VOLUME- 3 | ISSUE- 7 JULY 2020

International Research Journal of Ayurveda & Yoga

An International Peer Reviewed Journal for Ayurveda & Yoga

SJIF Impact Factor : 5.69 | ISRA Impact Factor : 0.415 | ISSN:2581-785X

Research Article | Volume: 3 | Issue: 7

Pharmacognosy Study And Quality Control Study Of *Gomutra Of* Icg *(India Cow Gomutra) And* Jcg *(Jersey Cow Gomutra)*

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ABSTRACT:

Our great *Acharyas* believed in Serendipity which lead to discovery of *gomutra* as a *dravya*, in *Ayurveda*. As since ancient times the Religion and science have co existed so, there was wide practice as parallel treatment of medical science with religion, thereby considering the cow *(Kamadhenu*) worth worshiping, the milk and urine. *Acharya*s have prescribed the treatment for various diseases where *Gomutra* is used a medicine to cure various diseases causing elements. All the *bhirhat triya* and *lagutriya* had mentioned the properties, formulations and use of it in various *vayadhi* specially *udharoga chikitsha* and *ghraha dosha* treatment, as it considered as pious in Hindu religion.

Keywords: *Gomutra*, JCG, ICG, cow urine, phytochemical, pharmacognostic, mutra varga.

Article received on-7 July

Article send to reviewer on-11 July

Article send back to author on-19 July

Article again received after correction on -24 July

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How to Site the Article : Anu Tatak kato, A.Rama.Murthy, Krutika Joshi.,Gaurav Sharma, Pharmacognosy Study And Quality Control Study Of *Gomutra Of* Icg *(India Cow Gomutra) And* Jcg *(Jersey Cow Gomutra):* IRJAY, July: 2020 Vol- 3, Issue-7; 1-28, https://doi.org/10.47223/IRJAY.2020.3717

INTRODUCTION:

Gomutra has been mentioned in all the *mutra varga* of *Samhita* and all *Nighantu,*out of *asta mutra,Gomutra* is considered to be most potent and effective of all. In this study the pharmacognosy study and quality control study of ICG (Indian cow *Gomutra*) and JCG (Jersey cow *Gomutra*) *Gomutra* have been done using all the standared methology to evaluate the diffrence in nature and content of both the urine sample .

Taxonomical classification of cow:

Kingdom[1]: Animalia

Phylum : Chordate

Class : Mammalian

Order : Artiodactyla

Family : Bovidae

Subfamily: Bovinae

Genus : Bos

Species : Baurus

Table no.1: Synonym according to *Nighantu*[2]

S. no	Vernicular-names	*Dhan.ni*	*Shodal.ni*	*Madan.p.ni*	*Kaidev.ni*	*Raj.ni*	*Bhav. Ni*	*Priya. Ni*
1	*Gomutram*	+	+	+	+	+	+	+
2	*Gojalam*	+	-	-	+	-	-	-
3	*Goambho*	+	-	-	+	-	-	-
4	*Gopaniyam*	+	-	-	-	-	-	-
5	*Goistrav*	+	-	-	-	-	-	-
6	*Gavap*	+	-	-	-	-	-	-
7	*Gokilal*	+	-	-	-	-	-	-
8	*Goneer*	+	-	-	-	-	-	-
9	*Surbhijal*	+	-	-	+	-	-	-
10	*Bhramambha*	-	-	-	+	-	-	-

Gana/varga* of *Gomutra* according to *charaksamhita* and *Sushuruta samhita- *Katuskanda*[3] *Shirovirechana gana*[4]

Table no.*2: Varga* Classification of *Gomutra* according to different *Nighantu*

S. no.	***Nighantu***	***Ganna/varga***
1	*Dhanvantari nighantu*	*Mamsha dravyadi varga*
2	*Shodhala nighantu*	*Mutra varga*
3	*Madanpala nighantu*	*paniya varga*
4	*Kaiyadeva nighantu*	*Mutra varga*
6	*Raja nighantu*	*sheeradi varga*
6	*Bhavprakshnighantu*	*Mutra varga*
7	*Priya nigantu*	*Kasturiyadi varga*

