

# Anti Diabetic Potential of Selected Medicinal Plants and Cow Derived Products

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**Abstract:** Since ancient times the herbal medicines are used by human being. Many plants have pharmacological properties and have been applied in the cure of many patients with various ailments and diseases with successes. This has generated great interest among researchers in this regard to study various plants with medicinal properties. Hindus worship the cow in India and the reason for worshipping is the tremendous therapeutic values of cow derived products. The usefulness of these products has been well defined in ancient Ayurvedas. Cow derived products showed anticancer, hepatoprotective, Analgesic, Antioxidants, antidiabetic, immunomodulatory, antiepileptic, antibacterial, antifungal and antimicrobial activities. This study is to gather the scientific research findings to support the traditional uses of cow derived products and medicinal plants to create research interest. Both of these may provide clue for the development of new and better drugs for diabetes mellitus.

**Keywords:** Diabetes, Medicinal plants, Antidiabetic, Cow derived products

## 1. Introduction

A group of metabolic disorders characterized by hypertriglyceridemia, hyperglycaemia, and hypercholesterolemia, resulting from error in the secretion or action or both of insulin is called diabetes [1]. Diabetes mellitus is a metabolic disease as old as humankind, and its event is pondered to be high all over the world. Sulfonylureas and biguanides (oral hypoglycemic drugs) have been used in the treatment of diabetes mellitus [2]. The three main types of diabetes are type 1, type 2, and gestational diabetes.

### Type 1 Diabetes

Type 1 diabetes, which used to be termed juvenile diabetes. It develops in the young people; however, it can also develop in adults. In type 1 diabetes, human body no longer makes the insulin or enough insulin because the body's immune system, which normally protects you from infection by getting rid of bacteria, viruses, and other harmful substances, has attacked and destroyed or damaged the cells that make insulin.

### Type 2 Diabetes

Type 2 diabetes, which used to be termed adult-onset diabetes, can develop in people at any age, even children. However, it develops most often in middle aged and older people. People who are obese or overweight and inactive or lazy are also more likely to develop type 2 diabetes.

### Gestational Diabetes

Gestational diabetes can evolve when a woman is pregnant. All women have insulin resistance late in their pregnancy. During pregnancy, If the pancreas doesn't make enough insulin, a woman develops gestational diabetes. Overweight or obese women have a higher chance of gestational diabetes[3].

## 2. Symptoms of diabetes

Diabetes have the following symptoms:

- 1) Excessive thirst
- 2) Frequent urination
- 3) intense hunger
- 4) highly weight loss
- 5) Sudden changes in vision
- 6) Numbness in hands or feet
- 7) skin are very dry
- 8) Feel so tired many of the time
- 9) Sores that are healing slowly

More infections than usual vomiting, Nausea, or stomach pains may accompany some of these symptoms in the sudden onset of insulin-dependent diabetes, now called the Type 1 diabetes [4].

Indian Cow, (*Bos indicus*) has been pondered as holy animal by Hindus in India. Cow is defined as Kamdhenu (one animal who fulfills the wishes) since the Vedic times in Indian civilization. It is rely to be a "mobile hospital" for the treatment of various types diseases [5].

### 2.1 Cow derived Products

Ayurveda reported various cow derived products like cow's urine, cow's dung, cow's milk, ghee and curd are used to treatment of various disease conditions in human beings. All these five products are called as Panchgavya. Panchgavya Ghrita (PG) preparation is based on ghee [5].

#### a) Cow milk

Cow milk is a healthy food. It has low calorie, low cholesterol and high micro-nutrients, protein, calcium, vitamins, and plays an important role in meeting requirements of various essential nutrients in our daily life. It posses the carotenes, Vitamin A, Vitamin B complex group and Vitamin C. It contains rejuvenatory health protecting properties and is one of the best vitalizers, and bio-protective role in human health and is easy to digest [6,7]. Cow milk is effective in treatment of fever, diabetes, pain, tumors and weaknesses and importantly act as a medium to administer medicine. Cow milk delays the processes of aging [8].

