

Panchgavya Ayurvedic Formulation: Composition, Therapeutic Potentials, and Research Perspectives

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Abstract: *Panchgavya, a traditional Ayurvedic mixture consisting of five cow-derived products—milk, curd, ghee, urine, and dung—has long been prized in Indian medicine. Because of its many medicinal uses, panchgavya is used extensively in agriculture and for a range of medical ailments. This review looks at the pharmacological properties, traditional writings, current scientific evaluations, and therapeutic applications of Panchgavya formulations with an emphasis on its potential in neurological and chronic illnesses. Integrating traditional Ayurvedic knowledge with contemporary biology.*

Keywords: Panchgavya.

I. INTRODUCTION

The traditional Indian medical system known as Ayurveda places a strong emphasis on holistic and natural healing. Derived from the words “Pancha” (five) and “Gavya” (from the cow), Panchgavya refers to the five sacred products of the cow: dung (Gomaya), milk (Ksheer), curd (Dadhi), ghee (Ghrita), and urine (Mutra). These components are revered and thought to have powerful medicinal properties.

Numerous applications of Panchgavya in internal and external remedies are documented in classical Ayurvedic books such as the Charaka Samhita and Sushruta Samhita. The antioxidant, immunomodulatory, antibacterial, anti-inflammatory, and neuroprotective qualities of panchgavya have drawn interest in recent years. Using the HPTLC-DPPH bioautography method and tests for ferric reducing antioxidant power (FRAP), DPPH (free radical scavenging activity), and superoxide radical scavenging activity, Panchagavya, a traditional Ayurvedic treatment, was assessed for its antioxidant potential. Additionally, an estimate of the total phenolic content was made, and it came out to be fairly good. A study using HPTLC-DPPH bioautography showed that Panchagavya included a number of antioxidant chemicals. It demonstrated significant antioxidant activity in every assay that was conducted. A comparison of the results from three distinct batches of the materials under study revealed a 98.3–99.8% correlation between the FRAP, DPPH, and total phenolic content

II. COMPOSITION OF PANCHGAVYA

Ingredient	Ayurvedic Properties	Name
Cow Milk	Ksheer	Cooling, nourishing, promotes longevity
Curd	Dadhi	Digestive, probiotic, enhances gut flora
Ghee	Ghrita	Rejuvenating, enhances brain function
Urine	Gomutra	Antibacterial, detoxifier, diuretic
Dung	Gomaya	Disinfectant, used in wound healing

1. Cow milk: Cow milk is widely consumed for its nutritional and therapeutic benefits across all ages. According to Ayurveda, Ksheer is termed 'Aajanmasatmya' as every human being requires milk for survival after birth. Cow milk can replace breast milk in neonates. Cow's milk has several health benefits as indicated in Ayurveda. Cow milk is used in Rasayana for preventive, health promotion, and therapeutic benefits.

Milk is utilised in Anupana to improve medication absorption and interaction. Cow milk is used to detoxify metals and harmful plants, enhancing its medicinal properties. Cow milk, according to Acharya Vagbhata, has numerous benefits such as increasing life expectancy, nourishing body tissues, boosting immunity, improving intelligence, relieving



exhaustion, aiding in intestinal peristalsis, and treating severe debility and bleeding diseases. It boosts breast milk production in nursing moms.

Cow milk consists of 4.6% lactose, 4.65% fat, 0.54% minerals, 3.4% proteins, and 86% water. Cow milk proteins consist of 27% b-casein, 9% casein, 36% a-casein, and 27% peptides. Milk provides vital fatty acids, calcium, and phosphorus.

Milk contains phospholipids (cephalin, lecithin, and sphingomyelin), as well as vitamins (A, B2, B3, and K).

Cow milk's high calcium and phosphorus content promotes healthy teeth and bones. Improves bone density in osteoporosis patients. Cow milk contains vitamins A and K, which can improve vision and manage blood issues. Cow milk reduces dangerous gut germs and boosts healthy gut flora. Milk enzymes have antidiarrhoeal properties. Regular milk drinking is indicated for people with Ascites, gall bladder disorders, diabetes, and hyperlipidaemia. Milk contains the cis-isomer of linoleic acid, which has shown anti-cancer properties. Milk contains anti-cancer properties for skin, colon, and breast cancers. Milk contains sulphur amino acids, which contribute to its antioxidant properties.

2. Cow ghee :Cow ghee is also referred to as clarified butter. Ghrita, a popular long-term nutritional supplement in India, has been linked to increased risk of cardiovascular disease, diabetes, stroke, and dyslipidaemia due to its saturated fat content (13). Regular 10% consumption of Ghrita in the diet did not increase the incidence of CVDs, according to studies evaluating its influence on serum cholesterol levels (14). Ayurveda praised ghrita for its several advantages. Acharya Charaka suggests that ghrita improves pitta and vatadosha, as well as voice, skin, digestion, and reproductive potential. It improves memory and cognitive abilities. Ghrita has been used to treat a variety of conditions, including poisoning, epilepsy, insanity, phthisis, fevers, syncope, and chronic pain in the genital tracts, ears, and head. Rasayana is an immunomodulator that lubricates connective tissues in the body. According to Acharya Vagabhatta, Ghrita can help treat tumours, sinuses, ulcers, and worm illnesses. Ghrita has the unusual ability to enhance the virtues of other plants while preserving its own. Ayurveda encourages the use of ghee alongside other treatments. Ghee-based formulations improve the transport and bioavailability of hydrophobic components.