Table no.*3:*,*Rasa panchak* of *Gomutra* according to different *Nighantu's*

S.no	*Nighantu*	*madhur*	*amalya*	*lavan*	*Kattu*	*tikta*	*kashaya*
1	*Dhan.ni*	-	-	-	+	+	-
2	*Shodal.ni*	-	-	-	+	-	-
3	*Madan.p.ni*	-	-	+	+	+	-
4	*Kaidev.ni*	*Kinchit* +	-	-	+	+	+
5	*Raj.ni*	-	-	-	+	-	-
6	*Bhav.ni*	-	-	-	+	+	+
7	*Priya. Ni*	-	-	-	+	+	+

Table no.4 : *Guna* of *Gomutra* according to different *Nighantu's*

Sl.no	*Guna*	*Dhan.ni*	*Shodal.ni*	*Madan.p.ni*	*Kaidev.ni*	*Raj.ni*	*Bhav.ni*	*Priya. Ni*
1	*Tikshana*	-	+	-	+	-	-	+
2	*Lagu*	+	+	+	+	+	+	-
3	*Sar/Sarak*	+	-	-	-	-	-	+
4	*Kshar*	+	+	-	+	-	+	+
5	*Rusha*	-	-	+	-	-	-	-
6	*Ushana*	-	-	-	-	-	+	-

Table no.*5: Virya* and *vipaka* table of *Gomutra* according to different *Nighantu's*

S.no	***nigantu***	***ushana virya***	***kattu vepaka***
1	*Dhan.ni*	+	+
2	*Shodal.ni*	+	+
3	*Madan.p.ni*	+	+
4	*Kaidev.ni*	+	+
5	*Raj.ni*	+	+
6	*Bhav.ni*	+	+
7	*Priya. ni*	+	+

Table no.*6: Dosha Karma* of *Gomutra* As According To Different *Niganhtu's*

S.no	*Nighantu*	*Vata*	*pitta*	*Kapha*
1	*Dhan.ni*	*Vatashamak*	*Pitta karak*	*Kapha shamak*
2	*Shodal.ni*	*Vatashamak*	*Pitta vardhak*	*Kaphashamak*
3	*Madan.p.ni*	*Vataanulomak*	*Pitta prakopak*	-
4	*Kaidev.ni*	*Vatanashak*	*pittakarak*	*Kaphanashak*
5	*Raj.ni*	*Vata hara*	*pittakar*	*Kapha hara*
6	*Bhav.ni*	*Vatashamak*	*pittaprakopak*	*Kaphashamak*
7	*Priya. Ni*	*Vata-anulomak*	*pittavardhak*	*Kaphashamak*

Table no.*7:Karma* (Therapeutic Actions) Of *Gomutra* As According To Different *Nighantus*

S.no	*Nighantu*	***karma***
1	*Dhan.ni*	*Lekhana,agnideepana,medha vardahaka*
2	*Shodal.ni*	*Pachaka,deepana,medhaya,virechaka*
3	*Madan.p.ni*	*Deepana,pachana,ridhaya,bhedhana,sthrotas vishodana*
4	*Kaidev.ni*	*Pachaka,agnideepak,bhedak, medhaya,kushta,Gulma,udar roga,anaha,suwasha,arsha,pandu,shull*
5	*Raj.ni*	*Deepan,medhaya,tuwakrognashak*
6	*Bhav.ni*	*Agnideepak,medhaya,shoolnashak,Gulma,udhara roga,anaha,kandhu,netra roga,mukaha roga,kilas,aam,basti roga,kustha,kasa suwasa,shooth,kamala,pandu,kirmi*
7	*Priya. Ni*	*Mutral,kirmighana,vishagana,deepan,pachan,udarroganashak,pandu roganashak*

