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Multidimensional Use of Cow Urine (*Gomutra*), One of the Ingredients of *Panchagavya* – A Narrative Review

Review Article

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Abstract

Gomutra is one of the constituents of "*Panchgavya*". The use of "*Panchgavya*" dates back to 2nd and 3rdcenturies. *Gomutra* is a key component of *Panchgavya chikitsa*. Its importance and usage has been noted in several Ayurvedic literatures for the treatment of *shool* (*colic), akshi-mukharoga* (disorders of eye and mouth*), kilaas* (vitiligo*), kasa* (cough*), shwas* (respiratory disorders*), kamala* (jaundice*), pandu (*anaemia*)*, etc. This narrative review was designed to explore the research done on *gomutra*.The data from every study on *gomutra* was collected in this review. On browsing the various databases, 4 analytical studies, 15 animal studies, and 7 clinical studies were found. In this review, *gomutra* was found to have multifaceted use in various disorders. The properties of *gomutra* are such that it could be used in a versatile manner. It was also observed that the number of clinical studies were very less. Hence, there was a need to conduct clinical studies for confirmation of the results obtained in analytical and preclinical studies. Additionally, over the last few years, the Cow Urine treatment and Study Center in Indore has accomplished extensive research in this field. However, public vigilance and acceptance is intended to promote the importance and wide applications of *gomutra* and to uplift people's health and lifestyles.

Key Words: *Gomutra, Panchgavya,* Cow urine.

Introduction

Indian cow species are a distinctive and varied group of animals known as "*Kaamdhenu*" (One that can accomplish all of humanity's desires).Cow urine, one of the ingredients of '*Panchagavya*,' is capable of curing various curable and incurable ailments and has been utilized in ayurvedic preparations since ancient times extensively, as mentioned in prehistoric holy scriptures such as *Atharva Veda, Charaka Samhita, Sushruta Samhita, AshtangHridaya, and Bhavaprakash.*(1)Eight types of animal urines have been documented in Ayurveda literature, which can be employed in medication and therapies. All of these eight different varieties of animal urines are sharp (*teekshna*), spicy (*katu*), pungent, bitter *(tikta*) with a salty.(2)

As per mythology, the ancient Vedic text *"Dammar Tantra*" documents the "Benefits of Urine Therapy," which Lord Shiva enlightened Mother Parvati about. In ancient writings, urine is referred to as *"Shivambu*", which means "Shiva's water." Urine therapy has been used for ages to treat a variety of ailments.The 5000-year-old document "*Dammar Tantra"* describes the influential curative technique of "Self-urine therapy" in the "*Shivambukalpa Vidhi*" section, which relates this practice to the holy Hindu literature *Vedas. Gomutra* therapy is mentioned in most of the volumes of Ayurvedic literature. In *Bhavaprakasha*, urine is described as "*Vishaghna*" (Anti Poisonous). (3)

Charaka Samhita describes the qualities of *gomutra* as "*Krimi-Kushthanoot, Doshaghna and Madhur"*(that which cures infections and skin diseases) whereas *Sushrut Samhita* describes it as "*Medhya (*nootropic*),Kapha-vata-noot (*that which reduces vitiated humors-*kapha* and *vata),Katu* (pungent),*Teekshna* (sharp),*Ushna* (hot),*Laghu*(light) *and Agni deepanam"* (that which improves digestion).*Ashtang Hridaya* mentions the properties of mutras as *"Lavana- anurasa*(a bit salty), *Ruksha*(dry), *Teekshna*(sharp*), Ushna*(hot), *Katu*(pungent), *Laghu*(light).*"*

Cow urine contains 2.5% urea and enzymes each, 95% water, minerals, 24 types of salts, and hormones. It also contains carbonic acid, ammonia, iron, calcium, phosphorus, nitrogen, manganese, iron, sulphur, phosphates, potassium, enzymes, cytokine, urea, uric acid, amino acids, and lactose.(4)

Several studies have been conducted to study the effect of cow urine in the form of *arka* (distillate) or *asava*(fermented form) and in combination with other herbs on obesity, diabetes, analgesic, etc. Also, cow urine distillate has been discovered to have immunomodulatory properties, as it stimulates T- and B-cell multiplication as well as IGg7 levels. (5)

Hence, this review is undertaken to explore the research work conducted in various areas.

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Materials and methods

This review was conducted by searching Ayurvedic literature and various search engines like Google Scholar, PubMed, AYUSH (Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy) Portal, and Scopus. Analytical studies, Animal studies and Clinical studies on *gomutra* are included here.

