface of the jar.
- Urine of different breeds of cow as mentioned above was used keeping other ingredients same.
- 6.14 liters each of Cow urine of different breeds (*Malnad gidda, Jersy, Amritmahal, Hallikar, Gir)* for individual sample (1, 2, 3, 4, 5) was used as *dravadravya* as per classical reference.
- The sweetening agent (*Madhu*-1.2L for each sample) was dissolved completely in *dravadravya.*
- The mixture was filtered once after dissolving the sweetening agent to get rid off impurities if present in it.
- The *patra* placed in husk was carefully filled with this liquid mixture and *prakshepaka dravya (chitraka, shunti, maricha, pippali*- each 120gm for individual samples) was added to it.
- The *patra* was kept undisturbed by temporarily closing its mouth with a cloth and lid.
- Meanwhile 'the onset of fermentation' is observed daily for 3 to 5 days and soon after the onset of fermentation, *sandhi-bandhana* (sealing) of the jar was done.
- The jar was kept undisturbed for 15 to 30 days and later symptoms of completion of fermentation are looked for.
- After confirming completion of fermentation the vessel was opened and the preparation was collected by Siphoning technique.
- Filtration was carried out with clean and dry double folded cotton cloth.
- The obtained liquid was measured and stored in a clean airtight plastic cans and checked for continued fermentation for a fortnight or two.
- Later they were packed in a suitable container with neat label for further therapeutic use.

Maturation

The prepared fresh *asava* was not advised for immediate usage. Acharyas suggested to start using *Asavarishtas* only after one year. The words *chirakala, chirasthitam* were specifically used in classics. The series of changes that occur during the storage period which impart value addition to *asavaristas* are collectively called as maturation. The process of

fermentation further continues at micro level during the period of maturation. They may attain optimal levels of therapeutic index after maturation.

OBSERVATIONS

Container (*sandhana patra*) was opened for observations at different stages of procedure. The aperture made in the lid was closed by corking and the same was used for insertion of plastic tube to draw samples as and when required for testing.

(A) Initial stage of preparation

(B) Before onset of fermentation

(C) After onset of fermentation

(D) After completion of fermentation

A) Initial stage of preparation

- Quantity 6.14 lit. each for all the 5 samples
- Colour yellowish brown to Brown
- Taste *Tikta, Kashaya,* Slightly *Madhura*
- Temperature 28°C

(B) Before onset of fermentation

- Liquid was dark brown
- Consistency was watery
- Temperature was same as room temperature i.e. 28° C

(C) After onset of fermentation

- The liquid became little darker.
- Mild alcoholic smell and odor.
- Effervescence was observed with floating of prakshepaka dravya.
- Hissing sound was heard clearly.
- Burning Candle test was performed and candle continued burning.
- Lime water test was also performed and lime turned white.
- The temperature of the fermenting liquid slightly raised i.e. 28.5° C.

(D) After the completion of fermentation

- It took 30 days for the completion of fermentation
- All confirmatory tests for completion of fermentation observed positive

- The temperature of fermented liquid slightly reduced i.e. 28°C.
- The color of the liquid was clear brown.
- Taste was bitter, astringent and bit sweet.

Burning candle test

During the onset of fermentation burning candle gets put off if taken near to the fermentation liquid surface. This is because of the carbon dioxide production during the fermentation process. After completion of fermentation, as there will be no carbon dioxide produced, the candle continues to burn.

Lime water test

At the time of sealing the vessel for fermentation, the lid should be connected and sealed with a small pipe of 1/2 to 1 cm width by carving a hole in the lid. The other end of the pipe has to be properly clamped. After full establishment of fermentation process, the pipe's distal end clamp is removed and is put in lime water bottle. This test is done every week after onset of fermentation. Here turning off lime water to milky white indicates the production of 'carbon dioxide'.

The five samples of Gomutrasava will be analyzed with the following tests.

1. Organoleptic characters
- Colour
- Odour
- Taste
- Appearance

2. Physico chemical tests
- Specific gravity
- Total solid
- pH value
- Viscosity

3. Preliminary phytochemical test
- Carbohydrates
- Protein
- Alkaloids
- Cardiac glycoside

- Flavinoids
- Tannins
- Triterpenoids
- Saponin

4. Fluorescence test with various acid and base

5. Quantitative estimation

- Alcohol percentage
- Total sugar
- Reducing sugar
- Non reducing sugar
- Sodium, Potassium, Calcium
- Titrated acidity

6. TLC

RESULT

A. Organoleptic Characters

Colour	Brownish black
Odour	Characteristic
Taste	Bitter, astringent, bit sweet
Texture	Liquid

Note: All samples exhibited similar organoleptic characteristics.

Table no. 2: showing the Physico-chemical Parameters of different samples of Gomutrasava.

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Total solid	17.07%	22.06%	18.82%	19.50%	17.14%
Specific gravity at 25^0 C	1.0527	1.0513	1.0522	1.045	1.0552
Viscosity at 25^0 C	1.17	1.22	1.21	1.31	1.34
pH	4.13 +/- 0.10	4.18 +/- 0.10	4.17 +/- 0.10	4.13 +/- 0.10	4.06 +/- 0.10

Table no. 3: showing the Priliminary phytochemical Tests of different samples of Gomutrasava.