Table no.8:Vyadhiharatva. **Table of Gomutra according to different *nighantu***

S.no	*Nighantu*	*Vyadhiharatva*
1	*Dhan.ni*	*lekanyoga roga,agnimanda,medhanasa*
2	*Shodal.ni*	*Aruchi,agnimandaya,medanasa,verechana yoga roga*
3	*Madan.p.ni*	*Aruchi,agnimandaya,hridaya roga,bhedanyoga roga,sthrotas avarodhajanya roga*
4	*Kaidev.ni*	*Kustha rogahara ,Gulma,udhara roga,anaha, suwasha,arsha,pandu,shull,bhedhajanya roga,medha nasha,agnimandha,aruchi*
5	*Raj.ni*	*Aruchi,medhanasha,tuwak roga*
6	*Bhav.ni*	*Agnimandiya, medhaya nasha,shull, Gulma,udhara,anaha,kandu,netra roga,kilas,aam, basti roga, kustha,kasa,suwas,shooth,kamala,pandu,kirmi*
7	Priya. Ni	*Mutrakiritsa,kirmi,visha janya roga,udhara roga, pandu,aruchi,agnimandaya.*

A brief introduction on jersey cow and local *desi* cow[5]

1.Bos indicus (Indian and African) or zebu cattle

All the indigenous cattle comes in this group .these cattle have a common characteristic are as follows

a) Presence of a large prominent hump

b) Long face

c) Up right horns

d) Droping ears

e) Large dewlap and slender legs

f) The colour varies from white to grey and black

these cattle have low basal metabolic rate, better capacity for heat dissipation through cutaneous evaporation and thus help them to adaptation to tropical heat and resistance to various diseases.in u.s zebus are called Brahman cattle.

Table no.9: Types of Indian cow

breed	**home tract**	**weight**	**colour**	**distinguishing features**	**group**	**Utility**
1.Rathi	Alwar ,Bikaner district and rajputana region of rajasthan	m-385.6kg f-326 kg	white and light grey	medium sized powerful cattle similar to hariyana breed,well built and deep chest;face straight,flat forehead,eyes wide and large,ears are short but pendulous, short tail with black switch	2 group (dual perpose breed	bullocks are powerful and active ,suitable for field and road work.cow yields about 4.5kg milk per day
Sahiwal	central area southern	m-522kg	various shades of	deep body,loose skin,short legs,stumpy	3-group(milch breed)	best milk yielding breed. Average yield is

	part of Punjab	f-340kg	red,pale red, dark brown splashed	horns broad head and lethargic.horns are short and thick,don't exceed more than 3 inch.loose horns are common in females.massive hump in male,voluminous		2150kg in 300 days
Gir	Gir forest of south kanthiawar and wa-estern india	m-544kg f-386kg	color varying from almost black and to almost red	well proportion body,proud gait,docile temperament,ears are markedly long,pendulous resembling a tiny curled leaf,the head is moderately long but massive in appearance with prominent bony forehead,straight and leveled back are the most marking	group 3(milch breed)	average yield 1746 to 3175 kg, bullocks are heavy and powerful,medium paced,good for draught

				characters of the breed. tail is long, whip like with a black switch at the end, skin is fine and mellow ,hip bones are prominent.		

2. Bos Taurus (European)

These cattle groups are the descendent of Bos primigenius, the original wild cattle of Europe. Nowdays they no longer exist. They are all non humped cattle which are found mainly in Europe and North America. These foreign breeds of cows are mainly use for cross breeding purpose and high milk yielding characteristic.