Observations and Results

In this search, 26 articles were found as shown in Table 1

Table No.1

Type f Article	Year	Author name	Title of study	Research Outcome
ANALYTICAL STUDIES				
1	2013	Hitesh, Ramani (6)	"Biochemical of Cow urine."	The highest levels of urea and phenol were detected in pregnant cows, followed by milking cows, and lastly calve.
2	2015	ShivamJoshi, et.al(7)	"*Swedana Samsakara* of *Haritaki*(*Terminalia chebula* Retz) with *Jala* and *Gomutra*: A comparative Phyto-Pharmacognostical study"	Preparing *Haritaki* in *gomutra* medium altered intracellular architecture and increased intracellular nutrient bioavailability.
3	2017	BodhakarKishor, N.(8)	"*Shodhana* Of *Vishadravya* W.S.R.T.*Vatsanabha Shodhana* And *Bhallatak Shodhana*"	The total alkaloid content of *Ashuddha Vatsanabha* was reduced after *Shodhana* with *gomutra.*
4	2019	S.P. Vinay, et.al(9)	"Novel *Gomutra* (cow urine) mediated synthesis of silver oxide nanoparticles and their enhanced photocatalytic, photoluminescence and antibacterial studies"	Silver oxide nanoparticles generated from gomutra had potent antibacterial efficacy against food borne pathogens.
ANIMAL STUDIES				
1	2000	JimohS. A, et.al(10)	**"Effect Of Chronic Consumption Of Cow's Urine Concoction On Gastric Mucosa Of Albino Rat"**	On chronic consumption, the epithelial lining of the pyloric pits revealed considerable damage and sloughing after four weeks.
2	2004	K Krishnamurthi et al(11)	"Protective effect of distillate and redistillate of cow's urine in human polymorphonuclear leukocytes challenged with established genotoxic chemicals"	The redistillate of cow's urine had majority of the antioxidants coming from volatile fatty acids that protected human polymorphonuclear leukocytes.
3	2006	DipanwitaDutta et al.(12)	"Anticlastogenic effect of redistilled cow's urine distillate in human peripheral lymphocytes challenged with manganese dioxide and hexavalent chromium"	Redistilled cow's urine distillate had substantial antigenotoxic and anticlastogenic that protected HPNLs and HLC treated with Cr+6 and MnO2
4	2008	E. Edwin Jarald, et al (13)	"Antidiabetic Activity of Cow Urine and a Herbal Preparation Prepared Using Cow Urine"	The experiment suggests that cow urine extracted active ingredients from herbal medication which helped in reducing blood sugar levels.
5	2009	Mishra, R.; Dass,et.al.(14)	"Histo-morphological evaluation of wound healing potential of cow urine in goats"	Oral use of cow urine aided in the healing of surgical wounds, while topical treatment offered synergistic effects in goats.
6	2010	Ravi Kant Upadhyay, et.al (15)	"Antimicrobial Activity Of Photo-Activated Cow Urine Against Certain Pathogenic Bacterial Strains"	Photo activated cow urine showed very high susceptibility to all bacterial strains at very low concentration.
7	2011	K. Rajapandiyan, et.al(16)	"*Azadirachta indica* - cow urine extract, a novel controlling agent towards clinically significant Multi Drug-Resistant Pathogens"	Flavonoids and alkaloids of cow urine and chloroform extracts of A.indica could be responsible for highest antibacterial activity against Multi Drug-Resistant Pathogens.
8	2011	Charmi P Shah,et.al (17)	"In Vitro Screening of Antibacterial Activity of Cow Urine Against Pathogenic Human Bacterial Strains"	The significant antibacterial activity of cow urine was likely due to presence of certain volatile and non volatile components and its acidic pH.

