

ETHNO-PHARMACOLOGY, CHEMISTRY AND PHARMACOLOGY OF GOMUTRA

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ABSTRACT

Gomutra (urine of *Bos indicus*) is a blessing sculpted from ancient Indian systems of medicine and rich Indian heritage. It is an inseparable portion of several Indian rituals. It has unique and vivid chemical compositions supporting its therapeutic efficacy. Numerous researches in today's world proved that it has multi-faceted therapeutic role in combating diseases even cancer. This review sums up almost all the research updates in every aspect of *Gomutra*. This review on *Gomutra* throws light over ethno-pharmacology, chemistry and pharmacology of *Gomutra* in a single paper and critically discusses every aspect of it.

Keywords: Gomutra, AuriumHydroxide, Gomutra distillate, Cancer

INTRODUCTION

Indian Cow (*Bos indicus*) is the most valuable animal and because it is the panacea of all types of acute and chronic diseases, it is believed to be a mobile dispensary^[1]. In Sanskrit, cow's urine is known as *Gomutra* (GM), which is a miraculous and divine prescript, included in 'Panchagawya' (containing five ingredients which are obtained from a cow- urine, milk, curd, dung and ghee). These five major substances possess medicinal properties and cultural values. Along with medicating various diseases, it also has been employed extensively in preparations of

Ayurvedic medicines. Cow's urine has been mentioned in ancient holy texts like *Charaka-Samhita*, *Sushruta Samhita*, *Atharva Veda*, *Bhavaprakash*, *Raj Nighantu*, *Amritasagar* etc^[2]. Cow's urine has been entitled as "Sanjibani" and "Amrita" in Ayurveda as people who daily drink cow's urine are said to live healthy and salubrious life, clear from diseases. GM is capable of curing various diseases such as Diabetes, arthritis, cancer, thyroid, asthma, heart attack, AIDS, eczema, piles, constipation, migraine, ulcer, acidity, prostrate, renal colic, gynaeco-

logical problems, ear& nose problems, blockage in arteries, and several other diseases^[3]. GM is like other urine source GM is not a toxic waste material, 95% of it is water, 2.5% consists of urea, and the remaining 2.5% is a mixture of salts, minerals, hormones and enzymes^[4]. GM promotes the phagocytic activity of macrophages and for this reason it is very helpful and favourable in preventing and control of any bacterial infections. It also promotes the secretion of interleukin-1 and interleukin-2^[5,6], it also augments B and T-lymphocyte blastogenesis, and IgA, IgM and IgG antibody titers^[7].

Modern medicines have helped us to eradicate and cure several diseases. But the side effects and after-effects of allopathic medicine, increasing trends of antibiotic resistance causing risk that has been made the situation more critical than ever before. Thus it has become the matter of concern for the scientist and researcher to develop alternative therapies. GM has proven to be cost effective, with minimum adverse reaction when compare to modern medicine^[8]. *Panchgawya* is used in the preparation of Ayurvedic medicines of animal origin, which enhance and boost up the immune system of the body and makes body indomitable to various diseases^[9]. GM distillate is more effective bio enhancer, and increases the effectiveness of anticancer, antimicrobial and antifungal drugs^[10]. GM distillate has bioenhancing property^[11]. It is attributed with biochemical roles because of presence

of various minerals and chemical constituents and contains nitrogen, sulphur, phosphate, sodium, iron, silicon, chlorine, manganese, Vitamin A; B; C; E, calcium salts, carbolic, malic, citric acids, gold acids which balance 'Tridosha' (three humor: *vata, pitta and kapha*) of the human body. GM compensates those micronutrients which are excreted through our urination. GM can also be used for stones formation in body^[12].

CHEMISTRY

Various tests on GM published that declares that the main constituents of it are Urea, Uric acid and minerals, but along with them, there are many bioactive molecules and hormones that are present within them.

GM contains bioactive molecules and hormones like Urokinase, epithelial growth factors, growth hormones, erythropoietin, gonadotropins, trypsin inhibitor, allantoin, anti-neoplaston, H-11 beta-iodole-acetic acid, nitrogen, sulphur, copper, iron, phosphate, sodium, potassium, manganese, carbolic acid, calcium, salts, Vit. A, B, C, D, E; lactose sugar, etc.^[13].