Table no.10: Characteristics of jersey cow breed in table form are as follows:

Country of origin	**Color**	**Weight**	**Average gestation periods**	**Milk yielding capacity in 305 days**	**Age at first calving(month)**	**Distinguishing characteristics**
English channel	fawn, with or without	male-675kg	280 months	4000 lit	38 months	Cows have straight top lines, level

	white marks	female-450kg				hump, sharp withers, heads have a double dish, animals are inclined to be nervous and sensitive. Capable of utilizing roughages efficiently .can with stand tropical and humid climate more than Holstein

CHEMICAL COMPOSITION OF *GOMUTRA*[6]:

Nitrogen (N_2), Sulphur (S) Ammonia (NH_3) Ammonia gas (NH_3) Copper (Cu) Urea [$Co(NH_2)_2$]Phosphate (P) Manganese (Mn) Calcium (Ca) Vit. A, B, C, D, E, Lactose ($C_6H1_2O_6$) Water (H_2O) Creatinine ($C_4HgN_2O_2$) Otherminerals, Iron (Fe), Uric acid ($C_5H_4N_4O_3$) Sodium (Na), Carbonic acid (HCOOH) Salt $(NaCl)_2$.Acording to other studies reported that cow urine distillate is having bio-enhancing activity, Anti microbial effect, anti fungal agents, anti infective agents and anti Cancer agent etc. Properties It also reduce the cost of treatment and the Side effects[7].

AIMS & OBJECTIVES:

- To establish the identity of, ICG(Indian cow gomutra), and JCG (Jersey cow gomutra)through pharmacognostical study.For proper authentication & identification of the drug.

- To assess the physicochemical parameters ICG, and JCG,.
- To detect the presence of functional group present in a given sample of ICG (Indian cow *gomutra)* urine sample and JCG (jersey cow *gomutra*) urine sample[8].
- Trace Elements Analysis on ICG and JCG.

MATERIAL AND METHOD

Material

ICG,and JCG, were used as material for the pharmacognostical study. The study was conducted as per the guidelines of *Ayurvedic* pharmacopoeia of India.

Test Sample (Collection and Authentication): -

Jersey Cow *Gomutra* Sample (JCG), Indian Cow *Gomutra* Sample (ICG) was collected form Shri Pinjarpole Goshala (dated on20/9/19vide invoice no 13693) *Goshala* by scholar herself on the month of September 2019.

For the Desi Cow Urine, Gir (*Bospremigeniusindicus*) or Sahiwal (*Bospremigeniusindicus*) species of the cow was selected as they are available in Rajasthan. For Jersey cow urine, Jersey (*Bostaurus*) and Guernsey (*Bostaurus*) species was selected.

Chemical and Consumables: -

Glycerin, Safranin, Dilute Ferric chloride, Eosine, Methylene blue, HCI, Phlorogucinol, Iodine solution, Molisch's reagent, Benedict's reagent, Barfoed's reagent, Fehling solution, Mayer's reagent, Dragondroff's reagent, Picric Acid, Nitric Acid, Ferric Chloride, Potassium Dichromate, Ninehydrine, Chloroform, Ammonia Solution, Copper sulphate, Sodium Hydroxide, millons reagent, Sulphuric Acid, Lead Acetate, potassium permanganate, NaCl, NaOCl, K.I., Sodium Carbonate, Acetone and Benzene etc.

Equipment's or Apparatus: -

Digital balance machine, Common glass wear, Microscope, Microtome, Muffles Furnace, Hot Air Oven, Moisture Meter, pH meter, Chromatography Camber, Soxhlet assembly, Clavinser assembly etc.

Method

Macroscopic study:

The collected sample was studied organoleptically, with naked eye & magnifying lens, with the help of Pharmacognostical procedure i.e. Appearance, size, shape, colour, and odour and findings were recorded. . **Macroscopic study:** The collected sample was studied organoleptically, with naked eye & magnifying lens, with the help of Pharmacognostical procedure i.e. Appearance, size, shape, color ,taste and odour and findings were recorded.

