# MEERUT INSTITUTE OF ENGINEERING & TECHNOLOGY

# (MIET Meerut)

**CPCSEA Registration Number:**
**711/PO/Re/S/02/CPCSEA (Ministry of Environment, & Forest, Government of India)**

# ANTI-DIABETES EFFICACY OF SDM02 TABLETS

**SPONSOR**

JEENA SIKHO LIFECARE LIMITED &
MITTAL AYURVED SANSTHAN

**CLINICAL RESEARCH ORGANIZATION**

MITTAL GLOBAL CLINICAL TRIAL SERVICES (MGCTS)

**TEST LABORATORY**

PHARMACOLOGY DEPARTMENT, DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY, MIET Meerut
NH-58, Delhi-Roorkee Highway, Baghpat Bypass Road Crossing, Meerut, U.P. – 250005

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|---|---|
| **PROJECT NO** | **: 2024-06-289** |
| **REPORT NO.** | **: MIET/DPT/2024-06/289/Diabetes** |
| **DATE** | **: 05-07-2024** |

**Test Compound** : SDM02 Tablets
**SPONSOR** : Jeena Sikho Lifecare Ltd & Mittal Ayurved Sansthan
**CRO** : Mittal Global Clinical Trial Services (MGCTS)
**STUDY** : ANTI_DIABETES EFFICACY OF SDM02 Tablets
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# 1. STATEMENT OF COMPLIANCE

I, the undersigned hereby declare that **Project No. 2024-06-289/ Report No. MIET/DPT/2024-06/289/Diabetes**; entitled "***Anti-Diabetes Efficacy of SDM02 TABLETS"*** was performed in accordance to the standard procedure of Pharmacology Department, Department of Pharmaceutical Technology, MIET Meerut, UP, as well as the approved study plan.

I hereby attest the authenticity of the study and guarantee that this report is a true and accurate record of the results obtained and shall not be reproduced except in full, without the written approval of the Sponsor.

This study was conducted inaccordance to the Good Laboratory Practices (GLP).

All original raw data including documentation, the draft report, a copy of the final report and the representative test sample are archived at the Pharmacology Department, Department of Pharmaceutical Technology, MIET Meerut, UP. There were no circumstances that may have affected the quality and integrity of the study.

The sponsor of the study is responsible for the necessary evaluation of the test sample concerning the chemicals, purity, identity, stability and other required data.

**Study Director** **05-07-2024**
**Mr. Ankit Chaudhary (M.Pharm)** Date

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## 2. STATEMENT BY TEST FACILITY MANAGEMENT

Management of the test facility has made available all the resources to the Principle Investigator necessary for conduct of the present study in compliance with the principles of GLP.

I, the undersigned, take overall responsibility for the reliability of the work described in the report with accordance to GLP.

**Test Facility Management** **05-07-2024**
**Dr. Vipin Kumar Garg (M.Pharm, PhD)** Date

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## 3. QUALITY ASSURANCE REPORT

This **Project No. 2024-06-289**, **Report No. MIET/DPT/2024-06/289/Diabetes** entitled **"*Anti-Diabetes Efficacy of SDM02 TABLETS***" (ISO Guideline 10993 – 11) was subjected to inspection by Quality Assurance Unit.

This report had been audited by the Quality Assurance Unit, and is considered to be an accurate account of the data generated and of the procedures followed. In each case, the outcome of the QA evaluation is reported to the Principle Investigator and Management on the day of evaluation. Audits of study documentation, and process inspections appropriate to the type and schedule of this study were as follows:

| | |
|---|---|
| Standard Test Method Compliance Audit | : 10-06-2024 |
| Animal Preparation | : 11-06-2024 |
| Test Material Preparation | : 16-06-2024 |
| Application of test compound | : 17-06-2024 to 23-06-2024 |
| Assessment of Response | : 21 Days (10-06-2024 to 30-06-2024) |
| Draft Report Audit | : 02-07-2024 |
| Final Report Date | : 05-07-2024 |

**FOR QUALITY ASSURANCE** **05-07-2024**
**Ms. Garima Agarwal** Date

| | |
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# 4. STUDY PERSONNEL

| | |
|---|---|
| **Study Director** | **:** Mr. Ankit Chaudhary (M.Pharm, Pharmacology) |
| **Study Personnel** | **:** Ms. Aditi Giri (M.Pharm, Pharmacology) |
| **Veterinarian** | : Dr. Sonia Sharma (MVSc) |
| **Study Managers** | : Ms. Garima Agarwal (M.Pharm) |

## 5. SUMMARY

The study was conducted in accordance with the previously reported literature to evaluate the Anti-Diabetes Efficacy of SDM02 TABLETS in streptozotocin induced diabetic rats.

