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# Impact of Nutraceuticals-Cow-ghee on diabetic induced experimental animals

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**ABSTRACT**

The present novel study was performed to evaluate the Anti diabetic activity of natural cow ghee against alloxan - induced diabetic models is Wistar albino rats. The 36 of animals either sex weighing between 150 g -to 200 g were taken for the study. Rats were divided into 6 groups (n=06) in which all the groups were diabetic induced by alloxan at the dose 160mg/kg. (i.p) for the screening. The Metformin (500mg/kg) was treated as a standard drug. Blood glucose levels were determined on 0-day ,2nd day, 4th day and 7th day after oral administration of cow ghee (200 and 400mg, p.o). There is reduce in blood glucose concentration significantly on the 7th day after continuous administration of test compound. There was significant reduction in glucose level ($p<0.001$) in diabetic rats. These results indicate that cow Ghee possesses a good anti diabetic property.

**Keywords:** Cow ghee, Alloxan, Metformin, Hypoglycemia.

## I. INTRODUCTION

Diabetes mellitus is a serious health problem with continuously increasing rates of incidence and mortality. Diabetes mellitus is characterized by elevated plasma glucose concentrations resulting from insufficient insulin and insulin resistance, or both, even leading to metabolic abnormalities in carbohydrates, lipids and protein[1] If not cured or controlled it may even lead to acute or chronic complications causing ketoacidosis, microangiopathy and other related infections.[2]

For a long time, diabetes, a chronic metabolic disorder, has been treated with several medicinal plants or their extracts based on folklore medicine[3], Synthetic hypoglycemic agents can produce serious side effects and in addition, they are not suitable for use during pregnancy[4]. Therefore, the search for more effective and safer hypoglycemic agents has continued to be an important area of active research.[5] Furthermore, after the recommendations made by WHO on diabetes mellitus, investigations on hypoglycemic agents from medicinal plants have become more important[6]

As a very common chronic disease, diabetes is becoming the third “killer” of the health of mankind along with cancer, cardiovascular and cerebrovascular diseases because of its high prevalence, morbidity and mortality[7]. Therefore, once diagnosed, it is well regulated by means of various therapeutically effective drugs. Besides, the therapy based on chemotherapeutic agents, the present century has progressed towards Phyto-medicines is comfort and free from hazards[8].

Ghee is identified as valuable natural source of food which has several health benefits entirely beneficial to the human population. It is one of the popular ingredients in the Indian diet and takes prevalent position in the dairy industry market[9]. Consumption of ghee in an adequate amount, imparts various health benefits such as binds toxins, enhances complexion and glow of the face and body, an amazing rejuvenator for the eyes, increases physical and intellectual stamina etc. in addition to imparting sustaining energy.[10]

Cow ghee promotes lifespan and protects from many diseases. It enhances digestive power, absorption and assimilation in the body[11]. It strengthens the nervous system and brain by nourishing Ojas and Dhatus therefore improves memory. It alleviates Vata, Pitta and also acceptable for KaphaPrakriti. Cow Ghee is recognized to be digested 96% which is very best as compared to all different vegetable or animal supply fats[12]. Ghee is nutritionally more reliable to other oils/fats due to the fact of its medium chain fatty acids content, which are absorbed directly by the liver and burned to supply energy[13]. It is fairly shelf stable due to low moisture and natural antioxidants contents. Lactose or casein intolerant have no difficulty with ghee because of removal of

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milk solids and impurities most human[14]. Due to characteristic of short chain fatty acids content, ghee has been accepted universally as best fat to other fats, which are accountable for its better digestibility and anti-cancer properties[15]. Different scientific findings recommend that the characteristic flavor of ghee and a mixture of bio-functional compounds make it appropriate for consumption by individuals of all ages with many health benefits[16].

Fatty acid profile of ghee residue revealed that the palmitic acid registered the highest among saturated fatty acids and the oleic acid accounted for the highest proportion (25.15) among unsaturated fatty acids[17]. Linoleic, linolenic, eicosatetraenoic and docosahexaenoic acid[18]. GLP-1 is an important gut hormone, ghee can helps improve the function of GLP-1 and helps in secretion of insulin from b-islets[19] cells of pancreas based on this mechanism of action our study was focused on evaluation of antidiabetic activity of ghee on alloxan induced on rats. The results are optimistic and significant[20] ,< 0.001and results are tabulated in Table-1.

## II. MATERIALS AND METHOD

Cow-Ghee was obtained from market (Patanjali Ayurveda Ltd. Batch No;

SP- 175(D) License no .10016022005581) .The Wistar male rats (weighing between 150 and 200 g) procured from the animal house of Bapuji Pharmacy College of Davanagere, Karnataka were used for the investigation. The animals were housed in standard environmental conditions of temperature (21 ± 2◦C), humidity (55 ± 10%), and a 12-h light-dark cycle. Rats were supplied with standard pellet diet and water ad libitum.