Table no.11: Result of organoleptic study

S.no	macroscopic study	ICG	JCG
1	**Color**	dark brown	light brown
2	**Odour**	characteristic Gomutra smell	characteristic Gomutra smell
3	**Taste**	pungent + salty+ astringent+ bitter	pungent ++ salty++ astringent++

ANALYTICAL STUDY

Every drug has its own physical and chemical characteristics property which help to separate it from other closely related drug. The Physicochemical analysis provides the objective parameters to fix up the standards for quality of raw drugs as well as finished products. Analytical study of a drug also help to interpret the pharmacokinetics and pharmacodynamics of the same. The production cost of synthetic drugs is very high and shows many side effects. It takes almost decade to develop a new drug[9]. On the other hand plant based drugs have long history of use and better patient tolerance as well as public acceptance. They are easily available at low

cost as compare with modern drugs. Also phytoconstituents isolated from them may act as a lead compound for new pharmaceuticals[10].

MATERIALS AND METHODS:

1. **Collection, preservation and preparation of test drugs:**

The details of the collection,and preservation have been provided in pharmacognosy chapter.

2. **Physicochemical analysis**

. Loss on drying, foreign matter, ash value, acid insoluble ash, water soluble extractive, alcohol soluble extractive, Ph value, Specific gravity, viscosity, and refractive index were determined following standard procedure in API.[4]

3. **Chromatographic study**

TLC study was carried out following standard guidelines of API.

Drying , ash value, water soluble, methanol soluble extractive values, $P_{H.}$

Methods

1. **Physico chemical parameters**

Determination of Moisture Content[11]

Moisture content is a water holding capacity of sample, higher moisture content in sample show that it may decrease stability.

Moisture content was determined by placing weighed sample of 5gm of drug in oven at 105º for 5 hours, and calculated weight of sample for every 30 minute, until the weight of the sample came out to be constant, no variation of weight was recorded. This sample was allowed to cool at room temperature in a desiccator for 1 hour before weighing.

Weight of the empty petridish = W_1gm

Weight of the drug sample = X gm

Weight of the petridish with drug before drying (W_3) = (W_1 + X)

Weight of petridish after drying = W_2gm

Loss on drying in % = W_3-W_2x100/X

Determination of pH[12]

The pH value of an aqueous liquid may be defined as the common reciprocal of the hydrogen ion concentration expressed in gram per litre. It practically means the

quantitative indication of the acidity or basic nature of a solution.

- The pH of a given solution is measured by using digital pH meter.
- First Standardized the pH meter. Tablets of different pH were taken and each tablet was dissolved in 100 ml of distilled water to prepare solutions of different Ph.
- The instrument was switched on and left for some time until required different Ph solutions appeared.
- Buffer solution was taken in the beaker and the electrode was dipped in it. Same procedure was repeated for the other buffer solution after washing the electrode thoroughly with distilled water.

  The sample was taken (10% aqueous solution) and electrode was dipped in it and the value of pH was noted.

Chromatography[13]:

Thin layer Chromatography is a tool for separation and identification of chemical constituent. Thin-layer chromatography is a technique in which a solute undergoes distribution between two phases, a stationary phase acting through adsorption and a mobile phase in the form of a liquid. The adsorbent is a relatively thin, uniform layer of dry finely powdered material applied to a glass, plastic or metal sheet or plate. Glass plates are most commonly used. Separation may also be achieved on the basis of partition or a combination of partition and adsorption, depending on the particular type of support, its preparation and its use with different solvent.

Identification can be effected by observation of spots of identical Rf value and about equal magnitude obtained, respectively, with an unknown and a reference sample chromatographed on the same plate. A visual comparison of the size and intensity of the spots usually serves for semi-quantitative estimation.

Chromatography plates-

For ICG and JCG TLC plate coated with 0.25 mm layer of silica gel 60 F_{254} with fluorescent indicator was used. (Each plate dimension is 10 cm long and 2 cm width)

Activation of pre-coated Silica gel 60 F_{254} -

Plates were dried in hot oven at 105^0 C for one and half hour

Preparation of mobile solution

Toluene (2.0) : Ethyl acetate (5.0): formic acid (1.5) : water(1.5)

Visualization: Anisaldehyde sulphuric acid reagent-(0.5ml anisaldehyde in 50ml of glacial acetic acid +1ml sulphuric acid 97%.

