

Therapeutic Evaluation of *Anjeer (Ficus carica Linn)* in *Ziabetus Shakri* (Type 2 Diabetes)

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Abstract: A randomized, single-blind, standard-controlled clinical trial was conducted to assess the therapeutic efficacy of *Anjeer (Ficus carica)* in the management of Type 2 Diabetes Mellitus (T2DM), traditionally referred to as *Ziabetus Shakri*. Sixty confirmed T2DM patients were randomly assigned into two groups: Group A (Test) and Group B (Control), with 30 participants in each. Group A received the investigational drug (*Ficus carica*) at a dosage of 3 grams twice daily, while Group B was administered Metformin 500 mg (Cipla), one tablet twice daily, over a period of 45 days.

The findings demonstrated that the test formulation significantly improved certain subjective symptoms, including fatigue ($p < 0.001$) and unexplained weight loss ($p < 0.01$). However, no statistically significant changes were observed in polyuria, polydipsia, polyphagia, or progressive weakness ($p > 0.05$). Regarding objective parameters, Group A exhibited notable improvements in fasting blood sugar (FBS), postprandial blood sugar (PPBS), urine glucose levels ($p < 0.01$), and glycated hemoglobin (HbA1c) ($p < 0.05$). In contrast, the control group did not show statistically significant changes in FBS and urine glucose ($p > 0.05$).

These results suggest that *Ficus carica* may offer potential as an adjunctive treatment for T2DM, particularly in alleviating specific clinical symptoms and improving glycemic control.

Keyword: *Ziabetus Shakari*, Diabetic Mellitus, *Anjeer*, Metformin, HbA1c.

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I. INTRODUCTION

Ziabetus Shakari (Diabetes mellitus) is one of the oldest known diseases. The term Diabetes (derived from the Greek word *diabaínein*, meaning "to pass through" or "siphon") refers to a group of metabolic disorders primarily marked by persistent hyperglycemia (elevated blood glucose levels). Common symptoms include increased hunger (polyphagia), excessive thirst (polydipsia), frequent urination (polyuria),

glucose in the urine (glycosuria), and unintentional weight loss. These symptoms reflect the body's impaired ability to regulate glucose, often due to issues with insulin production or action. Synonyms for *Ziabetus* like *Zalaqul Kuliah*, *Istisqae Anmas*, *Daulabia*, *Dwarfish*, *Barbarian*, *Parkariah*, *Muatteshah*, *Attashah*, *Marze Majari* and *Muabbar* etc. [1, 2, 3, 4, 5]. The earliest evidences regarding the etiology of *Ziabetus* were more mythological than rational as the polyuria is mentioned in the Ebers' papyrus [6, 7, 8].

The global prevalence of diabetes is increasing at an alarming pace, posing significant public health challenges [1]. According to current estimates, approximately 20% of the worldwide diabetes burden is concentrated in the South-East Asia Region, a figure projected to triple by 2025—rising from approximately 30 million to 80 million cases [9]. In India alone, the International Diabetes Federation estimates that 40.9 million individuals are currently living with diabetes, a number expected to escalate to 69.9 million by 2025 [10].

Over the past 25 years, diabetes has taken on a pandemic-like form in India, with a particularly high prevalence in urban populations. Comparative epidemiological studies conducted across different regions of the country consistently highlight a rising trend in the incidence and prevalence of the disease. These findings underscore the growing public health challenge posed by diabetes in both clinical and societal contexts, especially in rapidly urbanizing environments. [11].

The world's highest concentration of diabetics is found in India. It is estimated that there was 3.8% over all prevalence in 1995, 4% in 2000 and is expected to reach 6% in 2025. In 1995, there were about 19.4 million diabetics living in India. In 2000, this number had risen to 31.7 million, and by 2025 and 2030, it is expected to reach 57.2 million and 79.4 million, respectively [12]

Most of the Unani physicians have described *Ziabetus* in simulating pattern in their books. In addition, they have mentioned causes, leading to the development of *Ziabetus* like *Sue mizaj har Kuliah* (abnormal hot temperament of kidney), *Zoaf-e-Kuliah* (Weakness of kidney), *Majarie baul ka kushada aur farakh ho jana* and *Tamam badan /Kabid /Kuliah ka Sue mizaj barid* (Abnormal cold temperament of the whole body / liver / kidney) [1, 13].

Ziabetus can be divided into two types according to presence or absence of the sugar in the urine. ***Ziabetus Shakari*** which is characterized by excessive thirst, excessive urination and presence of sugar in the urine. ***Ziabetus Sada*** which is characterized by excessive thirst and excessive urine, but the sugar is absent in the urine and it is more common in old age [14, 15].

