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REVIEW ARTICLE

Application of Cow and Goat Urine in Traditional Systems of Medicines: A Brief Review

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ABSTRACT

In spite of the progresses in science and technology, India is well-known for its traditional system of medicine. Traditional use of medicine is practiced since the era of vedic. The Indian traditional system of medicine such as *Ayurveda, Siddha,* and *Unani* has a very rich history of their effectiveness. As India is a rich repository of herbal and medicinal plants, these traditional systems of medicine use herbal plants and minerals as the vital source for drugs. Along with the use of herbal plants, the Indian traditional system of medicine, especially *Ayurvedic* system, uses animal urine as a source of drug. In *Ayurveda*, the properties of the urine of eight different animals along with the human urine and also its uses are described. Basically, cow's urine (CU) is used mainly for the treatment of various diseases in *Ayurveda.* Apart from CU, urine of the other animals such as goat, sheep, buffalo, elephant, horse, camel, and donkey were also used as remedies for the treatment of different diseases. An attempt has been made in this article to bring forth the traditional and therapeutic use of cow and goat urine (GU) and also highlights its efficacy. This article will provide brief information on cow and GU and their application in traditional practice of medicine which may help people working in this area.

Keywords: *Ajamutra, ayurvedic system*, ethnomedical, gomutra, *panchagavya, siddha system, unani system*

INTRODUCTION

The traditional system of medicine is utilized such as Ayurveda, Unani, and Siddha medicine.[1] It is considered as a major health-care provider around the globe particularly in rural areas. India is known for its traditional practices of medicine since time immemorial. Medicinal plants based on traditional systems of medicines are playing an important role in providing health care to large section of population, especially in developing countries. India is a land of different groups of people who have their own religion, beliefs, culture, language, and dialects. Thus, diverse medicinal systems have developed in this region. A number of medicinal systems also introduced here from outside and enriched in India.[2] Among ancient civilizations, India has been known to have diversified varieties of medicinal plants as well as aromatic plants. These medicinal and aromatic plants are collected as raw materials for traditional medicine. As per the record, currently, there are about 20,000 medicinal plants, among them only 7000–7500 plants are used by traditional practitioners. However, *Ayurvedic* system of medicine uses about 2000 plants, *Siddha* system of medicine uses about 1300 plants, and *Unani* system of medicine uses about 1000 plants. In India, around 25,000 plant-based formulations of traditional folk medicine are effectively use.[3] Along with herbs, other ingredients are also used for traditional practices of medicine. Among them, animal urine is also used for the treatment of various diseases. In general, cow urine (CU) is considered as a remedy of all diseases. It is an element of "*Panchagavya*" which is a concentrated preparation of five products of cow. It has been extensively used in the preparations of many formulations of *Ayurveda* for treating curable as well as incurable diseases.

The CU has an indelible placed in *Vedic* literature for instance "*Chakra Samhita*," "*Ashtanga*

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Samgraha," and "*Atharva veda*" science ancient time in India. It has been considered as the most valuable animal secretion having therapeutic activities. In ancient time, CU therapy was used by a large number of people for the treatment of many diseases using *Panchagavya* or *Panchakavyam*. The *Panchagavya* is a mixture of cow milk, ghee, curd, dung, and urine.[4] In *Ayurveda*, CU has been referred for use more commonly because of the special sanctity attached to the cow in India.. The urine of other animals such as goat, sheep, buffalo, elephant, horse, camel, and donkey, are also very much used as remedies for the treatment of worms, dropsy, abdominal enlargements, flatulence, colic, anemia, abdominal tumor, loss of appetite, tuberculosis, poison, hemorrhoids, amenorrhea, leukoderma, leprosy, and aggravation of *kapha* and *vata* and in several other mental diseases.[5] In this context, this article aims to highlight the characteristics, traditional as well as therapeutic utility and future prospect of cow and goat urine (GU).