The test sample was administered through the oral route at pre-specified fixed-dose 2g/kg volume in either sex wistar rats (8-12 weeks). The body weight of animals was measured at day 0 (before the drug administration) and on days 7, 14 and 21 of the study. The rate of mortality and general behavior of the animals were observed continuously for the initial 1, 4, and 24 h after the drug administration and then daily for 21 days. Cage side observations included variations in the skin and fur, eyes, and sleep time at night. Particular attention was directed to observations of tremor, convulsions, salivation, diarrhea, lethargy, sleep, and coma. Also, respiratory, circulatory, autonomic, and central nervous systems and somatomotor activity were examined.

In the study, no mortality was observed up to 21 days. No toxic symptoms were found in rats 2g/kg at dose according to their body weight. No abnormalities were been observed in general clinical observations or gross necropsy. The rats were found to behave normally with no variation in locomotor, behavioral, neurological, or secretary patterns. No significant changes were observed in the body weight of rats.

Considering the data obtained from the study, the SDM02 TABLET at dose of 2g/kg is found to be effective.

# 6. INTRODUCTION

## A. Purpose of the Study:

The test article identified below was evaluated to determine the Anti-Diabetes efficacy of the SDM02 TABLETS following oral administration to rats.

## B. Testing Guidelines:

The study was conducted based on the International Organization for Standardization (ISO) 10993, Biological Evaluation of Medical Devices, Part 11- Test for Systemic Toxicity,and previous reported literatures.

**References of literature reported**


- Mestry, S. N., Dhodi, J. B., Kumbhar, S. B., & Juvekar, A. R. (2016). Attenuation of diabetic nephropathy in streptozotocin-induced diabetic rats by *Punica granatum* Linn. leaves extract. *Journal of traditional and complementary medicine*, *7*(3), 273–280. https://doi.org/10.1016/j.jtcme.2016.06.008
- Molehin, O. R., Oloyede, O. I., & Adefegha, S. A. (2018). *Streptozotocin-induced diabetes in rats: effects of White Butterfly (Clerodendrum volubile) leaves on blood glucose levels, lipid profile and antioxidant status.* *Toxicology Mechanisms and Methods, 1–14.* doi:10.1080/15376516.2018.1479476
- Ahmad, U., & Ahmad, R. S. (2018). Anti diabetic property of aqueous extract of Stevia rebaudiana Bertoni leaves in Streptozotocin-induced diabetes in albino rats. *BMC complementary and alternative medicine*, *18*(1), 179. https://doi.org/10.1186/s12906-018-2245-2

# 7. MATERIALS

**Sample Details**

The test article provided by the sponsor was identified and handled as follows:

| | |
|---|---|
| Test Compound | : SDM02 TABLETs |
| Batch No | : 02 |
| Mfg Date | : 04/2024 |
| Physical Appearance | : Grey color solid dosage form |
| Expiry Date | : 3 yrs from mfg date |
| Storage Condition | : Room Temperature |
| Control Article | : NA |
| Control Article Stability Testing | : NA |

**Sample Preparation**:

The sample was directly used in different dose volumes.

**Test System**

| | |
|---|---|
| Species | : Wistar rats |
| Source | : Lala Lajpat Rai University |
| Strain | : Albino |
| Sex | : Female |
| Body Weight Range | : 180-250 gm |
| Acclimatization | : Minimum 5 days |
| No. of Animals | : 18 Rats |

Identification Method: Marked with a permanent marker on the tail.