9	2012	SP. Wate, et.al (18)	"Study of Analgesic Activity of Cow Urine and Its Distillate by Rat-Tail Immersion Method"	Steroidal moieties and several volatile fatty acids were responsible for the analgesic action.
10	2012	Sachdev, et al.(19)	"Evaluation Of Antidiabetic, Antioxidant Effect And Safety Profile Of *Gomutra Ark* In Wistar Albino Rats."	*Gomutra arka* had a considerable anti-diabetic impact that was comparable to glibenclamide.
11	2013	A.B Shukla,D.RMandavia (20)	"Antiurolithiatic activity of cow urine *ark* on ethylene glycol induced renal calculi"	Cow urine ark had a strong antiurolithiatic effect and restored damaged kidney function.
12	. 2014	· SA Seriki, et. al (21) ·	"Role of cow urine on the onset of leptazole-induced convulsion in Wistar rats"	On comparing the control group and cow urine group it was found that cow urine did not prevent convulsions.
13	2014	Nagda, G., Bhatt, D.K(22)	"Effect of treatment of cow's urine "*Gomutra*" and antioxidants in alleviating the lindane-induced oxidative stress in kidney of Swiss mice (*Musmusculus*)."	Lindane treated group showed increased lipid peroxidation and endogenous levels of vitamin C and E were significantly decreased as compared to control. Administration of cow urine and antioxidants alleviated the levels of peroxides.
14	2017	JianMeng Hoh, B. Dhanashree (23)	"Antifungal effect of cow's urine distillate on Candida species"	Cow's urine distillate inhibited Candida species in a concentration-dependent manner and was effective against isolates that are resistant or susceptible to commonly used antifungal drugs.
15	2019	K. N. Killari,et. al. (24)	"Anti-inflammatory Activity of Wheat Grass Fortified with Cow Urine Distillate"	Wheat grass fortified with cow urine did not have significant anti-inflammatory activity when compared to control group.
			HUMAN STUDIES	
1	2012	Raman S. Belge, Archana R. Belge (25)	"Clinical Evaluation of the Efficacy of *Gomutra Aasava* in *Shvitra* Vis-A-Vis Vitiligo."	Administration of *Gomutra Aasava*, demonstrated considerable repigmentation properties.
2	2013	Dr.OmaprakashW. Talokar,,et.al (26)	"Clinical Evaluation of Cow-Urine Extract special reference to *Arsha* (Hemorrhoids)"	Oral Cow-urine supplementation reduced complications of Hemorrhoids of Grade I & II.
3	2016	Kumar Saini,Naveen,(27)	"Clinical trial of *gomutra* (cow urine) in obesity management"	The trial revealed significant weight and lipid profile reductions.
4	2016	Garg,et.al (28)	"A Comparative Study Of *KapalBhati* And *Medohara Arka* In The Management Of *Sthaulya* (Obesity)."	*KapalBhati* in conjunction with the *Medohara Arka*, was effective in the management of *Sthaulya*.
5	2017	Dr.Mrudul Mohan, et al(29)	"A Clinical Study on *Vrana Shodhana* Action of *Gomutra Arka* in *Dushta vrana* w.s.r. to Diabetic Foot Ulcer"	In comparison to Betadine, *Gomutra Arka* had good benefits in lowering burning sensations, itching, smell, size, depth, discharge and the presence of granulation tissues.
6	2020	Manish Kumar Singh,et.al (30)	"A Clinical Evaluation Of Antimicrobial Activity Of *Gomutra Arka* In *Dusta Vrana".*	*Gomutra Arka* proved to be a better Antimicrobial agent than povidone-iodine.
7	2018	ParweShweta D, et al (31)	"Effect of *Gomutra Niruha Basti* on *Sthaulya* (obesity)"	The administration of *gomutra niruha basti* yielded statistically significant results.

Discussion

On browsing for the articles, 4 analytical studies, 15 animal studies, and 7 human studies were found. A brief account of the studies conducted has been mentioned below-

Biochemical constituents of cow urine of Gir species at various phases

- A total of 12 cows were selected, divided into three groups(4 each): calf, pregnant, and milking cows and were studied for four weeks by Hitesh, Ramani. On analyzing the urine of pregnant cow, milking cow and calf, the urea and phenol content was least in that of calves which indicated that calves had a better renal function than other two groups.

Effect on Gastric Mucosa

- Effect of prolonged ingestion of cow urine concoction and the action of tobacco leaves were investigated on Albino rats in the study by Jimoh S.A, et.al. A modified version of cow urine concoction without tobacco leaves; a formulation with only tobacco leaves soaked in cow urine and a full formulation cow urine concoction was prepared. After staining with haematoxylin and eosin dyes, the histology of the mucosa was examined. The pyloric pits in mice given

full formulation cow urine concoction revealed moderate commotion with sloughing of the epithelial lining.