CHARACTERISTICS OF URINE

The urine of both cow and goat is sharp, hot, pungent, astringent in taste, and light in nature.[5] The biochemical estimation of CU demonstrated that it contains 95% water, 2.5% urea, minerals, 2.5% enzymes, 24 types of salts, minerals including nitrogen, sodium, manganese, iron, silicon, chlorine, magnesium, sulfur, calcium, phosphate, citric, succinic, lactose, carbolic acid, and creatinine, hormones, urea Vitamins A, B, C, D, and E, and gold acids.[6,7]

Biochemical analysis of normal GU constitute of nitrogenous constituents such as nitrogen, urea, uric acid, allantoin, creatinine, creatine, and ammonia. Non-nitrogenous constituents include carbonates and bicarbonates; total phosphates and sulfates; and chlorides, calcium, and magnesium.[8]

APPLICATION OF COW AND GU

Traditional applications

Cow is considered to be similar to mother (mata and gaumata) in the Indian tradition and is worshipped as goddess from ancient times, for which every product of cow including its excreta has a diversified use in *Ayurveda*. *Gomutra* was compared to nectar and considered as potent medicine in *Veda*. In the ancient holy literature *Sushruta Samhita*, the properties of *gomutra* CU have been elucidated. It states that the *gomutra* is pungent, penetrating, hot in potency, easily digestible, kindles digestion, and is alkaline in nature.[5]

Conventionally, *Gomutra* has been considered many holy purposes in India from ancient time. It is sprayed in around the home and courtyards. People are believed that it brings all happiness, purity, peace, good health, and wealth.[9] Eventually, CU is used as disinfectant and natural insecticide.[10] It is utilized as an antiseptic agent for the treatment of wound and skin diseases effectively since time immemorial in the rural areas. CU is also used for bathing as it is believed to be a disinfectant.[11]

Conventionally, a mixture of CU with curd, pepper, and ghee is utilized in the treatment of fever. In the treatment if leprosy, CU is utilized along with dhruhardi. It is mixed with Nimbuchal use in deformities related with leprosy. Mohanty *et al*. mentioned about a combined formulation of CU with the leaves of Kaner, leaves of Vasaka, bark of Neem and leaves of Kuraila for the treatment of chronic leprosy. The bark of Neem, Somapada, and Mustard oil is mixed with CU which can be used to treat epilepsy. To treat anemia, CU is mixed with either mixture of cow milk, triphala, or mixture of milk, lohabhasma.[12] In Mandsaur, it prescribes in worm infestations, to improve immunity and to prevent aging effect.[13]

The use of GU and fermented CU is practiced as a traditional pest management system and crop production in India and Ethiopia. Goat and fermented cattle urine, sand, ash, and practices such as intercropping, border cropping, crop rotation, and use if botanicals are some of weapons against field and storage pests. The natural products such as urine of goats and cattle, whey, sand, and ash are often used in the developing countries to control pest in the farm and storage where economic conditions limit the usage of conventional pesticides as well as protectants.[14]

The CU destroyed parasitic infections and skin diseases including leprosy and removes itching. It is beneficial for various problems that might occur in the digestive system if taken internally. The urine of both cow and goat are believed to alleviate the *Tridoshas* in *Ayurveda*, which increases *Pitta* (that represents metabolism, uses bile to direct digestion,

and enhances metabolism) while decreases *Kapha* (plays an important role in the perception of taste, together with nourishment and lubrication) and *Vata* (all movements in the body are due to the properties of *Vata.* Pain is characteristic feature of deranged *Vata*). GU is beneficial for cough, dyspnea, edema, jaundice, and anemia.[10]

Therapeutic use

The cow has been considered as fundamental to Indian economy and culture life since millennia. According to *Ayurveda*, the application of cow products wrote in many *Vedic* literatures for positive health, pharmaceutical processes, and in therapeutics. However, it has been quite a few studies on the activity, efficacy, acceptability, and safety of *Panchagavya* as well as other cow products.[15] CU is believed to have great pharmacological significance.

In *Ayurveda,* CU holds a distinctive position and considered one of the most vital secretions of animal origin possessing innumerable therapeutic values. CU has been described in the ancient holy literature "*Sushrita Samhita"* and "*Ashtanga Sangraha"* that *Gomutra* contains all the substances that are naturally present in the human body and are believed that it balances all these substances on consumption of the urine and also helps in the treatment of many curable and incurable diseases. Drinking of CU has been practiced for thousands of years. CU and it products possess many medicinal properties. Therefore, these are taken alone or in combination with some other medicinal plants to treat many diseases, even those are not curable by allopathic system. The "*panchgavya* therapy" or "cowpathy" is mainly utilized in these kind of treatment.[16]

As per *Ayurvedic* literature, *gomutra* is beneficial for the treatment of number of diseases particularly abdominal tumor, filariasis, skin diseases, cancer, etc. CU is used along with herbs to treat various diseases such as abdominal pain, anemia, constipation, epilepsy, and fever.[17]