#### b) Cow butter

Butter is a traditional food which is widely consumed worldwide. Its nutritional value (due to large content of vitamins, minerals and fats), exclusive and delightful flavour makes the butter appreciated by consumers. Butter can be made by separation of milk and subsequent churning of the cream or directly from milk [9]. Although butter is not a easily spoiled food, it spoiled the by moulds and bacteria, and the sweet, sour, raw or pasteurized cream are the main source of microorganisms [10].

#### c) Cow ghee

The butter fat get from the cow milk has been claimed to have many medicinal qualities like it is cooling in energy, bestows luster, and rejuvenating, beauty, enhances stamina and memory, increases the intellect and promotes longevity. It is protects the body from many diseases [11].

#### d) Cow urine

Cow urine (Goumutra) takes a unique place, in Ayurveda and has been perceived as water of life or "Amrita" [12]. In Sushruta Samhita, cow urine has been represented as the highly effective substance of animal origin. In India, drinking of cow urine has been used for many (thousands) of years [13]. The Cow urine distillate showed a significant decrease in the high blood glucose, serum cholesterol and serum triglycerides levels when compared with the diabetic control [14]. Cow urine can be used for stones. If you take a glass of fresh cow urine as a first thing in the morning for 21 days, Uric acid which present in cow urine dissolve these stones to a manageable size [15].

Many of researches has been reported that Goumutra is capable of curing blood pressure, arthritis, diabetes, blockage in arteries, heart attack, cancer, asthma, psoriasis, thyroid, eczema, prostate, fits, AIDS, piles, ulcer, acidity, migraine, constipation, gynaecological problems and several other diseases and many of researches have been conducted in Cow Urine Treatment and Research Centre, Indore over the past few years [15].

#### e) Cow curd

Curd from cow milk is examined as "Vatanashak", blood purifier, "Tridoshnashak" and found useful in "Pitha", blood related problems, gastrointestinal disorders and piles. Curd is a well organized probiotic with capabilities to regulate the infections in a nondrug manner. Curd or Mattha (whey or butter milk) is considered as nutritive, digestive and is useful in many gastrointestinal problems by checking or regulating the growth of harmful and noxious organisms. In curd and buttermilk (mattha), lactic acid producing bacteria are present and that produces antifungal metabolites viz. phenyl lactic acid cyclic dipeptides, as well as proteinaceous compounds and 3-hydroxylated fatty acid [12, 7].

#### f) Cow dung

Cow dung contains antiseptic and disease deterrent properties. Dung of cow can use as a skin tonic. When it mixed with crushed neem leaves and speeded on skin, it shows the best results for boils and heat rashes. Cow dung relieves the toothache, and also used as tooth polish, so in place of toothpaste which is made of chemicals & dead

bones of animals, it is a good substitute. The fresh cow dung kills or removes the germs of Malaria and T.B. Cow dung is antiseptic and contains prophylactic (disease deterrent) properties [12, 7]. It demolishes the microorganisms that originate disease, fermentation and putrefaction. Cow dung also contains antifungal components which forbid growth of even coprophilous fungi and their activity is elevated when used in combination with cow urine [16].

### 2.2 Antidiabetic activity of Cow derived products

Many diseases can be cured by the cow derived products. In the Ancient Ayurveda scriptures such as Charaka samhita, Shushruta samhita and Brahad Waghbhatt, the use of Cow milk, ghee, curd, urine and dung are well described and explained in detail [5]. Combination of five major products obtained from cow is describe by the term Panchgavya, which include cow's urine, milk, curd, ghee (butter) and dung. Panchgavya therapy or cowpathy make use of these five products as they posses therapeutic potential and are used separate or in combination with some other herbal drugs (plants derived drugs), animal or mineral origin in cure of different disorders and diseases like flu, colds, cough, allergies, arthritis, rheumatoid arthritis, leucoderma, leucorrhoea, wound healing, heart disease, hepatitis, asthma, hypercholesterolemia, dietary , renal disorders and gastrointestinal track disorders, ulcer, tuberculosis, chicken pox, skin infections, leprosy and other bacterial/fungal/viral infections, aging, chemical intoxication, worm infestations, obesity etc. These treatments seem to be profitable even for dangerous (deadly) diseases like Acquired immunodeficiency deficiency syndrome (AIDS), diabetes and cancer. In Ayurveda, anti-inflammatory activity and Immunomodulatory of Panchgavya is already being mentioned [12,7,17]. In this experiment studied the effect of Gomutra ark (GoA) on experimental alloxan-induced diabetes in rats. Wistar albino rats of either sex weighing 200-250 g were used for this purpose. The biochemical parameters (like blood sugar, vitamin C, and malondialdehyde release) were measured. Gomutra ark significantly reduces the blood glucose in diabetic rats although the effect was found to be less than glibenclamide. It significantly reduces the malondialdehyde and vitamin C level in diabetic rats [18]. According to Ramachandran P and Srividya N, the curd with aloe jel powder significantly reduce the blood glucose level as compared to control. This experimental work provides clinical proves for the improved glucose lowering effectiveness of a dairy product containing Aloe gel [19].