Ghee contains important fatty acids (omega 3 and omega 9), vitamins A, D, E, and K. Ghee contains therapeutic qualities including anti-inflammatory, immunostimulant, anti-asthmatic, anticholinergic, and antineoplastic effects. Ghrita formulations can improve vision, promote wound healing, cure gastrointestinal issues, and alleviate paralysis.

3. Curd: It is also known as 'dadhi' or 'yoghurt'. Curd is consumed globally for its nutritional content and health advantages. Ayurveda promotes curd eating based on environmental factors, climatic circumstances, and individual health. Curd is produced by fermenting cow milk with bacteria such as *Streptococcus thermophilus*, *Lactobacillus acidophilus*, and *Lactobacillus bulgaricus*. Curd contains water, proteins, vitamins A, B, D, and E, as well as minerals such as calcium, phosphorous, magnesium, and zinc. Curd contains probiotics that can help alleviate digestive issues by inhibiting unwanted germs and promoting healthy gut flora. It helps in strengthening immunity to fight against pathogens including HIV. Curd also serves as a blood purifier. Its antifungal properties are used to cure dandruff on hair.

Consuming curd on a daily basis can cut total cholesterol and low-density lipoproteins, reducing the risk of obesity.

4. Cow urine: Cow urine, also known as 'Gaumutra', is a waste discharged from the cow. Cow urine or its distillate is used in Ayurveda for several therapeutic purposes. Cow urine can alleviate Kaphaja and Vataja problems, such as excessive adiposity, poisoning, worms, gaseous swelling of the abdomen, skin diseases including leprosy, jaundice, swelling, and loss of appetite [24]. Gomutra is used to administer Vasti/Basti (therapeutic enema). Gomutra is utilised in Rasashastra to cleanse herbomineral substances such as Dhātu, Upadhātu, and Visha. Cow urine is 95% water, 2.5% urea, and the remaining 2.5% comprises enzymes, hormones, salts, and minerals. Cow urine contains enzymes that increase appetite, promote digestion, and regulate immunity. Clinical studies have shown that taking cow urine as an oral supplement will alleviate discomfort, improve defecation, and avoid itching and bleeding of haemorrhoids. Cow urine (2 ml, oral) and its distillate (2 ml, oral) demonstrated analgesic effects in rats of both sexes (150e200 g) using the rat tail immersion test and Diclofenac sodium (50 mg/kg, oral) as the reference standard. Cow urine has a considerable influence on wound healing in Wistar albino rats [30]. Cow urine and its distillate were investigated for antimicrobial action against pathogens including *Bacillus subtilis*, *Salmonella typhi*, *Klebsiella pneumoniae*, and *Pseudomonas*



aeruginosa. Cow urine has anticancer properties due to its ability to scavenge free radicals. Cow urine and its distillate have been used in cancer patients, with promises of improved quality of life and even longer longevity. CSIR scientists previously obtained US patents for cow urine distillate for its bio-enhancer, antibacterial, anti-fungal, and anti-cancer properties. This sparked significant curiosity. However, these assertions require rigorous clinical trials. Cow urine and manure are commonly employed in ancient Ayurvedic preparations. San-jeevanivati and Punarnava-mandur are two frequent preparations.

Similar to aconite, it is important to study the phytochemical profiles of both processed and raw plants. Traditionally, 'Bhasmas' are made by cooking cow dung cakes over fire in stages, using Agniputa, Kukkuta, and Gaja puta.

5. Cow dung: Cow dung has antibacterial properties, effectively killing malaria parasites and Mycobacterium tuberculosis. Antifungal activity is reported against Coprophilous fungi. This skin tonic is useful for treating psoriasis and eczema. Crushed neem leaves and cow dung can effectively treat boils and heat rashes. Burning cow dung produces smoke that can irritate eyes and create tears, potentially improving vision.