Practitioners of *Ayurvedic* medicine from India have shown and reported that taking CU routinely is very useful and has cured many diseases such as flu, colds, asthma, cough, and allergies. It is also reported to cure parasitic infections, skin diseases including leprosy, rheumatoid arthritis, tuberculosis, chicken pox, hepatitis, leucorrhoea, abdominal tumors, ulcer, heart disease, and chemical intoxication.[16]

CU is taken on a daily basis to boost immunity. It is a potent antibiotic and is able to destroy pathogenic organisms. Diseases that are proven to be cured by CU are cough, dysmenorrhea, diabetes, blood pressure, asthma, eczema, heart disorders, blockage in arteries, cancer, migraine, thyroid, constipation, gynecological disorders, respiratory disorders, and endocrine disorders.[12]

The GU "*Ajamutra*" is referred with great importance from ancient period of time as well as it also has a great significance in *Ayurvedic* treaties. *Ajamutra* is said to be beneficial for all channels and alleviates in all the three *Dosha*. GU is pungent (*Katu*), hot (*Ushna*), and dry (*Rooksha*). It is useful in treating deep sinuses (*Nadi*) and relieves pain (*Artijit*); spleen-related disorders, splenomegaly (*Pleeha*); Ascites (*Udara*); Kapha disorders such as obesity; Asthma, respiratory disorders involving difficulty in breathing (*Shwasa*); abdominal tumor, ditention (*Gulma*); and edema (*Shopha*).[8]

The urine of male and female goat is referred to have different effects in curing disease. The urine of he-goat and she-goat are used to be prescribed separately for alleviating different diseases. The usage of he-GU has been recommended both externally and internally. Externally, it has been prescribed in ointment for alleviating epilepsy, toxicosis, etc., also in nasal medication as snuff for curing insanity and in eye ointment for curing dimness of vision, infection, and discharge of pus. Internally, he-GU has been prescribed to be taken in medicated ghee in complaints of cardiac seizures. The urine of she-goat has been prescribed extensively in the complaints of gynecological diseases such as vaginitis and cervicitis.[5] The *Ayurvedic* treatise mentions the efficacy of he-GU for the treatment of menometrorrhagia, cervical erosion (*karnini*). It has a major ingredient of a paste efficacious for treating piles.[5]

In *Astanga Samgraha* of *Vagbhata*, the GU has also been referred as having the curing properties in ailment of cough, respiratory difficulties, and earache. GU slightly reduces and relieves cough, dyspnea, edema, jaundice and anemia. Externally, GU is used to treat itching skin diseases, ringworms, dermatophytosis or tinea infection and herpes.[8]

In *Ayurveda*, for the treatment for Psychosomatic disorder such as "*Apasmara*," the oil of *Brassica*

campestris Linn. Var. sarson Prain is prepared in 4 times of GU by *tailaPaka* method. The whole body of the patient is massaged with it.[18]

The mixture of the pastes of Neel leaves *(Indigofera tinctori*) and Triphala paste [a paste prepared from Haleela (*Terminalia chebula*), Balela (*Terminalia bellirica*), and Amla (*Phyllanthus emblica*)]; and Bhangra (*Eclipta prostrata*) with an equal amount of GU is prepared and applied on white hairs to make hairs black.[19]

The powder/paste of Shireesha (*Albizia lebbeck*), asafoetida (*Ferula assa-foetida*), garlic (*Allium sativum*), tagara (*Valeriana wallichii*), vacha (*Acorus calamus*), and kushta (*Saussurea lappa*) is triturated by adding GU. This paste after dilution is used for inhalation therapy and collyrium.[8]

Varti (medicated bougie) is prepared of Kushta (*Saussurea lappa),* Pippali (*Piper longum*), buds of Arka (*Calotropis gigantea*), and rock salt by triturating with GU. It is inserted into the vagina which cures *Karnini* type of uterine diseases. All the therapeutic measures prescribed for the treatment of diseases cause by *Kapha* are also beneficial for the cure of this ailment.[8]

Patient suffering from epilepsy should massage its body with a mixture made of mustard oil cooked with 4 times of GU that helps the patient to get relief from pain.[8] The patients suffering from *Kshaya,* i.e. synonym of *Rajayakshma* (pulmonary tuberculosis) should stay in the company of goats in the same room, drink goats milk, and use *ghrita* prepared from goat's milk in the *ahara*. The room in which the patient and goats stay, should be painted and tiled with goat's faeces and urine.[20]

Tribal people of Attappady hills of Western Ghats use GU orally for the treatment of tuberculosis and uses goat milk externally for treating eye problems.[21]