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Carbohydrate	Present	Present	Present	Present	Present
Protein	Present	Present	Present	Present	Present
Alkaloid	Present	Present	Present	Present	Present
Cardiac glycoside	Present	Present	Present	Present	Present

Flavinoids	Present	Present	Present	Present	Present
Tannins	Present	Present	Present	Present	Present
Triterpenoids	Present	Present	Present	Present	Present
Saponin	Present	Present	Present	Present	Present

Table no. 4: showing the Fluorescent Tests of different samples of Gomutrasava.

	Under Visible Light	**Under Long UV**
Sample + Water	Dull brown	Fluorescent yellow
Sample + MeOH	Greenish brown	Fluorescent yellow
Sample + 10% NaOH	Orange	Fluorescent green
Sample + 10% HCL	Light brown	Fluorescent yellow
Sample + 10% HNO_3	Light brown	Fluorescent yellow
Sample + 10% H_2SO_4	Pale brown	Fluorescent cream
Sample + 10% NH_3	Light orange	Fluorescent green

Note: All Samples (1, 2, 3, 4, 5) exhibited same observations in Fluorescent tests.

Table no. 5: showing the Quantitative Estimation of different samples of Gomutrasava.

	Sample 1	**Sample 2**	**Sample 3**	**Sample 4**	**Sample 5**
Total Sugar	12.61%	17.40%	17.29%	15.27%	15.95%
Reducing Sugar	6.32%	7.98%	8.20%	7.39%	7.45%
Non-reducing Sugar	6.29%	9.42%	9.09%	7.88%	8.50%
Alcohol %	4.85%	4.02%	4.10%	4.50%	4.35%
Sodium(mg/L)	3911	8251	5091	9981	8010
Potassium(mg/L)	1696	7921	9435	3912	6622
Calcium(mg/L)	92.3	82.1	109.21	91.15	107.25
Titrable Acidity%	9.45%	9.65%	9.85%	10.05%	8.5%

Thin Layer Chromatography

Solvent System: Toluene: Ethyl Acetate: Methanol: 80: 20: 10

Various Samples of Gomutrasava were directly spotted.

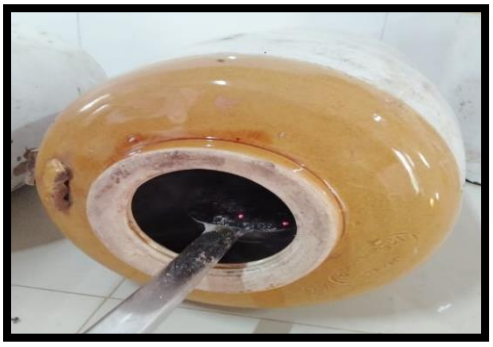
Note: No spots were observed under Visible Light.

All samples exhibited similar bands of same Rf values, only intensity of colors were different.

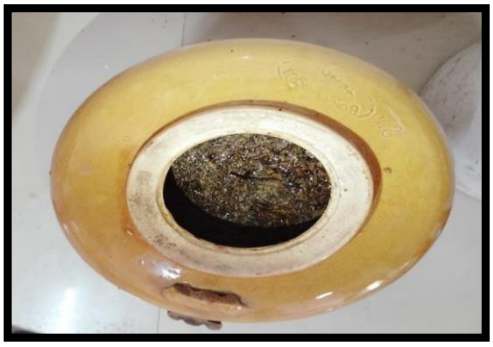
Rf	**Under Long UV**
0.05	Bright fluorescent green
0.08	Bright fluorescent green
0.16	Fluorescent green
0.31	Fluorescent green
0.38	Fluorescent green
0.44	Fluorescent green

0.51	Fluorescent green
0.62	Fluorescent green
0.69	Fluorescent green
0.78	Bright fluorescent green
0.89	Fluorescent green