**Animal Management**
**Husbandry**:
The conditions conformed to the MIET Standard Operating System that is based on "*Guide for theCare and Use of Experimental Animals*"

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**Food**:
A commercially available Rat feed was provided daily

**Water**:
Portable water was provided *ad libitum* through species appropriate water container ordelivered through an automatic watering system.

**Environmental conditions**:
Air conditioned rooms with 10-15 air changes per hour, Temperature between 22 ± 3°C, relative humidity 40 – 60% and illumination cycle set to 12 hours artificial fluorescent light and 12 hours dark.

**Selection**:
Only healthy previously unused animals were selected.

**Personnel**:
Associates involved were appropriately qualified and well trained.

**Veterinary Care**:
Standard veterinary medical care was provided in the study.

**IAEC**:
This procedure has been approved by MIET's Institutional Animal Ethical Committee and is reviewed at least half-yearly by the same committee.

# 8. METHODS

Preparation of Animals:

18 Wistar rats were randomly selected, weighed, and marked individually for identification. A total of three groups were formed containing six rats in each group. The animals were kept in the cages for five days prior to dosing to allow for acclimatization to the laboratory conditions.

Preparation of test drug:

The test drug was directly suspended in distilled water.

Drug administration:

Animals were kept on overnight fasting before the drug administration and three to four hours post-drug administration. During that time, the animals had free access to the water. Before the drug administration, the animals were weighed. Diabetes was induced following single-dose administration of streptozotocin at a dose of 45mg/kg via the *i.p.* route. The test sample was administered at a pre-specified fixed-dose volume (2g/kg) via oral route daily for two weeks.

Mortality observation:

The numbers of animal deaths were observed at day 0 before drug administration and at days 7, 14, and 21 after drug administration.

General Clinical observation:

Post-drug administration, the animals were continuously observed for muscle activity (Locomotion, muscle coordination, tremor and convulsive episode), Visual place response, and secretory activity (Lacrimation, and salivation). Also, respiratory and heart rate were examined.

Biochemical Parameters:

At the end of study, all the rats were sacrificed for the Biochemical Parameters estimation.

Body weight Measurement:

The body weight was recorded at day 0, 7, 14 and 21 of the study using electric balance.

Gross Necropsy:

At the end of the observation period the survived animals were sacrificed by an over dosageof pentobarbital and were subjected to gross necropsy. All gross pathological changes were observed and pancreas and kidney were isolated for histopathological analysis.

## 9. Acceptance Criteria and Statistical Analysis

According to the previous literature reported, the number of animal mortalities and evident toxicity, the hazard class was classified to the category of Globally Harmonized Classification System.

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## 10. RESULTS & DISCUSSION

Mortality:
No mortality was observed in any animals until 21 days post drug administration.

Clinical signs:
No abnormalities were observed in any animals until 21 days after the drug administration.

Body Weight:
No significant variation has been observed. Weight gain or weight loss in the study cannot be considered a sign of evident toxicity as no abnormalities were observed in clinical and gross necropsy findings.

Macroscopic Findings:
No abnormalities were observed in any animals at 2g/kg dose.

Table:

| Dose (mg/kg) | Animal No. | Mortality Observed | Initial Body weight | Body weight post drug administration | | | Macroscopic Findings (Abnormalities detected) |
|---|---|---|---|---|---|---|---|
| | | | Day 0 | Day 7 | Day 14 | Day 21 | |
| Control Group | 1 | No | 220.4 | 219.8 | 218.5 | 218.2 | None |
| | 2 | No | 224.5 | 225.8 | 223.8 | 223.5 | None |
| | 3 | No | 221.6 | 222.4 | 223.4 | 224.8 | None |
| | 4 | No | 219.8 | 217.6 | 219.5 | 220.5 | None |
| | 5 | No | 222.5 | 223.5 | 225.8 | 224.7 | None |
| | 6 | No | 225.4 | 224.3 | 223.5 | 221.8 | None |
| STZ induced Group | 1 | No | 224.9 | 211.5 | 210.5 | 204.3 | None |
| | 2 | No | 218.7 | 213.5 | 211.8 | 210.9 | None |
| | 3 | No | 220.8 | 214.8 | 215.6 | 214.8 | None |
| | 4 | No | 222.8 | 210.9 | 208.9 | 206.4 | None |
| | 5 | No | 223.9 | 209.9 | 211.9 | 209.5 | None |
| | 6 | No | 226.8 | 210.4 | 212.8 | 210.2 | None |
| STZ + Test Drug | 1 | No | 217.5 | 213.8 | 215.9 | 216.7 | None |
| | 2 | No | 220.9 | 212.9 | 213.5 | 215.4 | None |
| | 3 | No | 223.1 | 217.8 | 218.4 | 218.9 | None |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 4 | No | 227.7 | 216.7 | 217.4 | 218.9 | None |
| | 5 | No | 228.9 | 218.4 | 220.4 | 220.8 | None |
| | 6 | No | 225.9 | 219.4 | 220.4 | 221.3 | None |