Rf Value-

Measured and recorded the distance of each spot from the point of its application and calculated Rf. value by dividing the distance travelled by the spots by the distance travelled by the front of the mobile phase.

Calculation of R_f Value

R_f= Distance travelled by solute from origin line

Distance travelled by solvent from origin line

Density[14]:

Select a thoroughly clean and dry pycnometer. Calibrate the pycnometer by filling it with recently boiled and coole d Water at 25ºC and weighing the contents. Adjust the temperature of the substance to be examined, to about 20ºC and fill the pycnometer with it. Adjust the temperature of the f illed

pycnometer to 25ºC, remove any excess of

the substance and weigh. Substract the tare weight of the pycnometer from the filled

weight of the pycnometer. Determine the weight per milliliter dividing the weight in air, expressed in g, of the q uantity of liquid which fills the pycnometer at the specified temperature, by the capacity expressed in ml, of the pycnometer at the same temperature.

Sp. Gravity:

Sp. Gravity= density of sample/ density of water

Refractive Index[15]:

The refractive index (η) was measured with Abbe's refractometer in sunlight at 25^0C.

- Open the prism of refractometer and clean with soft cotton.

- Calibrate the apparatus against distilled water which has a refractive index of 1.3325 at 25^0C.

- Place a drop of the sample to be tested on the lower part of the prism and close the refractometer.

- Observe through eyepiece and turn the dispersion correction compensator knob until the coloured indistinct boundary seen between the light and dark field becomes a sharp line.

- Adjust the knurled knob until the sharp line exactly intersects the midpoint of the cross wires in the image. Read the refractive index from the magnifier in the pointer and record the reading.

- Clean the prism with cotton wool wetted with hexane or acetone.

- Close the prism and keep the refractometer in a box and place it at identified location.

Determination of Viscosity[16]

Viscosity is a property of a liquid, which is closely related to the resistance to flow. In C.G.S system, the dynamic viscosity (n) of a liquid is the tangential force in dryness per square centimeter exerted in either of the two parallel planes placed, 1 cm apart when the space between them is filled with the fluid and one of the plane is moving in its own plane with a velocity of 1 cm per second relatively to the other. The unit of dynamic viscosity is the poise (abbreviated p). The centi (abbreviated cp) is $1/100^{th}$ of one poise. While on the absolute scale, viscosity is measured in poise or centi poise, it is not convenient to use the kinematic scale in which the units are stokes (abbreviated S) and centistokes (abbreviated CS). The centi stokes is $1/100^{th}$ of one stoke. The kinematic viscosity of a liquid is equal to the quotient of the dynamic viscosity of the liquid at the same temperature, thus:

Kinematic Viscosity =dynamic Viscosity /Density

Viscosity of liquid may be determined by any method that will measure the resistence to shear offered by the liquid. Absolute viscosity can be measured directely if accurate dimensions of the measuring instrument with a liquid of viscosity and to determine the viscosity of the unknown fluid by comparision with that of the known.

Procedure

The liquid under test is filled in a U tube viscometer in accordance with the expected viscosity of the liquid so that the fluid level

stands within 0.2 mm of the filling mark of the viscometer when the capillary is vertical and the specified temperature is attained by the test tube. The liquid is sucked or blown to the specified weight of the viscometer and the time taken for the meniscus to pass the two specified marks is measured. The kinematic viscosity in centistokes is calculated from the following equation:

Kinematic viscosity = kt

Where k = the constant of the viscometer tube determined by observation on liquids of known kinematic

viscosity. T = time in seconds for meniscus to pass through the two specified marks.

To detect the presence of functional group present in a given sample of ICG (indian cow *gomutra)* urine sample and JCG (jersey cow *gomutra*) urine sample[17].