PHARMACEUTICAL STUDY PICTURES



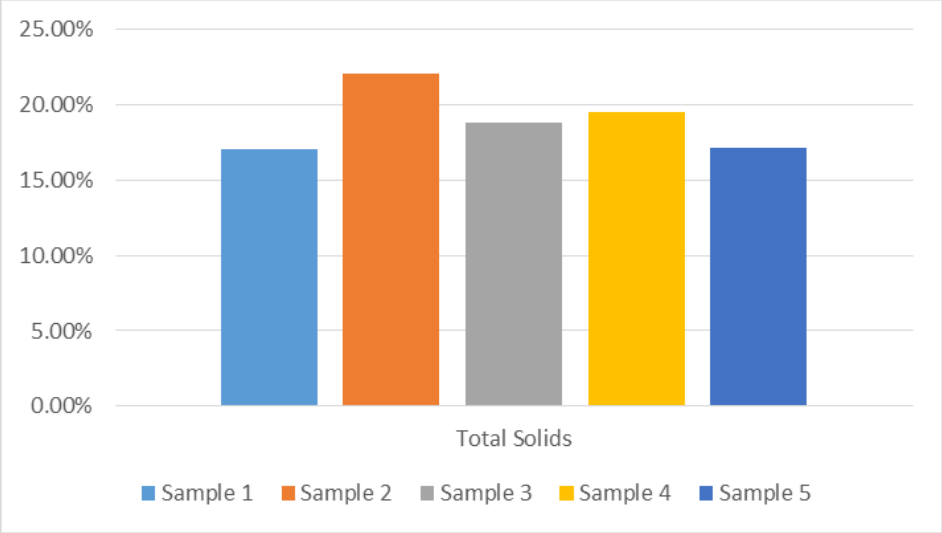
Dhupana



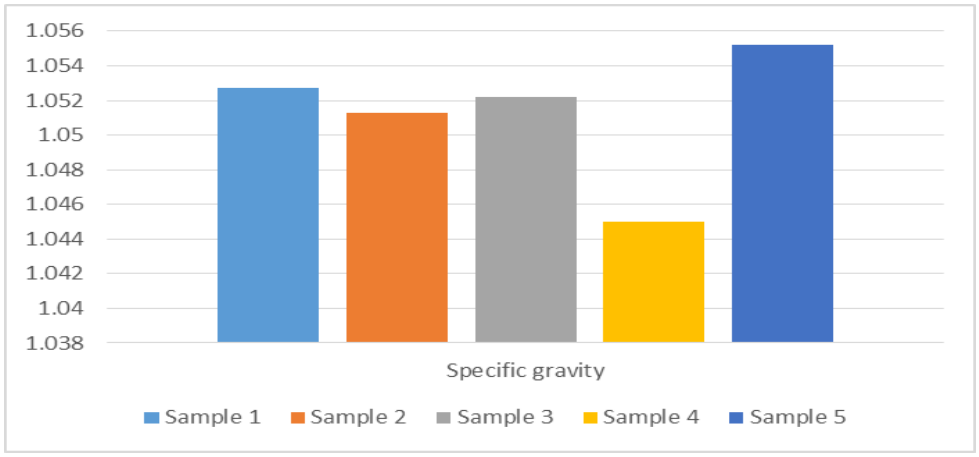
Prepared gomutrasava

Sandhibandhana

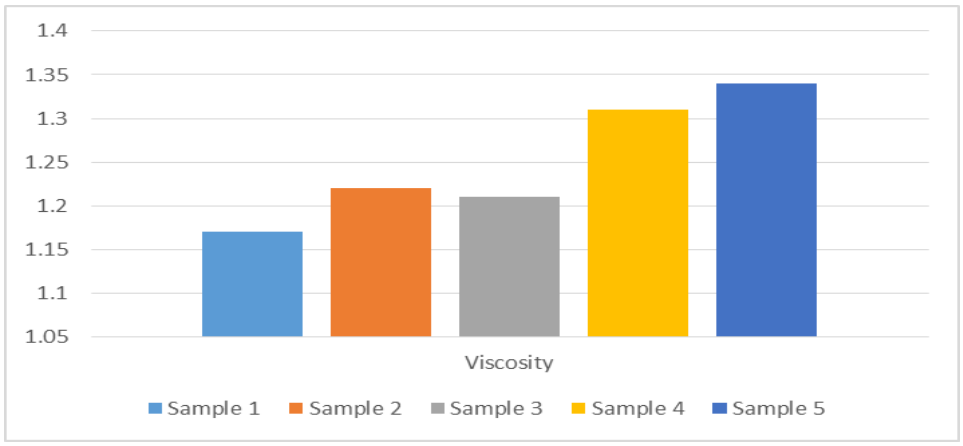
Burning candle test



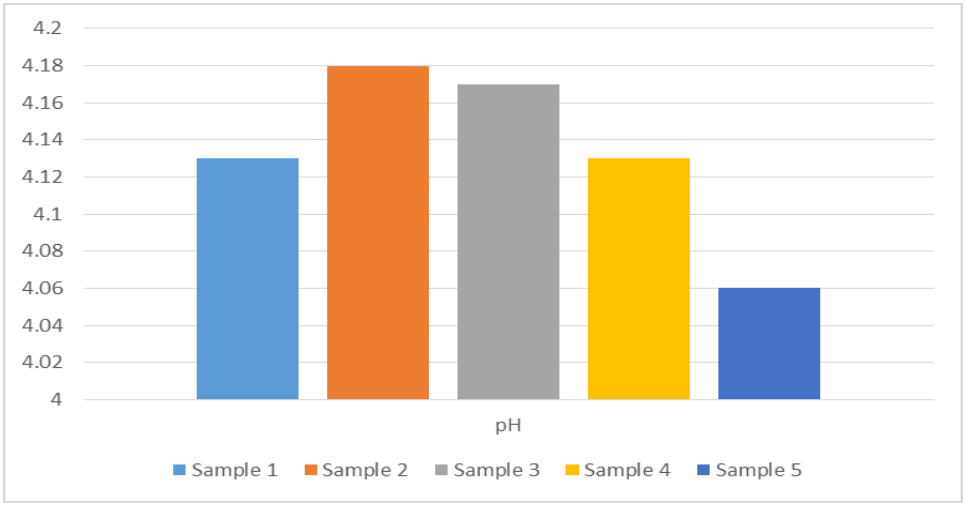
Graph no. 1 showing the comparision of Total solids among the different samples of Gomutrasava.



