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**Satyapal Singh**  
Assistant Professor,  
Department of Kayachikitsa,  
S.A.M.C. & H., Chunar,  
Mirzapur, Uttar Pradesh, India

## Biochemical appraisal of Gomutra (Cow urine)

**Satyapal Singh**

### Abstract

The sacred animal cow accorded a special status in Indian tradition. Its various products including urine is being used for various purposes since time immemorial. Cow urine is recognized to contain almost all substances (elements, enzymes, hormones, etc.) which are required by a human biological system. Therefore, regular use of cow urine maintains the balance of these elements in the human biological system and thus helps to maintain a good health & also helps to treat various disorders. Ayurveda (Indian system of medicine) described the various uses for different products of cow. Cow urine is recognized as 'Amrit' & Sanjeevani and its regular use promotes positive health. As a therapeutic agent cow urine is traditionally being used to treat many illnesses which include various allergies (especially skin allergies), cold, flu, hepatitis, leucorrhoea, leprosy, rheumatoid arthritis, various types of bacterial & viral infections, tuberculosis, ulcers and in chemical intoxication. Recent researches also validated cow urine having various pharmacological potential which include anti-oxidant, immunomodulating, bio-enhancing, lipid lowering, anti-diabetic, anti-carcinogenic, anti-microbial, anthelmintic, etc. effects.

**Keywords:** Gomutra, Gomata, cow urine, Ayurveda, CUD, Yogavahi, bio-enhancer

### Introduction

Cow is recognized as very sacred animal in India and its various products are being used by mankind since Vedic or pre-Vedic period for a variety of purposes which include ritual purpose, medicinal purpose and to clean the premises. Traditionally various cow products including cow urine are being used for the treatment of flu, cold, various allergies, microbial infections, rheumatoid arthritis, hepatitis, leprosy & various other skin disorders, aging, leucorrhoea and in chemical intoxication. Traditional healers from 'Gayathri Parivar' in Mandsaur use an herbal preparation with cow urine to treat diabetes mellitus. They prepare a decoction of some useful herbs by using cow urine instead of water. At present, the application of various cow products in various forms is termed as 'Cowpathy'. Mankind is regularly using these cow products and getting benefits of it regardless of their scientific validation. But it is the need of time to scientifically validate the cow urine for its worldwide acceptance and popularity [1-2].

Cow urine is a natural and non-toxic product which promotes power of wisdom in human beings, acts like a universal medicine and is easily digested by all. The imbalance in the quantity of some elements is recognized as principal cause of various diseases. The cow urine contains most of such elements and thus helps to restore the imbalance of these elements. Cow urine therapy appeared to be an alternative therapy to chemotherapy with no adverse effects for the management of the deadly disease, cancer [3].

Biochemical estimation of urine of Indian cow *Bos indicus* reveals that it consist of 95% water, 2.5% urea and 2.5% is a mixture of various salts, hormones, enzymes and many Vitamins which includes vitamin A, B, C, D & E, nitrogen, sulphur, manganese, iron, silicon, chlorine, magnesium, citric, succinic, calcium salts, carbolic acid, phosphate, lactose, etc. Deficiency of any these lead to biochemical imbalance which resulted in to impaired functioning. Internal use of cow urine resulted in restoration of these deficiency and thus restoration of normal function of a particular tissue or organ [4].

Go-mutra (cow urine) and Go-mutra Ark [cow urine distillate (CUD)] are not chemically similar because during distillation of cow urine some of its ingredients evaporated as vapor. CUD is palatable, non-smelling and thus can easily be used by patients or an individual. CUD is usually more effective than cow urine which was also reported by some studies. It would become more effective if honey is added to it. CUD can be prescribed at a usual dose of 10-12 ml twice a day. It is mostly effective to reduce the serum cholesterol level and to reduce general body weight. It can be good prescript in various diseases of children specially cough. Regular and long term use of CUD (usually for a period of 3-4 months) provides better results especially in chronic disorders [5].

**Correspondence**  
**Satyapal Singh**  
Assistant Professor,  
Department of Kayachikitsa,  
S.A.M.C. & H., Chunar,  
Mirzapur, Uttar Pradesh, India

Through the principle of reverse pharmacology Ayurveda has made a major contribution to the drug discovery process. One of the important examples include concept and technology of 'Yogavahi' which is responsible for the development of new technologies to improve the bio-availability of many drugs and have made a revolutionary shift in the way of their administration [6].

Co-administration of a bio-enhancer resulted in reduced drug dosage & cost, reduced incidence of drug resistance, reduced risk of adverse effects and enhanced bio-availability & therapeutic efficacy of a particular drug. Other benefits include reduced requirement of raw material for drug manufacture which is especially evident in the case of anti-cancer drug, Taxol. Taxol is obtained from Yew tree and used to treat breast cancer. Yew tree is one of the slowest growing trees in the world and to obtain taxol for one patient, six trees of 25–100 years are need to be chopped [7]. Being a good bio-enhancer, cow urine increases the anti-microbial and anti-proliferative activity of many drugs. Therefore, cow urine can be co-administered with various therapeutic agents to treat several disorders including the deadly disease cancer [28].