Role of cow urine in *Haritaki (Terminalia chebula) Swedana Samsakara* and *Vatsanabh shodhan* (purification)

- Three samples *Haritaki Churna*(Powder);*Haritaki swedana* with *jala*(water) and *Haritaki swedana* with *gomutra* were prepared in the study by Shivam Joshi,et.al, to compare the role of *Swedana Samsakara* based on pharmaceutical, pharmacognostical (powder microscopy),HPTLC (High-performance thin-layer chromatography)densitogram.The most variance was found *Haritaki swedana* with *gomutra* in all Phyto-Pharmacognostical and HPTLC tests.
- Study conducted by Bodhakar Kishor, showed that after purification of *Vatsanabha* with *gomutra* total alkaloid was decreased. But on purification of *Bhallataka* (*Semicarpus anacardium*) with *gomutra* (cow urine), *godugdha* (cow milk), *Ishtika churna* (brick powder) and *narikela jala*(coconut water)mild oil was left. Moreover, the phenolic contents that were present in impure *Bhallataka* were absent after purification with *churna* of *ishtika*(brick powder).

Antimicrobial activity

Several experiments were conducted to study the antimicrobial activity of cow urine and have been summarized below.

- Silver oxide (Ag_2O) nanoparticles were successfully synthesized utilizing cow urine in the study by S.P. Vinay,et.al. The outcome forecasted various biological components in cow urine that could be used as a source for the production of Ag_2O nanoparticles using a 500°C combustion process. Disc diffusion method showed that the produced material had good antibacterial activity against both gram-negative and gram-positive bacterial strains.
- Also, in the study conducted by Ravi Kant Upadhyay et al, the activity of inhibition was against both gram-negative and positive bacteria with maximum efficacy at 30 microlitres dose.Additionally, the results by K. Rajapandiyan,et.al also showed that *A.indica* with cow urine extract had higher antibacterial activity against multi drug resistant E.coli and Klebseilla pneumonia.
- In another investigation, it was found that fresh cow urine had higher antibacterial activity than photoactivated urine which could be due to the acidic pH, volatile and non- volatile components.
- In the in-vitro study by by Nagda, G.et. al, disc diffusion method was used to investigate the susceptibility of four reference strains and 37 clinical isolates of Candida species to amphotericin B, fluconazole, and voriconazole.The study concluded that susceptibility of Voriconazole and cow urine had a statistically significant relationship.
- In another study conducted for 14 days, 50 patients were randomly assigned to one of the two groups: Group A: *Gomutra Arka* (trial medicine) and Group B: Povidone-iodine (standard drug). Significant antimicrobial activity was found in *gomutra arka* group due to the presence of components such as copper, aurum, urea, and ammonia in *gomutra* as concluded by Manish Kumar Singh, P,et.al's study.

Antioxidant/Antigenotoxic Activity

- In- vitro tests were performed on cow urine distillate and redistillate by K Krishnamurthi et al. The antioxidant status as well as the amounts of volatile fatty acids was determined. For inducing DNA (deoxyribonucleic acid) strand break, actinomycin-D and hydrogen peroxide were utilized. Actinomycin-D and H_20_2(Hydrogen peroxide) both generated statistically significant DNA unwinding.
- In another investigation**,** seven groups were formed – Control(lindane)group,antioxidant group,cow urine group.antioxidant + lindane group, cow urine+antioxidants group, cow urine+lindane group and cow urine+antioxidants+lindane group. Male healthy mice aged 8-10 weeks, weighing 30.5 g were selected. Lindane treatment increased lipid peroxidation and decreased various peroxidases and endogenous vitamin C and E levels.

Anticlastogenic Activity

- Dipanwita Dutta et al's study showed that redistilled cow urine distillate significantly prevented DNA strand breaks, chromosomal abnormality and micronucleus production caused due to manganese dioxide and hexavalent chromium administration.

Antidiabetic Activity-

- In the study by E. Edwin Jarald, S. Edwin,et al diabetes was induced in rats using alloxan. The formulation was tested at 200 and 400 mg/kg for 21 days. The activity was compared to a control with a reference standard of insulin (1 unit/kg). The herbal medicines considerably reduced hyperglycemic rats' blood sugar levels in a dose-dependent manner
- Also**,** in the study by Sachdev, Devender O et al, the diabetic group receiving *Gomutra arka* daily for 28 days, the mean blood glucose level was shown to be lowered. This indicated that *gomutra arka* had the anti-diabetic effect but was less when compared to glibenclamide.