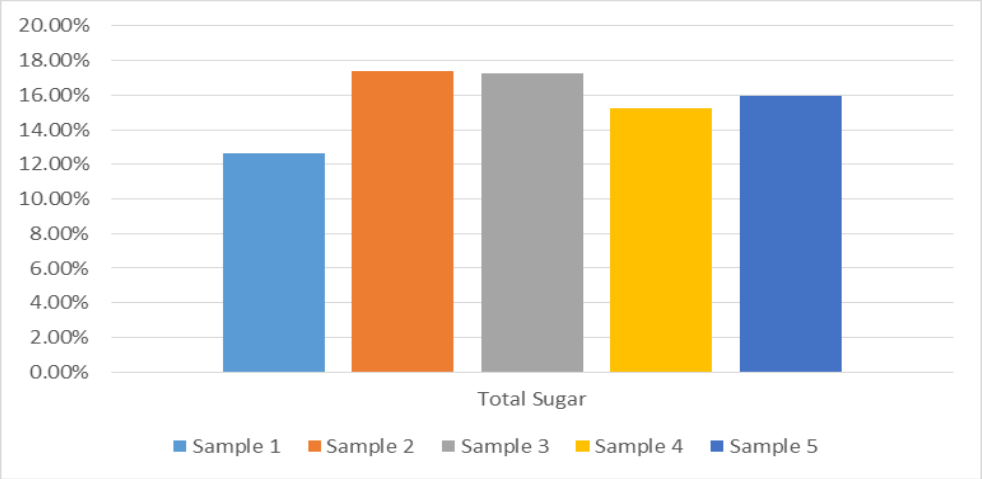
Graph no. 2: showing the comparision of Specific gravity at 25^0C among the different samples of Gomutrasava.



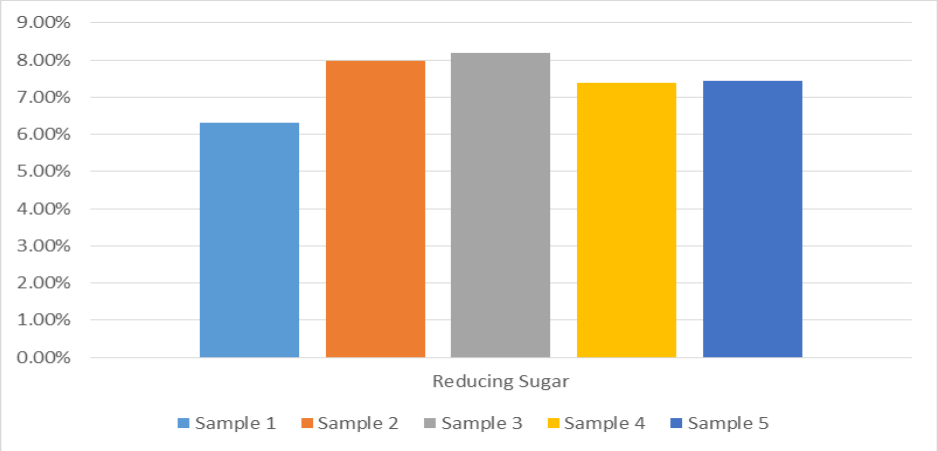
Graph no. 3: showing the comparision of Viscosity at 25^0C in Centipoise among the different samples of Gomutrasava.



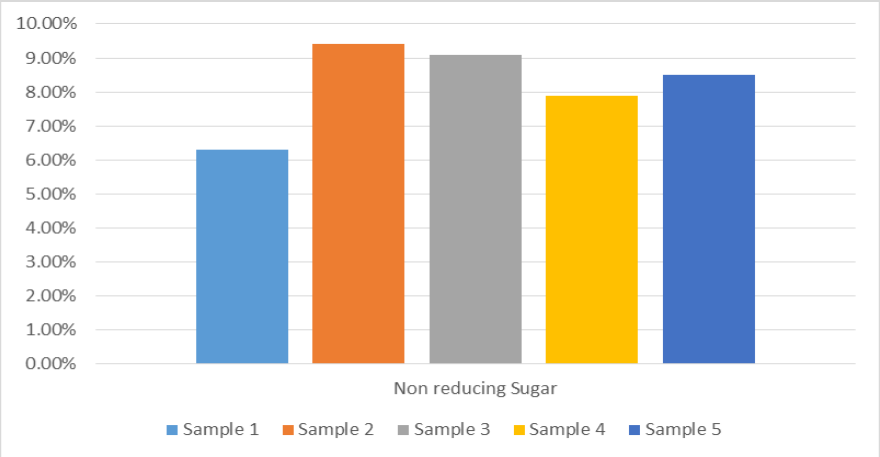
Graph no. 4: showing the comparision of pH among the different samples of Gomutrasava.