### Traditional Importance of Cow Urine

The traditional importance of cow urine in India can be traced back to the Vedic or pre-vedic period. The basic source of Indian traditional knowledge, the 'Vedas' mentioned about the use of cow urine. In Rigveda the cow urine is considered as nectar. 'Dammar Tantra' also mentioned about the importance of urine therapy [8].

Traditionally cow urine is being used by mankind for various purposes like ritual purposes, in agriculture, as antiseptic & disinfectant and as a therapeutic agent. Ayurveda described the importance and various uses of cow urine in quite detail. The Ayurveda described the uses of cow urine for three basic purposes

- For purification of various herbal and mineral drugs
- During the pharmaceutical processing for preparation of various formulations
- For the management of various disorders

Cow urine is employed for the purification of various toxic herbal and mineral drugs to make them non-toxic and therapeutically effective. The drugs include Vatsanabh (*Aconitum ferox*), Dhatoor beeja (*Datura metel*), Swarna (gold), Rajata (silver), Tamra (copper), iron, Kansya (bronze or bell metal), Abhrak (mica), Shilajatu (black bitumen or mineral pitch), Tuttha (copper sulphate or blue vitriol), Manikya (ruby), Mukta (pearl), Praval (coral), Vajra (diamond) etc. [9].

Various Ayurvedic classics described the therapeutic application of cow urine in a wide range of disorders which include Kushtha (dermatological disorders), Krimi (worm

infestation), Kandu (itching), various types of abdominal disorders, Shool, Gulma, indigestion, etc. [10-13]

Cow urine also used during pharmaceutical processing named 'Bhavana' (trituration). In this process the particular drug or ingredients of formulation are triturated with cow urine to prepare formulation. The trituration leads to enhanced bioavailability and thus ultimately resulted in reduction of drug dose as well as cost and enhanced therapeutic efficacy of the particular drug or formulation [14].

### Biochemical Importance and Mechanism of Action

The wound healing is a complex but dynamic process of cellular, physiological and biochemical events, which leads to the structural as well as functional restoration of injured tissue. Diabetes mellitus (DM) is one of the most important disorders responsible for impaired wound healing. Incidences of DM in India is progressively increasing due to stressful environment and adopting faulty lifestyle [15].

Treatment with cow urine resulted in increased formation of granulation and collagen tissues. It also significantly increased the incision wound breaking strength, granulation tissue dry weight & hydroxyproline contents when compared to diabetic control and leads to increased incision wound breaking strength and granulation tissue hydroxyproline content as compared to glibenclamide group. Cow urine also reduces inflammatory phase by decreasing the production of inflammatory cytokines and thus hasten wound healing process by promoting collagen synthesis. The wound healing efficacy of cow urine is mainly due to presence of anti-oxidants in it which lead to decrease collagen degradation and increase collagen synthesis [16].

The re-distilled cow urine found to be having strong anti-oxidant property mainly by virtue of volatile fatty acids present in it which was also reported by some studies. A study reported that oral administration of cow urine leads to the activation of third complement component in the serum which has further lead to characteristic acute fall in the neutrophil and monocyte count in the peripheral blood through the release of histamines. The acute fall in count was restored within the four hours [17].

Anti-diabetic effect (glucose lowering effect) of cow urine is might be due to stimulation of beta cells of pancreatic islets or stimulation of glycogenesis [18] and also due to its anti-oxidant effect [19-20]

The bio-chemical screening of cow urine confirmed the presence of urea, uric acid, phenol, creatinine, aromatic acids, vitamins and enzymes like phosphatase, alkaline phosphatase, amylase, etc. cow urine is recognized as a better solvent for extraction and extract out more constituents from the herbal drugs or formulations and thus, enhance their therapeutic efficacy.

**Table 1:** Chemical composition of cow urine distillate on percent basis

Component	Percent basis
Water	95%
Urea	2.5%
Minerals, Salts, Hormones Enzymes and others	2.5%