Biochemical Parameters:

Diabetes was induced after the single injection of streptozotocin at the dose of 45mg/kg. Significant toxicity was observed in the toxic group when compared to the control rats. Following this treatment was started at herbal drug was administered at the dose of 2g/kg via oral route. Blood glucose level was measured from tail vein using glucose meter (ACCU-CHEK advantage), seven days after induction. Rats with blood glucose level above 14 mmol/L were considered as diabetic and were used for further study by initiating the treatment. Pooled 24 h urine was also evaluated.

| Group | Blood Glucose level (mmol/L) | | | |
|---|---|---|---|---|
| | Day 0 (Before Injection) | Day 7 | Day 14 | Day 21 |
| **Control** | 4.35 ± 0.30 | 4.23 ± 0.37 | 4.31 ± 0.33 | 4.55 ± 0.39 |
| **STZ induced rats** | 4.33 ± 0.36 | 24.35 ± 0.61 | 24.68 ± 0.75 | 24.83 ± 0.86 |
| **STZ + Test Drug** | 4.39 ± 0.34 | 24.60 ± 0.83 | 23.52 ± 0.76 | 19.44 ± 1.08 |

| Group | Urine Albumin gm/24h | Urine Creatinine mg/24h |
|---|---|---|
| **Control** | 0.08 ± 0.01 | 21.91 ± 0.74 |
| **STZ induced rats** | 0.43 ± 0.06 | 12.52 ± 0.72 |
| **STZ + Test Drug** | 0.24 ± 0.06 | 15.42 ± 0.49 |

## 11. ARCHIVE

On completion of the study, the raw data and other material, sample of the test substance and the study report are being retained for 09 years at the Pharmacology Department, Department of Pharmaceutical Technology, MIET Meerut, UP.

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## 12. CERTIFICATE

This is to certify that the "***Anti-Diabetes Efficacy of SDM02 TABLETS***" sponsored by **JEENA SIKHO LIFECARE LIMITED** and **MITTAL AYURVED SANSTHAN** and the testing material for the study was provided by Clinical Research Organization: **MITTAL GLOBAL CLINICAL TRIAL SERVICES (MGCTS)** was performed according to the International Organization for Standardization 10993: Biological Evaluation of Medical Devices Part 11: and previous reported literature. **The test sample at the dose of 2g/kg was found to be effective in reducing the blood sugar, supporting urine Albumin, and creatinine excretion function.**

**Note**: Results and conclusions apply only to the test article tested. Any extrapolation of thesedata to other samples is the sponsor's responsibility.

Ankit Chaudhary

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**Study Director** **05-07-2024**
**Mr. Ankit Chaudhary** Date

## 13. ANNEXURE – I: REFERENCES


- International Organization for Standardization (ISO) 10993, Biological evaluation ofMedical Devices Part – 11, Test for Systemic Toxicity (2017)
- Mestry, S. N., Dhodi, J. B., Kumbhar, S. B., & Juvekar, A. R. (2016). Attenuation of diabetic nephropathy in streptozotocin-induced diabetic rats by *Punica granatum* Linn. leaves extract. *Journal of traditional and complementary medicine*, *7*(3), 273–280. https://doi.org/10.1016/j.jtcme.2016.06.008
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