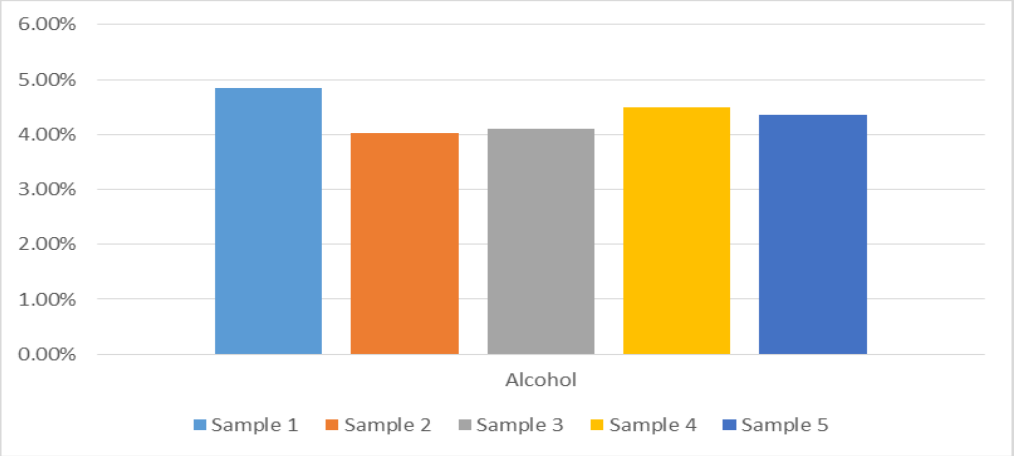
Graph no. 5: showing the comparision of Quantitative estimation of total sugar among the different samples of Gomutrasava.



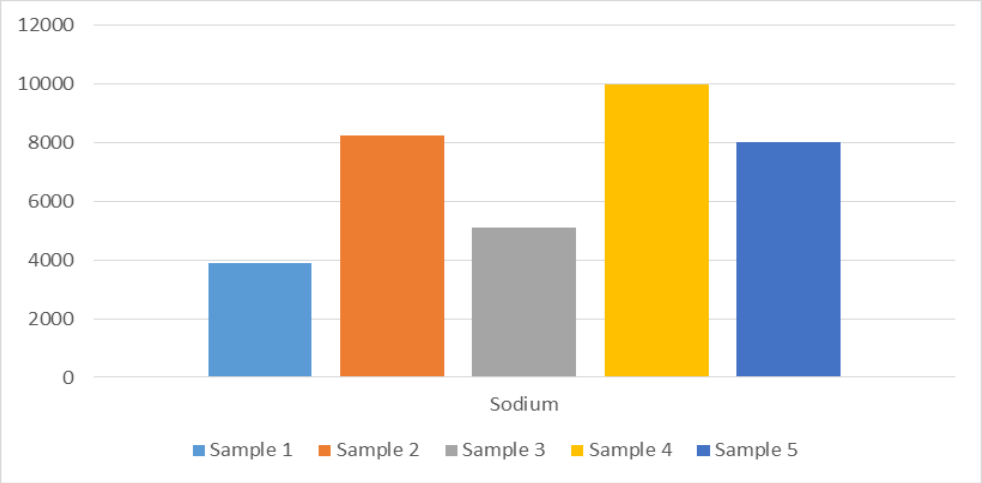
Graph no. 6: showing the comparision of Quantitative estimation of Reducing sugar among the different samples of Gomutrasava.



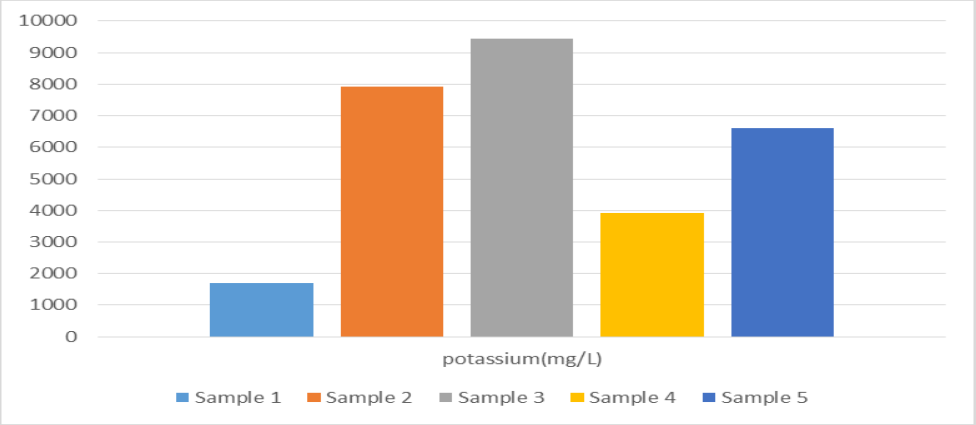
Graph no. 7: showing the comparision of Quantitative estimation of Non-reducing sugar among the different samples of Gomutrasava.