As antimicrobial

As antibacterial

A number of study report said that CU has act as an antimicrobial agent against pathogenic microorganisms such as *Aeromonas hydrophila, Bacillus cereus, Bacillus subtilis, Enterobacter aerogenes,* Escherichia *coli, Salmonella typhi, Proteus vulgaris, Staphylococcus aureus, Klebsiella pneumoniae, Lactobacillus acidophilus, Micrococcus luteus, Pseudomonas aeruginosa, Pseudomonas fragi, Streptococcus agalactiae, Staphylococcus epidermidis, Streptomyces aureofaciens, Streptococcus pyogenes,* and *Leishmania donovani*. The antimicrobial property of CU was detected as similar with ampicillin, Cefpodoxime, chloramphenicol, ciprofloxacin, gentamycin, nalidixic acid, ofloxacin, rifampicin, tetracycline, and streptomycin in experiment.[22,23]

Rana and De found that CU collect from Gir cow has a potential activity against Gram-positive compared to Gram-negative bacteria.[24] Sarsar and co-workers demonstrated that photoactivated urine has potential antimicrobial action against Gram-positive *B. cereus* and Gram-negative *A. hydrophila*. The bactericidal activity was depended on the type of bacteria and the concentration of photoactivated urine.[25]

The urinary proteins of GU have a potential *in vitro* antibacterial activity. The goat urinary cationic proteins have exhibited a significant zone of inhibition against *S. aureus* and *E. coli*. It can be applied to control infectious diseases.[26]

The CU has an antimicrobial and germicidal function due to the presence of elements, for instance, urea, creatinine, swarn kshar (aurum hydroxide), carbolic acid, phenols, calcium, and manganese.[27]

The antibacterial efficacy can increase due to the presence of amino acids and urinary peptides which can enhance the hydrophobicity of bacterial cell wall. Moreover, CU may raise the phagocytic action of macrophages. The antimicrobial efficacy of fresh CU has enhanced due to the higher quantities of phenol presence compared to distillate CU distillate (CUD). Essential volatile organic-inorganic and inorganic elements, for instance, acetone, methanol, propanol, ammonia, carbon dioxide, methane, and many secondary nitrogenous metabolite are generated in CU during photoactivation process.[28] The photoactivated CU (PhCU) has extremely acidic in nature than CU. The bactericidal activity may be enhanced due to the significant reduction in pH of PhCU. The presence of inorganic phosphorus, chloride, and dimethylamine synthesis of reactive substances such as formaldehyde, sulfinol, ketones, and some amines in the photoactivation process and long-term storage.[29] The development of antibacterial resistance of CU can be prevented by blocking the R-factor of plasmid genome of bacteria.[30]

The presence of swarn kshar in CU improves immunity after day-by-day consumption. The presence of allantoin raises the wound healing

activity.[31] It improves the immunocompetence by alleviating the release of interleukin-1 and -2 level, augments B - and T-lymphocyte activities, and concentration of IgA, IgM, and IgG antibody.[32,33]

As antifungal

Raw and CU distillate have been reported to exhibit antifungal property against *Aspergillus fumigatus*, *Aspergillus flavus, Aspergillus niger* and *A. flavus Aspergillus malassezia, C. tropicalis* and *C. glabrata.* CU inhibits 90–95% growth of the *Malassezia* fungi, which is responsible for causing dandruff.[4,34,35] The urine collected from outdoor feeding cow (OCU) has more effective to inhibit the growth of fungi in an *in vitro* experiment compared to indoor feeding CU (ICU). It was observed that 10% OCU has completely inhibited the growth of *Penicillium notatum, Trichoderma viride,* and *Alternaria solani* as compared to 20% ICU. However, the growth of *Rhizopus oligosporius, Claviceps purpurea, A. candidus,* and *C. albicans* was detected at 20% of OCU. [7] Gotora *et al*. reported that CU has inhibited the growth of *Fusarium lateritium* that cause Fusarium bark disease in coffee.[36]

Antiseptic

Sanganal and co-worker noticed that CU has significant wound healing property in Wistar albino rats. They were reported that topical use of CU on rats has progressively enhanced on the 4th day of application in wound healing compared to 1% w/w nitrofurazone ointment.[37]

As anthelmintic

Concentrated CU was observed more efficient compared to piperazine citrate as anthelmintic action. The anthelmintic activity was carried on *Pheretima posthuma* (Indian earthworm). Because, the physiology and anatomy of *P. posthuma* is similar with the roundworm present in human intestines.[38]