The acute toxicity test of the preparations and cow urine was determined according to the OECD guidelines (No. 420, Organization for Economic Cooperation and Development). Female albino mice (20–25 g) were used for this study[21]. Dosing amounts for sample in liquid form were calculated with the help of density or specific gravity. After the sighting study, a starting dose of 2000 mg/kg (p.o.) of the test samples was given to various groups of five animals each. The treated animals were monitored for 14 days for mortality and general behavior. No deaths were observed through the end of the study. The test samples were found to be safe up to the dose of 2000 mg/kg, and doses of 200 and 400 mg/kg were chosen for further experimentation.Diabetes was induced by single intraperitoneal administration of alloxan monohydrate in rats (150 mg/kg). The blood samples were collected from retro-orbital plexus on 15th day and blood glucose levels were estimated. Rats having blood glucose levels above 200 mg/dl were selected for further experiments and divided in five groups of six rats each[22]. Group I (normal rats); group II (diabetic untreated rats); group III (diabetic rats treated with ECR 200 mg/ kg), group IV (diabetic rats treated with ECR 500 mg/kg), and group V (diabetic rats treated with 400 mg/kg of metformin). All groups were treated orally once a day for 7 days. Rats in group I and II were fed with vehicle. The blood glucose levels were evaluated at regular time intervals at 0, 2, 4 and 24 h after the first treatment[23] (acute treatment) and on the seventh day 1 h after the last treatment (chronic treatment).

**Observation**

Wister rats were weighing between 150-200 g and fasted for 18 hrs with ad.libitum and made diabetic by injecting alloxan monohydrate with a dose of 150mg /kg (i.p), body weight in chilled citrate buffer (pH 4.5), after 24 hours, the rats showing blood glucose levels more than 250-350 mg/dl were considered as diabetic and employed in the study. The study was carried out following the guidelines of principles of laboratory animal care.

Group I: Served as solvent control.
Group II :Served as diabetic control (alloxan-induced,150mg/kg.i.p)
Group Ill: Served as standard (Insulin 0.6 U)
Group IV: Served as standard (metformin,200mg/kg,p.o)
Group V: Served as test-1 compound metformin 200mg/kg + Cow ghee,
Group VI: Served as test -2(metformin,400mg/kg, p.0+ Cow-ghee)

**Statistical analysis**

Data were expressed as mean ± SEM, and the obtained data were subjected to one-way ANOVA followed by Dunnet's test. The p values less than 0.001 were considered as significant.

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Table 1 Showing Anti-diabetic activity of Cow-Ghee

| Treatment | 0 Day | 2nd Day | Reduction % | 4th Day | Reduction % | 7th Day | Reduction % |
|---|---|---|---|---|---|---|---|
| Group I | 76.4 ± 1.96 | 79.2±0.86 | -3.66 | 79.6±0.50 | -4.18 | 80.2±1.13 | -4.97 |
| Group II | 202±9.69 | 257.6±4.50 | -27.5 | 274.4±2.15 | -35.8 | 312.6±1.77 | -54.75 |
| Group III | 253.8±1.74 | 186.2±2.2 | 26.63 | 123.4±1.07 | 5.13 | 117±1.94 | 53.9* |
| Group IV | 257±1.94 | 243.2±1.06 | 5.36 | 152.8±1.06 | 40.54 | 137.6±1.02 | 46.45* |
| Group V | 254±1.41 | 195.2±1.85 | 23.14 | 129.6±0.92 | 48.97 | 129.4±1.36 | 49.05* |
| Group VI | 260.8±0.37 | 202±1.14 | 22.5 | 141.8±0.80 | 45.6 | 137.8±0.86 | 47.16* |

One way ANOVA followed by Dunnet's test HS P<0.001

## III. RESULT AND DISCUSSION

The present investigation was focused on to evaluate antidiabetic activity metformin with cow ghee whether it could be potentiate the metformin activity or not. Whereas cow Ghee itself decreases the glucose concentration in diabetic induced Wister rats and also cow ghee was potentiate the actions of metformin in experimental tool. Apart from that Cow ghee act as a antidiabetic nutraceutical component in diabetic induced rat models. The Cow ghee containing the important active constituent like linolenic acid was also responsible for the anti-diabetic activity which stimulate insulin by binding to beta cells specific site cells of Karp channel complex and inhibiting its activity. KArp channel inhibition causes cell membrane depolarization and the cascade of events leading to insulin secretion and future increasing plasma insulin levels.

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