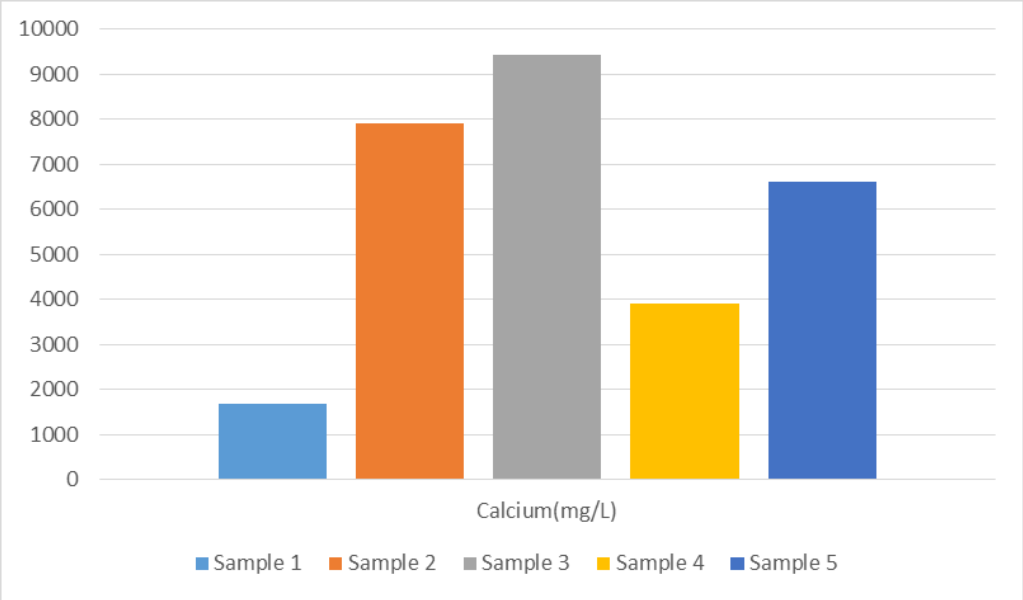
Graph no. 8: showing the comparision of Quantitative estimation of Alcohol among the different samples of Gomutrasava.



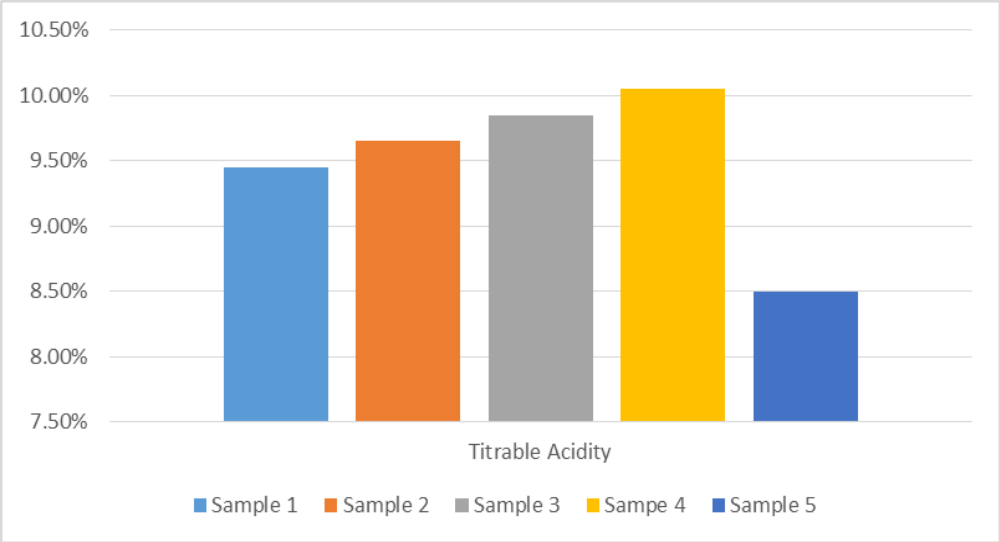
Graph no. 9: showing the comparision of Quantitative estimation of Sodium (mg/L) among the different samples of Gomutrasava.



Graph no. 10: showing the comparision of Quantitative estimation of Potassium (mg/L) among the different samples of Gomutrasava.



Graph no. 11: showing the comparision of Quantitative estimation of Calcium (mg/L) among the different samples of Gomutrasava.



Graph no. 12: showing the comparision of Quantitative estimation of Titrable Acidity among the different samples of Gomutrasava.

DISCUSSION

Discussion on preparation of gomutrasava

- 5 Samples of *Gomutrasava* was prepared by using *Gomutra* of 5 different breeds of cow, keeping other ingredients same.
- Same temperature (25^0C to 30^0C) was maintained for all the 5 samples to maintain uniformity in batches. The cold, winter season require a couple of weeks more for

completion of fermentation than in summer, the hot season which may take only a week or two. Hence I preferred to conduct this study in Summer.

- Same vessel (Porcelian jar) was used for all the 5 samples as it is easily available and portable for minimum production and studies have proved it as non-reacting and maintains all the parameters within limits.
- The *dravya's* which are used for fumigation are *Jatamamsi, Guggulu, Maricha, Agaru*. It is an important technique for surface sterilization in which micro-organisms are destroyed and their further growth is prevented as they contain volatile oils that have antibacterial and Antiseptic action.
- *Grita lepana* to the porcelain jar was done as it also increases the therapeutic value of the product.
- All the samples of *Gomutra* was collected on the same day to avoid bias in preparation.
- The color of all the samples of *gomutra* were almost same varying from yellowish brown to brown.
- *Gomutra* was filtered and Honey added and mixed well, then filtered again. Viscosity of all the 5 Samples slightly increased after adding Honey. *Tikta rasa* of *Gomutra* turned to slight sweetish. Color of all samples turned to dark brown.
- Unlike other *Asavas* here *dravadravya* is *Gomutra* and *madhura dravya* is Honey.
  Gomutra (cow urine) as a single medicine is capable of curing diseases like *Kandu (pruritis), Kilasa (skin disorder), Shoola (pain), Gulma, Atisara (diarrhea), Vaatroga, Kaasa (cough), Kustha (skin disorders), Krimi (worm infestation), Pandu (anaemia) and Udararoga (abdominal distention).*
- Honey also as single drug has many therapeutic values. *Madhura*, sweet ingredients are essential to provide base for fermentation. The fermentation of ingredients in presence of sweet substances triggers and energizes bacterial growth and thereby fermentation of amalgamated mix. Hence, nature, quantity and quality of sweetening substances, the main source of energy for fermentation affect the rate of fermentation and quality of the final product. Unlike other sweetening agents honey slows down the rate of fermentation but maintains sustainability.
- Optimal temperature range needed for quality fermentation is 28-34°c. It influences rate of fermentation and quality of end product. Fluctuating temperature and pH delays the onset of fermentation. Micro-organisms are sensitive to the variations in the environmental conditions; unfavorable environment with gross fluctuations in