Chemical compositions of Cow-urine distillate are aurium hydroxide, nitrogen, urea, uric acid, creatinine, phosphate, lactose, sodium, calcium, iron, sulphur, potassium, manganese, carbolic acids, salts (NaCl), other minerals, enzymes, Vitamins (A, B, C, D, E), hippuric acid and water. Therapeutic activities of given compositions are provided in (Table 1)^[14,15]

Table 1

Sl no.	Ingredient	Therapeutic activity
1.	Aurium hydroxide(AuOH)	Antibiotic and increases immunity power. It also acts as germicides.
2.	Nitrogen (N ₂ , NH ₂)	Purifies the blood and removes toxins and abnormalities and activates kidneys.
3.	Urea {CO(NH ₂) ₂ }	acts as germicide, affects urine formation
4.	Uric acid (C ₅ H ₄ N ₄ O ₃)	diuretic, removes heart swelling and inflammation
5.	Creatinine	Energy store

6.	Phosphate	Provide structure and strength to bones.
7.	Lactose (C ₆ H ₁₂ O ₆)	strengthens heart and removes thirst
8.	Sodium	Useful in nerve and muscle work, maintain fluid balance.
9.	Calcium	strengthens the bones and also purifies blood, protects the lungs from infections
10.	Iron	haematinic
11.	Sulphur	Makes vital amino acids.
12.	Potassium	Provides body growth, maintains fluid balance.
13.	Manganese	germicide
14.	Carbolic acids (HCOOH)	acts as germicide
15.	Salts (NaCl)	decreases acid contents in blood
16.	Other minerals	provides immunity to body
17.	Enzymes	provides immunity power and produce healthy digestive juices
18.	Vitamins (A, B, C, D, E)	Normal metabolic and physiological functions of human body.
19.	Hippuric acid (C ₉ H ₉ NO ₃)	-
20.	Water	Maintains body temperature and homeostasis.

ETHNO-PHARMACOLOGY

गोरोचना तु मङ्गल्या वन्द्या गौरी च रोचना ।

गोरोचना हिमा तिक्ता वश्या मङ्गलकान्तिदा । विषालक्ष्मीग्रहोन्मादगर्भस्रावक्षतासुहृत्

Gomutra is pungent, cooling, enchanting, auspicious, bitter and salty in taste. It pacifies two Ayurvedic humors *kapha* and *vata dosas* and aggravates *pitta dosa*. It is salty, slimming, mild laxative, *laghu*, stimulates digestive capacity and promotes intellect. When urine is to be prescribed as a medicine *gomutra* should be used. It is used as an antidote for several poisons in Ayurveda and alleviates psychosis, bleeding from wounds and miscarriages^[16]. GM is also applied in the purification and detoxification process of many plants such as purification of *Guggul* (*Commiphoramukul*), *Dhatura* (*Daturametel*) as well as metals and metalloids such as purification of *loha* (iron), both purification and detoxification of silver, etc^[17].

In *Charakasamhita*, GM is applied to alleviate various skin disorders, it is a good wormicide, beneficial in itching and leprosy^[18].

In *Susrutasamhita*, GM is applied to enhance intellect and promotes digestive power as it alleviates various digestive disorders, colic and constipation and useful as purgatives^[19].

GM had been widely used in ancient system of medicine. As GM is also an important component of the mixture called '*Panchagawya*^[20]. In Hindu culture GM is used as a medicinal drink^[21,22] and has spiritual cleansing effect^[23,24]. Traditional uses of cow urine as medicine alone or with certain synergistic drugs has been provided in Table 2^[25,26]

Table 2

Diseases	Constituents of <i>Gomutra</i> along with adjuvant
Leprosy	<i>Dhruharidra</i> , Urine
Deformation condition in leprosy	<i>Nimbuchal</i> , Urine
Chronic leprosy	<i>Vasaka</i> leaves, <i>Kurailabark</i> , Kanerleaves, Neem bark, Urine
Epilepsy	Neem bark, <i>Somapada</i> bark, Mustard oil, Urine
Anaemia (<i>Pandu</i>)	a) cow milk, urine, <i>tripala</i> b) <i>lohhasma</i> , urine, milk
Fever	Urine, Pepper, Curd, Ghee

GM is being used as an effective antiseptic for wounds and various skin diseases since for a long time in rural areas of India [27], and disinfectant can be prepared by the help of cow urine [28]

Ancient Indian Vedic Scriptures including *Manu Smriti*, *Charaka Samhita* and *Sushruta Samhita* and present day researchers have quoted that rational use of this animal product eliminates any non-functionality of respiratory systems, hepato-gastro-intestinal systems, cardiovascular systems, cancer and many others [29, 30].

PHARMACOLOGY

Anticancer activity- Study revealed that GM may have potential of curing cancer, which is enriched in GM therapy. People who had been suffering from various cancers like breast cancer, ovarian cancer, Blood Cancer CLL, ALL and CML, Leukaemia etc are now cured after dispensation of GM therapy as per several reports.

Stories of defeating cancer and practical feedbacks have been collected from patients for the treatment of cancer. Distilled cow urine protects DNA and repairs it rapidly as observed after damage due to pesticides [31], it protects chromosomal aberrations by mitocycin in human leukocyte [32], and GM helps the lymphocytes to survive and not to commit suicide (apoptosis). Go Vigyan Anusandhan Kendra (Cow science

research centre) at Nagpur enacted out many research works on GM which revealed the beneficial properties of GM in the treatment of cancer. Scientists CSIR and scientists of Central Institute of Medicinal and Aromatic plants (CI-MAP), Lucknow, along with collaboration with Go-Vigyan Anusandhan Kendra, Nagpur enacted out further research works on anti-cancer properties of GM and confirmed this milestone achievement [33].