Test for unsaturated compound (>c=<) and (- c=c-)

1. Take 2ml of both the*gomutra* sample in a separate test tube.

2. Dissolve both the *Gomutra* sample in 2ml of distilled water.

3. Add 1% alkaline potassium permanganate solution solution.

4. Observed both the solutions, if the pink color persists then it is saturated compound. if the pink color disappears then the given organic compound is unsaturated.

2) Test for R-OH group presence in both the given samples ICG and JCG urine sample.

Take 2ml of both the urine sample separate test tubes. Add 10 ml of NaCl with the help of dropper in both the *gomutra* sample.

Put both the sample in a hot water bath and observe the change in colour.

If yellow crystals of idoform separates, it shows the presence of R=OH compound

Test for phenolic group (OH) presence in both the urine sample of ICG and JCGT urine Samples (ferric chloride test).

- Take 2ml of both the urine samples in a two separate test tubes.

- Add neutral ferric chloride solution drop by drop with a help of dropper separately in both the samples.
- Note any color changes in the both urine samples appearance of a blue, green, violet or red color indicates the presence of phenolic –OH group in a given samples.

Test for an aldehyde presence in both the urine samples(ICG and JCG):

- a).Take 2ml of both the urine sample in a two separate test tube.
- Add both the reagent (fehling solution A, fehling solution B) and 2-3 drops of of water in each of the urine samples.
- Heat the content of the Test tube for about 5min in a hot water bath and observe any change any in the colour.
- Formation of brick red precipitate of copper oxide indicates the presence of an aldehyde group.
- b) Take 5 drops of both the urine in a two separate test tube.
- Add 2ml of Benedict reagent in both the urine sample.
- Heat the content of the test tube for about 2 min in a hot water bath, andobserve any change in color.

If anorange red precipitate appear it indicates the presence of an aldehyde group.

Ester Test: to detect the presence of carboxyl group (-COOH) in both the ICG and JCG urine sample.

- Take 0.1 gm of compound in a test tube. add 1ml ethanol or methanol and 2-3 drops of concentrated sulphuric acid heat the mixture for 10-15 min in a hot water bath at about 50^0C. Pour the reaction mixture in a beaker containing aqueous sodium carbonate solution to neutralize excess sulphuric acid and excess carboxylic acid
- Add both the urine samples separately with the sodium carbonate solution slowly so that

effervescence (formation of gas bubble) is visible clearly.

- And observe both the samples for any change.
- Sweet smell of the substance formed indicates the presence of carboxyl group

- **AminoGroup Test (NH_2) Or Solubility Test:**
- Take 1 ml of both the urine sample in a two separate test tube.
- Add 2 to 3 drops ofDiluteHclwith the help of a dropper and shake both the sample properly and observe.
- If the sample dissolves with the Dilute HCl it shows the presence of an amino group.

Carbylamine Test ($C_3H_6N^+$)

Take 2-3 drops of both the urine sample in a two separate test tube.

Add 2 to 3 drops of chloroform followed by addition of an equal volume of 0.5ml alcoholic potassium hydroxide soln. Heat the contents gently with the help of test tube holder and observe any change in both the urine samples. An obnoxious smell of carbylamines confirms the presence of primary amino group in the compounds.

Trace Elements Analysis

AAS is a widely used technique for determining a large number of metals. In AAS, an aqueous sample containing the metal analyte of interest is aspirated into an air acetylene flame, causing evaporation of the solvent as well as vaporization of the free metal atoms (atomization). N, P, K, Na, Ca, Cu, Fe, Mg, Mn, Zn, Cd, Au and Ag.