temperature may cause the organisms to go into stagnant phase hampering the ongoing fermentation process. Range of in-door and out-door temperature recorded during the preparation of all the 5 samples was between 25^0C to 30^0C. Keeping in view of the importance of temperature, the entire practical work was carried out during the summer season for efficient fermentation. Container was kept in *dhanya raashi* to avoid temperature fluctuation and to maintain standard temperature which is needed for fermentation.

- *Prakshepaka dravyas* were made into course powder in the pulveriser which increases the surface area for the action of the solvent and also allows penetration of the solvent for the extraction of the active constituents.
- *Prakshepaka dravya* i.e, *Shunti, Maricha, Pippali* and *chitraka* (course powder) was added to all the 5 Samples and lid was closed. The addition of *Prakshepa* serves multiple purposes. The drugs of *Prakshepa* are known to contribute to the total therapeutic activity of the drug. Also, the chemical constituents of the *Prakshepa Dravya* indicate that they have got a definite role to play in the process of fermentation. Some of the drugs that are commonly used as *Prakshepa* contribute to the fragrance, taste, colour of the final product increasing the acceptability by the patient.
- On initial days, even lime water test and burning candle test were negative in all samples, which indicates absence of fermentation.
- Around 5^{th}-6^{th} day effervescence and hissing sound were observed suggesting that the fermentation process was being initiated in all the 5 samples. The parameters like effervescence and hissing sound are seen during fermentation due to the escape of CO2 as the carbohydrate will be transformed to one molecule of ethanol and with the liberation of two CO2 molecules. In *Asavarishta* these parameters denote the conversion of glucose present in the *madhura dravya* used for the preparation to alcohol and carbon dioxide.
- It was observed that *Prakshepaka churnas* added to the *Asava* of all 5 samples got settled down once the fermentation was completed by the day 30.
- The odour of *Asava* was prominent alcoholic smell along with aromatic smell of *prakshepaka churnas*. The sweet smell which was observed after adding *madhu* was converted to the slight alcoholic smell due to the genesis of alcohol.
- There was no significant difference in color, odour, appearance, physical tests, total yield was observed among the 5 samples of *Gomutrasava.*

Table no. 6: showing the final yield of different Samples.

Sl.no	Samples	Total Volume	Solid residue obtained	Yield
1	Sample 1	7.50L	140gms	7.20L
2	Sample 2	7.42L	150gms	7.10L
3	Sample 3	7.44L	155gms	7L
4	Sample 4	7.46L	140gms	7L
5	Sample 5	7.44L	145gms	7.20L

Discussion on analytical study

A. Organoleptic Characters

Method- Organoleptic characters of the test sample were documented by means of examination using sensory organs

Colour Brownish black

Odour Characteristic

Taste Bitter, astringent, bit sweet

Texture Liquid

All samples exhibited similar organoleptic characteristics.

B. Physico-chemical tests

1. Specific Gravity: It is the ratio of the density of the substance to the density of another substance accepted as standard. The usual standard accepted for liquids and solids is water.

The specific gravity of all the 5 samples are ranging from 1.04-1.05 at 25^0C, which denotes that there is no significant difference in specific gravity among the 5 samples of Gomutrsava.

2. Total Solids: Total solid content of a sample is the mass of solids remaining after a sample has been dried in oven for 24 hrs at 110^0C, divided by original mass of the sample

The total solids of all the 5 samples of Gomutrasava are ranging from 17% to 22%, which denotes that there is no significant difference in Total solids among the 5 samples of Gomutrsava.

3. pH: pH is a scale representing the relative acidity or the alkalinity of a solution, where in value 7.0 is neutral.

A value below 7.0 indicates acidic nature of the liquid and the above alkaline nature.

The pH of all the 5 samples of Gomutrasava are ranging from 4.06+/-0.10 to 4.18+/-0.10 which denotes that there is no significant difference in pH among the 5 samples of Gomutrsava.

4. Viscosity: Viscosity is a property of a liquid, which is closely related to the resistance to flow.

The Viscosity of all the 5 samples of Gomutrasava are ranging from 1.17 to 1.34 which denotes that there is no significant difference in Viscosity among the 5 samples of Gomutrsava.