Various researches and studies highlight the role of cow urine in curing cancers and that cow urine enhances the potency and efficacy of anti-cancer drugs. Recently, the grant of U.S. Patent (No. 6896907) has validated this significant achievement in the field of treatment of cancers [34].

Anti-diabetic activity- Research work on GM revealed that GM has the power of curing diabetes characterized by hyperglycaemia, hypertriglyceridemia, and hypercholesterolem. A research work was done on Alloxan-induced diabetic rats with GM distillate and a standard drug, glibenclamide. A significant reduction of the elevated blood glucose, serum cholesterol and serum triglycerides levels occurred when GM distillate was charged when compared with the diabetic control [35].

Antioxidant activity- a study on GM revealed that both GM and its distillate unfolded antioxidant activity and antimicrobial activity; it was

observed that fresh cow urine was found to be better than its distillate [36].

Another research work on GM and its distillate was performed by using two methods, Superoxide scavenging activity and DPPH radical scavenging activity [37]. Ascorbic acid was used as standard. The output showed positive results.

Anthelmintic activity- Recent research work found out that GM concentrate has more potential and found to be more efficacious than piperazine citrate as anthelmintic agent at both 1% and 5% concentrations [38]

The efficacy of cow urine and cow dung in combination and separately in the control of root-knot nematode in tomato exhibited potent nematicidal activity [39].

Bio-enhancer-A 'bio enhancer'/'bio-potentiator' is substances that increase the bioavailability and bio-efficacy of active substance. Consuming CU daily increases the resistance to diseases by up to 104%. This has also shown enhancement in humoral, and cell-mediated immune response in mice [40]

GM increases the activity of gonadotropin releasing hormone conjugate with bovine serum albumin (GnRH-BSA) and zinc [41]. The GnRH-BSA conjugate has a deleterious effect on reproductive hormones and oestrous cycles of female mice; cow urine concentrate acts as a bio enhancer of immunization efficacy to modulate these effects [41].

Wound healing property- Researches on GM have also highlighted that GM has good antiseptic property in wound healing and that the healing times is less than the time taken by another wound to heal on which antiseptic cream was applied [42].

Another study on GM demonstrated that cow urine distillate has significant use in diabetic wound patient as it significantly increases

wound healing. Thus, wounds are healed in diabetic patients as it helps in accelerating wound healing in diabetic patients because of its property of enhancing granulation tissue formation [43].

Immuno-modulatory activity- A research on GM proves that it enhances the activity of T- and B-cell proliferation and it also enhances humoral, and cell-mediated immune response in mice [44, 45].

Another research also observed that GM increases the secretion of interleukin-1 and 2 [46].

Antibacterial activity- A US patent was obtained by CSIR (Council for Scientific and Industrial Research) India that claimed a novel pharmaceutical composition present in GM distillate which is effective as an antifungal and antibacterial agent. [47]

Antifungal activity- A research study focuses the antifungal activity of GM against *Aspergillus flavus* and *Aspergillus niger*. When the two fungal organisms were compared, maximum growth suppression was observed in *Aspergillus niger* than *Aspergillus flavus* [48].

Hepatoprotective activity- Study revealed that cirrhosis of liver can be treated by daily doses of 1-2 ounces of warm GM [49].

Anti-urolithiatic Activity- Urolithiasis is highly tormenting and the third prevalent disorder of urinary system [50]. There is a life time risk of 7-12% for renal calculi among general population [51]. Formation of stone is due alteration in crystallization conditions of urine [52]. Distillate of GM has revealed significant effect against restoration of compromised renal function and renal calculi. This type of action of GM might be due to reduction of excretion of calcium oxalate and inhibition process of crystallization by cow's urine.

CONCLUSION

Thus we see that GM is therapeutically useful which is supported by many pharmacological and ethno-pharmacological findings. This review paper also highlights the chemistry and significant therapeutic uses of GM and provide a new dimension for treatment of various curable and incurable diseases, by which patients are benefited. As GM has tremendous potential in the field of Indian medicine and patents granted for GM are the ultimate imprints of approval for Indian system of medicine. GM is non toxic, can be obtained from indigenous cow, and because of its therapeutic effects on diseases and highly valuable virtues, an integrated accession is needed for proclamation throughout the world, assistance of establishment of many patents and researches based on medicinal utilities of cow's urine, Many authentic and crucial data regarding the ancient and modern uses of GM can help to propagate the use of cow's urine. But apart from the only therapeutic purposes, GM has many beneficial and profitable implications in agriculture, organic farming as natural manure for cultivation of rice, as floor cleaner (repellents), as alternate energy source. This review on *Gomutra* may encourage the budding scientists in the field of traditional medicines for investigating further over the therapeutic treasures of it.

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