**Table 2:** Showing various bio-chemical ingredients present in cow urine with their effects [21-22].

Bio-chemical ingredient	Effects
Urea	Strong antimicrobial agent.
Nitrogen	Helps to purify blood, stimulates urinary tract and kidney and also a good diuretic.
Ammonia	Maintains the integrity of blood corpuscles.
Uric acid	Reduces cardiac inflammation, its antimicrobial activity helps to control cancer and secondary bacterial infection. Also a good diuretic.
Copper	Controls fat deposition and acts as antidote for various poisons in the body
Sulphur	Helps to purify blood and also a good pro-kinetic agent
Iron	Augment the production of RBCs (erythropoiesis) and thus stabilizes working power
Vitamin A,B,C,D & E	Prevent excessive thirst, infuse vigour & vitality and thus prevents from nervousness. Provide strength to bones.
Enzymes	Help to make healthy digestive juices and thus, add to the digestive power and also boost immunity.
Swarna Kshar (AuOH)	It is strong antibacterial agent and one of the best immunomodulatory agents. It is also a good antidote for various poisons in the body.
Creatinine	Anti-bacterial
Urokinase	Act as fibrinolytic agent therefore, useful in myocardial infraction.
Carbolic acid and manganese	These are anti-viral agents, help to prevent wound infection and formation of gangrene.
Kallikrein	Vasodilation through generation of kallidin, thus help to maintain cardiovascular health.
Allantoin	Wound healing and anti-cancer effect
Phosphatase & hippuric acid	Diuresis

### In Agriculture

Cow urine is very useful in agricultural operations as bio-fertilizer and bio-pesticide. The total nitrogen (N) content of cow urine is very high which ranges from 6.8 to 21.6 g N/l. By increasing the Nitrogen content of soil cow urine leads to enhanced rye grass yield along with the marked depression in the nitrogen fixation by 10% annually in clovers particularly in winter. It increases the nitrogen & potassium concentration of grass and potassium concentration of clover. Several studies reported cow urine to be an effective pest controller and larvicidal agent whether used alone or in combination with other preparations [23-25].

### Discussion

Various properties of cow urine like anti-microbial, anticancer, anti-oxidant, bio-enhancing, anti-diabetic, lipid lowering, anthelmintic, etc. are attributed by the presence of different bio-chemicals in it. These include various minerals like nitrogen, calcium salts, sulphur, phosphate, manganese, copper, gold, etc., vitamins like A, B, C, D & E, enzymes like urokinase, phosphatase, lactate dehydrogenase, etc. and hormones and also due various other biochemicals too. Cow urine, CUD, RCUD and residue all have possess good anti-oxidant effect. Cow urine could be a potent natural source of various anti-oxidants which might have a definite role in the prevention of oxidative stress and related disorders.

Cow urine is believed to provide nutrients to plants and crops at low cost and thus recognized as a bio-fertilizer for plants and crops for their nutrition and metabolic activation and as a bio-pesticide to control various pests. It could be an effective tool to address multi nutrient deficiencies in most of soils. With the advent of various chemical fertilizers, Indian farmers have slowly forgotten the use of urine and other products of cow in agriculture. Now it is strong need of time that the farming and scientific community should realize about the importance of cow & its various products for assuring sustainability in farming and try to bring the glory of cow again with our culture and in agriculture.

Cow is recognized as very sacred animal in the Indian tradition and worshiped as 'Gomata'. Its various products are being used for different purposes since centuries. The Indian system of medicine, Ayurveda recognized cow urine as the elixir of life. It is an effective natural remedy bestowed upon us by nature for prevention and treatment of various ailments. In India people are being used cow urine for various purposes

like in various rituals, in agriculture as bio-pesticide, as antiseptic & disinfectant for cleaning their premises and for the management of various disorders. Ayurveda described a wide range of applications for cow urine. For the purification of various poisonous herbal and mineral drugs, during Bhavana (trituration), a pharmaceutical processing used to prepare various formulations (Bhavana believed to increase the bio-availability of formulation) and for the management of various disorders.

Psychosocial stress and impaired immunity by various factors seems to be the major contribution in the etio-pathogenesis of the various disorders in the present era. Cow urine is considered a good immunomodulating agent. A study by using a nutraceutical formulation fortified with cow urine distillate showed better immunomodulation when compared with standard nutraceutical formulation [26]. Therefore, being a good immunomodulating agent cow urine can be used for the treatment of such types of disorders.

Various studies on cow urine also reported its anti-oxidant, immunomodulating, bio-enhancing, lipid lowering, anti-diabetic, anti-carcinogenic, anti-microbial, anthelmintic, etc. effects. Particularly for its bio-enhancing effect and antimicrobial & anticancer efficacy cow urine has been granted US Patents (No. 6,896,907 and 6,410,059) [27].

### Conclusion

Various products from cow are very useful to mankind. Cow urine considered a very effective natural remedy having intrinsic property to improve physical as well as mental health. It contains all the substances which are required by a human biological system. The Indian system of medicine, Ayurveda highlighted the use and importance of cow urine not only as a therapeutic agent but also in various rituals and during various pharmaceutical processing. It is also used in agriculture as bio-pesticide. The chemical based medicine (allopathic medicines) have various biological activities but their use also associated with the risk of various adverse effects. Therefore, it is need of time to promote cow urine for prevention and management of various disorders, especially in auto-immune disorder and in cancer.

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