In two different type of *gomutra* sample was analyzed using AAS equipped with flame and graphite furnace. Graphite furnace was used for the determination of trace and ultra-trace concentrations (N, P, K, Na, Ca, Cu, Fe, Mg, Mn, Zn, Cd, Au, Ag). The operation conditions used to operate AAS instrument were as recommended by the manufacturer. Data were rounded off properly based on the value of standard deviation from measurement conducted in triplicate

Table no.12: Study result of Physical property of two *Gomutra* sample:

sr.no	Test	ICG	JCG
1	moisture content%	46.92	46.88
2	density(gm/ml)	1.05172	1.04098
3	specific gravity	1.03459741	1.024032266
4	refractive index	1.356 (brick value=15)	1.345(brick value=8.5)
5	Ph value	8.0	8.1
6	Viscosity	2.39	0.94

Table no.13 : study result of Thin layer chromatography of both the Gomutra sample

ICG	JCG
	
0.18	0.20
0.23 0.51	0.34 0.51
0.59	0.75
0.75	0.95
0.9	

Table no.14:Functional group analysis of both the *Gomutra* sample

S. no.	Test	ICG	JCG
1	Test for unsaturated compounds(>c=c<and –c=c-)	**+ve**	**+ve**
2	Idoform test(R-OH group)	**-ve**	**-ve**
3	Ferric chloride test(phenolic group-OH)	**-ve**	**-ve**
4	Aldehyde Test a) Fehling test b) Benedict test	 **+ve** **+ve**	 **+ve** **+ve**
5	Amino group(-NH2)/Solubility test	**+ve**	**+ve**
6	Carbylamines test for amino group test	**+ve**	**+ve**
7	Carboxyl group(-COOH-) or ester test	**+ve**	**+ve**

Table no.15: Result of Trace element analysis of both the *Gomutra* sample:

S. no	Test	ICG	JCG
1	Nitrogen as N	0.003 %	0.001 %
2	Phosphorus as P	1.6 %	1.5 %
3	Potassium as K	21ppm	19ppm
4	Sodium as Na	9 ppm	7ppm
5	Calcium as Ca	4ppm	3ppm
6	Copper as Cu	BDL (D.L.1.0)	BDL (D.L.1.0)
7	Iron as Fe	0.05 ppm	0.06ppm
8	Magnesium as Mg	165 ppm	160ppm
9	Manganese as Mn	0.45ppm	0.52ppm
10	Zinc as Zn	0.02	0.02ppm
11	Cadmium as Cd	BDL (D.L.1.0)	BDL (D.L.1.0)
12	Gold as Au	BDL (D.L.1.0)	BDL (D.L.1.0)
13	Silver as Ag	BDL (D.L.1.0)	BDL (D.L.1.0)

BDL: Below Detection level, D.L: Detection Limit

DISCUSSION

Pharmacognostical and physic-chemical analysis are meant to establish the identity, purity and strength of drug. These tests also establish the quality of drug being used for oral consumption as well as for the

preparation of further formulations. Ingredients of cow urine are similar with human body. Hence consumption of cow urine is useful to maintain the balance of these substances and cures incurable diseases[18]. The values hence obtained were compared to the available Standard data. Refractive index, relative density, specific gravity, viscosity are the tools for identification and assessment of quality and strength of the sample. Here all the tests were found within standard limits.

The JCG and ICG samples were tested for traced elements (Table no.16.), where presence of Copper, Iron, Nitrogen, Phospherous etc were observed in both the samples. These traced elements are essential for cell functions at biological, chemical and molecular level[19].

CONCLUSION:

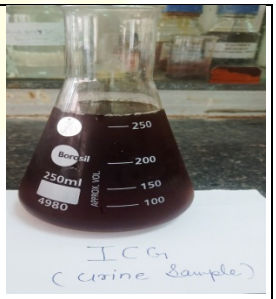
The pharmacognostic and phytochemical analysis of both the urine sample shows variation in the macroscopic study, Physical property, chromatography study, Functional group analysis and trace element analysis .These result show that the micronutrients content of ICG is higher than the JCG. And the ICG show more spots in thin layer chromatography study as compare to JCG sample.

Acknowledgement:- Nil

Financial Assistant:- Nil

Conflict of interest :- Nil

PHOTO COLLECTION

			
Jersey cow	Indian cow	JCG sample	ICG sample

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