### 2.3 Antidiabetic activity of Medicinal plants

#### *Psidium guajava*

Guava leaf (*Psidium guajava* L) belonging to family Myrtaceae. It used in egypt and worldwide as a folk medicinal plant in the management and regulation of diabetes mellitus. During the screening of various plants, the *Psidium guajava* leaves prevent the enhancement of plasma sugar level in alloxan-induced diabetic rats during glucose tolerance test [20]. In the treatment of diabetes mellitus various parts (leaves, stem, fruits) of *P. guajava* have been used. After all long time, it's different parts have been widely well studied for its medicinal role. Leaves of *Psidium*

*guajava* have been stated to have hypoglycaemic effect on blood sugar level of normal rats as well as Streptozotocin induced diabetic rats [21].

#### ***Cannabis sativa***

The *Cannabis sativa* (marijuana) plant contains specific components that are called cannabinoids. Cannabinoids have a various potential therapeutic effects which include analgesic, antiinflammatory and immunosuppressive properties [22,23]. Cannabidiol (CBD) treatment significantly decrease the phenomena of diabetes in NOD mice from an phenomena of 86% in non-treated control mice to an incidence of 30% in CBD-treated mice [24].

#### ***Hibiscus rosa-sinensis***

The *Hibiscus rosa-sinensis* a well-known member of the family Malvaceae. The leaves contains large amounts of phenolic and flavonoid compounds [25]. Aerial part of *H. rosa-sinensis* reduces the blood glucose level with a simultaneous increase in the plasma insulin and C-peptide levels. In streptozotocin induced diabetic rats, *H. rosasinensis* extract could influence marker enzymes and protein metabolism in addition.. Extract of hibiscus also protect the Kidney and liver from damage due to diabetes [26].

#### ***Prosopis cineraria***

*Prosopis cineraria* is a small to medium sized tree belongs to the family Mimosaceae. It is found distributed in various parts of India like Gujarat, Rajasthan, Haryana, Uttar Pradesh and Tamilnadu and in the regions of Arabia [27]. The plant *Prosopis cineraria* has significant role in lowering glucose levels as well as in increasing body weight. Hydroalcoholic extract of *Prosopis cineraria* statistically highly significant for the decreasing the blood glucose levels of STZ induced diabetic rats as compared to the normal control [28].

#### ***Trigonella foenum-graecum***

*Trigonella foenum-graecum* is commonly known as "Fenugreek" in English is a member of family Fabaceae. The plant is grown all over in India. *Trigonella foenum-graecum* is a medicinal plant claim to contain numbers of therapeutic uses. Seeds and leaves of fenugreek are used as antidiabetic [29]. This plant is one of the most oldest cultivated plants (which possesses medicinal properties) identified in the history, and further studies calculated that the fenugreek (seeds and leaves) having antioxidant properties [30]. Some researches proved that the fenugreek contain anticarcinogenic, anthelmintic, anti-microbial, immunomodulatory, anti-nociceptive, antioxidant, anti-ulcer, anti-obesity, gastro- and hepatoprotective, anti-hyperglycemic, anti-diabetic and hypocholesterolemic effects [31].