Wound Healing Property

- The experiment by Mishra,et.al was carried out on 48 surgically produced wounds in twelve healthy goats aged one and a half to two years and weighing between 10 and 15 Kg. Group I wounds were treated topically with cow urine, whereas group II and III wounds were treated topically with cow urine as well as orally (25 ml newly collected) and pyogen free distilled water, respectively. At various intervals of observation, group II showed the most infiltration and fibroblastic proliferation followed by groups I and III.
- In another experiment conducted by Dr. Mrudul Mohan, et al.**,** a total of 40 patients were enrolled and separated into two groups, each with 20 patients. Duration was for 45 days or until the formation of

granulation tissue, whichever came first. After the purification with *Gomutra Arka*, *Jatyadi Taila* was used for healing which showed that *gomutra arka* purified *jatyadi tail* let to faster formation of granulation tissue.

Analgesic and Anti-InflammatoryActivity

- The analgesic activity of cow urine and its distillate was comparable to that of contemporary analgesics. The presence of steroidal components and certain volatile fatty acids in cow urine contributed to the analgesic effect as mentioned by SP. Wate, NJ. Duragkar, et.al.
- In the study by K. N. Killari, K. Prasad, et.al, the antioxidant capacity of wheat grass powder with cow urine distillate was examined using the ferric thiocyanate technique and carrageenan-induced paw edema in Wistar rats at 100, 200, and 400 mg/kg dosages of wheat grass powder along with cow urine distillate. Using ferric thiocyanate method, wheat grass powder fortified with cow urine distillate demonstrated a major reduction in the formation of peroxides.

Antiurolithiac activity

- Six equal groups of 36 male Wistar rats were formed at random. For 28 days, Group I animals acted as vehicle control and was given distilled water. Animals in groups II to VI were given 1 percent v/v (Volume/ volume percentage) EG (Ethylene glycol) in distilled water. The EG control group was Group II. Cow urine ark was given orally to Groups III and IV (preventive groups) for 28 days at doses of 1 mL/kg and 2 mL/kg, respectively. From the 15th to the 28th day, Group V and VI (treatment groups) received 1 mL/kg and 2 mL/kg cow urine ark orally, respectively. On days 0 and 28, 24-hour urine samples were taken. The volume of urine and the amount of oxalate in it were both measured. The antiurolithiac activity of *gomutra* was most likely due to lower oxalate excretion and inhibition of crystallization as concluded by A.B Shukla, D.RMandavia's study.

Anticonvulsive Activity

- In the study by SA Seriki, et. al, four groups of forty rats (weighing 100-120g each) were employed. Two groups were given various quantities of cow urine orally, followed by a convulsive dose of leptazole delivered intraperitoneal after 60 minutes. A control group was given neither cow urine nor leptazole, while a reference group was given the same dose of leptazole as the control group. Conclusively, cow urine could not prevent leptazole induced convulsions.

Action Against Vitiligo

- The study by Belge et al**.** revealed that in addition to repigmentation of hypopigmented areas in vitiligo, there was also an increment in Hb percent, with low ESR(Erythrocyte Sedimentation Rate), low eosinophil counts which indicated multi-system effect of *gomutra*.

Healing Haemorrhoids

- Belge et al's study showed that cow-urine caused smooth stool excretion which reduced pain during defecation, bleeding, and perianal itching. Thus, it provided better relief to hemorrhoids patients.

Role in Weight Loss

- In the study by Gunjan, et al.90 patients were randomly divided into three groups, each with 30 patients. For 45 days, *Kapalbhati* was advised to Group A twice a day for 15 minutes in the morning and evening on an empty stomach. *Medohara arka* was given in a 30 ml dose with honey twice a day for 45 days in Group B, while both *KapalBhati* and *Medohara arka* were given in Group C. *Medohara arka* group showed significant change in BMI(Body Mass Index) level, Skin fold thickness, and lipid profile.
- In another clinical trial, 30 patients who had been diagnosed with *sthaulya*(obesity)were selected. Patients were given *Gomutra Niruha Basti*(enema) for 15 consecutive days. The study revealed significant reduction in BMI, waist-hip ratio and lipid profile. *Gomutra* would have acted by breaking down the pathogenesis as mentioned by Parwe Shweta D, Nisargandha Milind A, et al.

Conclusion

- This review demonstrates *gomutra's* multifaceted influence in many combinations. Also, in an acute toxicity investigation, no toxicity of cow urine was found even at 32 times the study dose, indicating that cow urine had a very high therapeutic index. If utilized in the proper dose and timeframe as specified in Ayurvedic scriptures, miraculous results could be achieved. Since, the majority of the studies have been conducted on animals and few have proceeded clinically, it expands the parameters under which further experiments can be conducted. Thus, *gomutra* could be a ray of hope for multi-systemic ailments.

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