C. Priliminary phytochemical Tests: Carbohydrate, Protein, Alkaloid, Cardiac glycoside, Flavinoids, Tannins, Triterpenoids and Saponin were present in all the 5 samples of Gomutrasava. It denotes that there is no significant difference in preliminary phytochemical tests among the 5 samples of Gomutrsava.

D. Fluorescent Tests: All the 5 samples of Gomutrasava exhibited same observations in Fluorescent tests.

It denotes that there is no significant difference in Fluorescent Tests among the 5 samples of Gomutrsava.

E. Quantitative estimation

1. Alcohol %: The amount of self-generated alcohol produced in Arishtasava represents the amount of alcohol %. In this study it was observed that in all the 5 samples the percentage of alcohol formed was comparatively less as the dravadravya used is gomutra which is kshareeya (Alkaline) in nature.

The Alcohol % of all the 5 samples of Gomutrasava are ranging from 4.02% to 4.85% which denotes that there is no significant difference in Alcohol % among the 5 samples of Gomutrsava.

2. Total Sugar: It is a measurement of reducing sugars and non-reducing sugars. The most common reducing sugars are glucose and fructose. Sucrose is a non-reducing sugar. OR All mono- and disaccharides present in the sample is the Total Sugar.

The Total sugar of all the 5 samples of Gomutrasava are ranging from 12.61% to 15.95% which denotes that there is no significant difference in Total sugar among the 5 samples of Gomutrsava.

3. Reducing Sugar: Those sugars which act as reducing agents are called reducing sugars. They contain an aldehyde (-CHO), which makes them undergo oxidation readily to form carboxylic acid or a ketonic C=O, all monosaccharides and disaccharides (except sucrose) are reducing sugars, e.g., glucose, fructose, lactose etc. They reduce Fehling solution and Tollen's reagent.

The Reducing sugar of all the 5 samples of Gomutrasava are ranging from 6.32% to 8.20% which denotes that there is no significant difference in Reducing sugar among the 5 samples of Gomutrsava.

4. Non-reducing Sugar: Sugar which does not have free aldehyde or ketone functional group is the non-reducing sugar. Also, they do not get oxidized. Sucrose is their most common source. They give a negative reaction for Fehling's as well as Benedict's test. All polysaccharides are non-reducing sugars.

The Non-reducing Sugar of all the 5 samples of Gomutrasava are ranging from 6.29% to 9.42% which denotes that there is no significant difference in Non-reducing Sugar among the 5 samples of Gomutrsava.

5. Sodium: The sodium content present in all the 5 samples of Gomutrasava are ranging from 3911 to 9981 which denotes that there is no significant difference in Sodium content among the 5 samples of Gomutrsava.

6. Potassium: The Potassium content present in all the 5 samples of Gomutrasava are ranging from 1696 to 9435 which denotes that there is no significant difference in Potassium content among the 5 samples of Gomutrsava.

7. Calcium: The Calcium content present in all the 5 samples of Gomutrasava are ranging from 82.1 to 109.21 which denotes that there is no significant difference in Calcium content among the 5 samples of Gomutrsava.

8. Titrable acidity: The Titrable acidity content present in all the 5 samples of Gomutrasava are ranging from 8.5% to 10.05% which denotes that there is no significant difference in Titrablr acidity content among the 5 samples of Gomutrsava.

F. TLC: In thin layer chromatography at 254 nm there was eleven compounds were identified in all the 5 samples of Gomutrasava .

All the 5 samples of Gomutrasava exhibited similar bands of same Rf values, only intensity of colors were different.

Overall view of the Pharmaceutical data and Analytical data gives an idea that as there is no significant changes, Gomutra of any of the above studied breed can be used in Gomutrasava.

CONCLUSION

Asava-arishta represent unique concept and forms of classical Ayurvedic pharmaceutical dosage forms wherein microbial transformation helps in initiating the process of generating alcohol to extract the therapeutic attributes of a group of natural ingredients and enhancing its bioavailability. *Asava-arishta* dosage forms help the collective transformation of multiple

phytochemicals having therapeutic attributes present in a group of raw ingredients to provide safe, potent and easy to administer liquid form with prolonged shelf life.

The proficiency of Ayurvedic knowledge, traditional processes developed based on deep understanding of natural product behavior and adaptability to contemporary needs are evident in these forms. Several points of significance emerged of this critical review that could be of help to further its development and therapeutic utility.

Standardization is necessary for present day manufacturing. This critical review helps understand sensitive issues and their significance in preparation of *asava-arishta*.

The purpose of the study was to find whether there will be any significant changes in terms of pharmaceutico-analytical study among the 5 samples of *gomutrasava*. Based on the output of the pharmaceutical study and analytical study reports it can be concluded that there is no any significant changes in terms of pharmaceutico-analytical study among the 5 samples of *Gomutrasava* prepared.

In India urine of different breeds of cow are used in medicinal preparation as per geographical area, there is no as such uniformity in its use in pharmaceutical industries. So here I had planned to evaluate the pharmaceutico-analytical changes in samples of *Gomutrasava* prepared by *Gomutra* of different breeds of cows- *Malnad gidda, Jersy, Amritmahal, Hallikar* and *Gir,* and there were no any significant changes among the samples which denotes that urine of any breeds of cow among the 5 breeds mentioned above can be used in the pharmaceutical industries.

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