#### ***Mentha piperita***

*Mentha piperita* L belongs to the family Labiatae (genus *Mentha*). In Brazil, it is widely used plants. *Mentha piperita* is generally used in the treatment of common cold, fever, bronchitis, loss of appetite, vomiting and nausea [32]. For therapeutic purpose, Peppermint is one of the plants most commonly used by the Brazilian population.. It has medicinal properties like: antispasmodic, anti-inflammatory,

and analgesic activities and the treatment of respiratory and gastrointestinal problems, as well as its antiperoxidant and antioxidant effect [33]. Peppermint juice showed the beneficial effect on blood sugar levels in oral administration [34].

#### ***Aegle marmelos***

*Aegle marmelos* is the traditional and an important medicinal plant. It belongs to the family of Rutaceae and is also known as Bael fruit tree. It is a restrained sized, aromatic, slender tree. The miscellaneous bio-chemicals present in the leaves of *A. marmelos* are alkaloids, terpenoids, saponins, cardiac glycosides, tannins, flavonoids and steroids [35, 36]. According to Kuttan & Sabu (In 2004), *Aegle marmelos* leaf extract on Alloxan induced diabetic rats and demonstrated that the leaf extract was more able to reduce oxidative stress and influence anti-oxidant levels, so that the increased level of blood sugar become decreased [37].

#### ***Momordica charantia***

Bitter melon, *Momordica charantia* (*M. charantia*) plant that has received the most attention for its anti-diabetic properties and it is commonly referred to as karela, bitter gourd and balsam pear Its fruit is also used for the cure of diabetes and amongst the indigenous populations of Asia, India, South America and East Africa [38]. This is one of the most important plant which used in cure of diabetes and investigation on traditional use of bitter melon in India proved it as hypoglycemic agent [39]. Tablets of bitter melon fruit can have shows the beneficial effects in the cure of diabetes mellitus. In the management of diabetes mellitus, tablets of Bitter gourd fruit may be used as supplementary medicine adjuvant with oral hypoglycaemic agents. Bitter gourd is one of most valuable plants that have been traditionally used for the cure of diabetes [40].

#### ***Syzygium cumini***

*Syzygium cumini*, generally known as "jamun" and belonging to the family Myrtaceae. It is a large evergreen slender tree up to 30 m in height and a girth of 3.6 m. *Syzygium cumini* has been valued in Unani and Ayurveda system of medication for containing variety of therapeutic properties. *Syzygium cumini* mainly cultivated in the Madagascar, Eastern Africa, South America [41]. The seeds, fruits, leaves, and bark are all traditionally used in ayurvedic medicines. Its bark possess carbohydrates, tannins and other nutritional micronutrients that help to conflict with many diseases. Also, it possesses to anti inflammatory, antifungal, anti-diarrheal, anti fertility and antiulcerogenic properties [42]. According to R. Bhaskaran Nair, *Syzygium cumini* was screened for its antidiabetic activity at the different dose levels. *Syzygium cumini* seed (aqueous suspension) exhibit the maximum hypoglycaemic activity in rabbits [43].

#### ***Ocimum sanctum***

*Ocimum sanctum* Linn belonging to the family Lamiaceae, generally known as Tulsi which is also a sacred plant in India. Fresh leaves of tulsi commonly used as home remedy or in ayurveda for the cure of cold, cough, abdominal pain, skin diseases, arthritis and diarrhea. The preclinical evaluation on different extracts of different parts of *Ocimum Sanctum* Linn and other variety of tulsi showed anti-cancer,

anti-diabetic, anti-fertility, anti-fungal, cardioprotective and hepatoprotective actions [44].

### 3. Conclusion

This review paper is aimed together all the scientific research findings supporting the use of cow derived products and medicinal plants in prevention, cure and treatment of various ailments in human being and animals. Cow derived products like cow milk, cow ghee, cow urine, cow milk curd and cow dung along with combination Panchgavya and medicinal plants like *Ocimum sanctum*, *Syzygium cumini*, *Momordica charantia*, *Aegle marmelos* etc contains several pharmacological activities like antidiabetic, anticancer, antiseptic, antimicrobial, antibacterial, antifungal, immunomodulatory, anticonvulsant, hepatoprotective, analgesic, antihemorrhoids and eye lubricant.

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