Various compositions of Panchgavya and mixture of 10%, 50%, and 75% of Panchgavya with the ethanolic extract of *Bauhinia variegata* Linn were detected to be good anthelmintic activity against *P. posthuma* compared to piperazine. In this experiment, combined mixture produced synergistic activity with increasing doses.[39]

Antioxidant activity

An antioxidant prohibits the oxidation of other substances and the releases of free reactive oxidative species (ROS) or radicals. The ROS are naturally generated in a living system from cell metabolism as by-products. They can damage key cell components. Thus, antioxidant preserved the essential cell elements from ROS effects. The ROS or free radicals are the critical intermediated for a wide range of diseases such as aging, cancer, and diabetes.[40] The antioxidant property of CU was elucidated by superoxide scavenging activity and 2, 2-diphenyl-1-picrylhydrazyl radical scavenging activity *in vitro* models using ascorbic acid as standard. Relatively fresh CU was observed more free radical scavenging activity than its distillate.[17] The CU elements can prevent the process of aging.

Anticancer activity

The CU has a potential of anticancer activity. It rises the immunocompetence of people. It has a free radical scavenging and antioxidant function. Therefore, CU scavenges the ROS. The researchers were demonstrated that apoptosis occurred in lymphocytes at very low doses of pesticides. It was also caused DNA fragmentation in tissues. Thus, CU inhibits apoptosis of the lymphocytes by preventing the formation of free ROS. It efficiently regenerated the damage tissue DNA. By this mechanism of action, CU has carried anticancer therapy.[41]

Through an experiment, it has been demonstrated that the urine of the Indian cow is the most efficient among all kind of urine. The anticancer efficacy of CU was measured by two phases in Swiss albino mice. The carcinogenesis was induced on the skin by applying of 7, 12-dimethyabenz[a]anthracene (DMBA) topically. They reported that CU has the potential chemopreventive activity on DMBA-induced skin carcinogenesis in Swiss albino mice.[42]

TOXICITY OF CU

Sachdev and coworkers analyzed the acute and chronic toxicity of CU on male Wistar rats. They reported that CU has no any toxicity after 32 times of the experimental doses. Therefore, CU is

possessing excellent therapeutic index. Moreover, they did not examined the histopathology of rats.[43]

CHALLENGES, OPPORTUNITIES, AND FUTURE PERSPECTIVES

Scientific researchers found that CU has many beneficial properties, especially in the field of agriculture and therapeutics.[44] Therefore, many researches were carried out using CU to cure several diseases. Recent researches proved that the distillate of CU is an efficient bioactivity enhancer and availability facilitator for bioactive molecules.[16] The CUD was granted U.S. Patent (No: US006410059B1) for its antimicrobial and antifungal effect.[45] The experiment demonstrated that purified PhCU has been effective against many drug-resistant bacterial strains including *S. aureus, P.fragi, E. coli, S. agalactiae,* and *B. subtilis*.[46] The antioxidant property of CU and its distillate will be very beneficial in modern sciences and will able to provide potential therapeutic intervention against oxidative threats that will help to cure certain diseases.[17] Extracts of *Zingiber officinale* Rose. exhibit anthelmintic, larvicidal, and antimicrobial activities after extracting with CU and PhCU as a menstruum. However, antimicrobial, anthelmintic, and larvicidal activity of *Z. officinale* Rose. raised with PhCU.[6]

CONCLUSION

Cow and GU have a lot of application in traditional and therapeutic uses. CU has a huge potential of being used as an immunomodulator particularly along with antibiotics and/or vaccines to ameliorate their activity. CU, nowadays, has been widely accepted as traditional medicine for curing innumerable diseases. But, some may find it difficult to consume the urine in raw form or consumption of it may not be accepted in some societies. Therefore, several organizations have come forward to modify the palatability of the crude CU and started marketing. Efforts are being made to prepare the dry form of CU without losing its activity. Along with CU, GU has also got a diversified application in therapy. Both *Gomutra* and *Ajamutra* in the near future will be able to get a great position in modern pharmacology. Since both Gomutra and Ajamutra are available everywhere especially in rural areas, therefore, the drugs produced by them will be of low production cost compared to other drugs. However, more investigation is necessitated for both cow and GU to treat various diseases. The therapeutic and traditional use of GU is not mentioned in a systemic manner in *Ayurveda*. However, scattered references are available to therapeutic and traditional use of urine. The information available in this review could be helpful to scientist, drug designers, forensic experts, and other scientific bodies related to *Ayurvedic* or ethnomedical research. Further, more research is needed on both cow and GU to establish their claimed therapeutic potential.

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