6. Panchagavya properties

Panchagavya is prepared using a variety of formulas in ancient Ayurvedic literature and can be used alone or in combination with other herbal medications. Ancient texts like the Chakara Samhita and Chaukambha Sanskrit Pratistana, among others, described the different forms of Panchagavya that can be used either by itself or in combination with other herbal medications. Mahapanchagavyagritha, which involves combining 18 or 24 herbs with Nitrogen, sulphur, phosphate, sodium, manganese, chloride, magnesium, and calcium salts, as well as acids like citric, succinic, and carbolic, vitamins A, B, C, D, and E, minerals, and hormones, are abundant in Panchagavya products. These products have been shown to improve immunity and treat a number of human diseases by promoting immunological modulation through increased humoral and cellular immune responses, upregulating lymphocyte proliferative activity, and lowering lymphocyte apoptosis. By effectively mending damaged DNA and limiting the production of free radicals, they function as anti-aging agents (Dhama et al., 2012 & 2005a). to create Mahapanchagavyaghrita, Panchagavyaghrita (meaning ghee formulations), and Swapla-Panchagavyaghrita are the many formulations of Panchagavya. These varied formulations are used to treat a range of human ailments, including vitiligo, skin conditions, colds, coughs, and chronic illnesses. Cowpathy, also known as Panchagavyachikitsa or therapy, is the term used to describe the use of Panchagavya to treat human ailments. A different and practical



preventative and therapeutic strategy for the health of humans, animals, and poultry has been suggested: panchagavya therapy (Dhama et al., 2012; Mathivanan et al., 2008; Dhama et al., 2005a). The five ingredients that make up panchagavya are cow dung, milk, ghee, curd, and urine. Each of these products has therapeutic qualities and can be used either alone or in combination with other herbs. High-nutrient components of panchagavya, such as cow milk, curd, and ghee, as well as cow dung and urine, can serve as a cheaper and alternative source of fuel, power, biogas, and energy (Chauhan, 2004; Dhama et al., 2005; Alves, 2008; Dhama et al., 2013). Native cow breeds were used to create Panchagavya, which is good for human consumption. Panchagavya consists of five products: cow dung, urine, milk, curd, and ghee. Panchagavya is formulated in the Ayurvedic literature in the following ratio: 2:1:6:12:2 (urine, dung, curd, milk, and ghee). Researchers have examined the antibacterial, antifungal, anticancer, immunological, pharmacological, and other characteristics of Panchagavya's five constituent parts as well as Panchagavya's combination properties with herbal drugs.

7. Antimicrobial and Antioxidant activity

The antibacterial and antioxidant properties of cow urine (CU) and cow urine distillate (CUD) were investigated by Edwin et al. (2008). Freshly collected cow urine outperformed distilled cow urine in this comparative investigation. In 2010, Sathasivam et al. assessed cow urine's ability to combat *Aspergillus flavus*. Evaluations of cow urine's antifungal properties in vitro in comparison to two *Aspergillus* fungus species. According to their comparative investigation, *Aspergillus niger* showed more growth suppression than *Aspergillus flavus*. When Athavale et al. (2012) assessed the antioxidant activity of the traditional ayurvedic preparation of Panchagavya, they found that it has a high potential for antioxidants and that this serves as the foundation for employing Panchagavya to treat cancer. The antibacterial efficacy of cow urine against a variety of pathogenic and non-pathogenic bacteria was investigated by Raad et al. (2013). They examined 14 cultures of harmful and non-pathogenic bacteria in various cow pee samples. They came to the conclusion that there was unmistakable proof of bioactive substances and antibacterial activity in each of the various cow urine samples. In addition to analysing certain components in evaporated cow dung extracts, Waziri and Suleiman (2013) examined the antibacterial properties of these extracts against a variety of diseases. The antioxidant properties of cow milk caseinates hydrolysed with various proteases were investigated by Kumar et al. (2013). The peptic hydrolysate of cow milk casein exhibited the strongest antioxidant activity, according to the analytical investigation.

Jirankalgikar Nikhil et al. (2014) investigated the High-Performance Thin Layer Chromatography (HPTLC) profile and in-vitro antioxidant activity of cow dung, revealing the inherent antioxidants in the dung. The antibacterial efficacy of Panchagavya against urinary tract infections was investigated by Deepika et al. (2016). They researched natural goods like buttermilk, honey, and Panchagavya (cow dung, milk, curd, ghee, and urine). Hoh and Dhanashree (2017) investigated how *Candida* species were affected by the antifungal activity of cow urine. They explained how cow urine distillation served as an alternate medication for antifungal illnesses. Karami et al. (2017) assessed cow milk's antagonistic properties against a few diseases. From the dairy product, they separated and identified the probiotic *Lactobacillus* bacteria, and discovered that the isolated *Lactobacillus* species have greater ability to combat certain infections. The antibacterial activity of goat and cow urine against specific dental caries-causing microorganisms was compared in vitro by Dave et al. (2018). The therapeutic potency against dental caries bacteria was higher in both urine samples.

This comparison analysis revealed that goat urine was more powerful than cow urine. Using both raw and distilled cow pee, Rachana and Sreepada (2019) assessed the antioxidant and anti-inflammatory properties of the urine. When compared to distilled cow urine, they found that raw cow urine exhibited more anti-inflammatory and antioxidant properties. Joshi et al. (2019) investigated the antibacterial and antioxidant properties of cow urine collected from different climate and elevation regions in Nepal. They came to the conclusion that a Nepalese cow urine sample exhibits natural antioxidants and potent antibacterial properties.



8. Anticancer activity

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