It can also divide according to *khiffat* and *shiddat* (degree of intensity of sign and symptoms) into two types: ***Ziabetus Har***; in this type, the patients experience extreme thirst and pass white colour urine frequently. Excretion of sugar renders the body weak, organ start to dissolve and thus, body become lean and thin and the general health runs down, finally it results in *Zooban* and *Diq*. ***Ziabetus Barid***; this type of diabetes has less severe signs and symptoms than *Ziabetus Har*, but the patient still feels thirsty and excretes out white colour urine in large quantity [16, 17].

Till date no curative therapy is available and the current therapeutic aims in the management of the disease include improvement in function and quality of life and minimization of toxic side-effects. The long-term use of anti-diabetic drugs

produces major adverse effects like GI bleeding, hypertension, hepatic and renal impairments, thrombocytopenia etc. Therefore, these drugs cannot be prescribed for longer duration. In view of the above-mentioned side effects of the drugs, the higher incidence of the disease and resulting deformity, researchers of various systems of medicine are concentrating themselves to develop safe and effective mode of treatment for *Ziabetus Shakari*.

In recent years, there has been a significant global increase in research focused on medicinal plants, driven by growing interest in their therapeutic potential and integration with traditional healthcare systems. Extensive pharmacological and ethnobotanical studies have provided strong evidence supporting the efficacy of plant-based compounds in the prevention and treatment of various diseases. Notably, more than 13,000 plant species have been scientifically investigated in the past few years, highlighting their relevance in modern drug discovery and complementary medicine [18]. According to the World Health Organization, more than 80% of the world's population—primarily those of developing countries—relies on plants and plant derived medicines for their health care [18]. In recent years, extensive scientific investigations have been conducted to evaluate the therapeutic potential of Unani medicines. Several studies have demonstrated that certain Unani formulations exhibit significant hypoglycemic effects. Among these, *Ficus carica* Linn. (commonly known as Anjeer or fig) has been identified as a promising candidate for further study due to its potential role in blood glucose regulation.

II. METHODOLOGY

The current clinical trial was carried out in the Jamia Tibbiya Deoband Hospital in Saharanpur, Uttar Pradesh. Before starting a patients study, a thorough protocol was developed and approved by the institute's institutional ethics committee for biomedical research JTD/Eth/02/2011. After the ethical clearance, a clinical trial was initiated by randomly assigning eligible patients from Jamia Tibbiya Deoband's OPD and IPD to test and control groups. This clinical trial was conducted from October 2010 to March 2012. The test drug dried *Anjeer* was procured from local market and identified for the same and was given orally 3 gm twice a day with routine physical activity. The standard control drug i.e., Metformin was purchased from Cipla Company and 500 mg twice daily orally given to group B patients with routine physical activity.

➤ Inclusion Criteria:

Participants in this study had to have type 2 diabetes mellitus and be between the ages of 30-60 years of age of either sex. They had to meet one of the following requirements at screening; Fasting blood sugar (FBS) > 126mg/dl; Post Prandial blood sugar (PPBS) > 200mg/dl and patients with HbA1c >7%.

➤ Exclusion Criteria:

Patients with malnutrition related diabetes mellitus (MRDM); complicated cases of Diabetes Mellitus (Diabetic Ketoacidosis, Retinopathy, Neuropathy, Nephropathy);

coronary artery disease; peripheral vascular disease; advanced liver, kidney and pulmonary diseases; pregnancy & lactation and those who do not follow up or who fail to provide written consent are among the participants who are under 30 and over 60.

Using a computer-generated random table method, 60 patients were divided into two groups, with 30 patients in each of the test and control groups. Some investigations like HbA1c, Hb%, TLC, DLC, Urine routine and microscopy, AST, ALT, Blood Urea, Serum Creatinine, Serum Uric Acid and ECG were done in each and every case before and after the treatment. Other tests, such as FBS, PPBS and Urine sugar were conducted on the 0-day, 15th day, 30th day and 45th day of each follow up.

Assessment of the patients was carried out on 0-day, 15th day, 30th day and 45th day. After 45 days treatment, the value of every follow up of FBS, PPBS and urine sugar and pre and post value of HbA1c were analyzed both in test and control groups. Statistical analysis was done on 60 patients who completed the course of treatment and statistical analyses was done by appropriate test for subjective and objectives parameters respectively.

III. RESULT

In this study 16 (26.67%) patients were in the 35-40 age group, followed by 16 (26.67%) in the 41-45 age group, 16 (26.67%) in the 46-50 age group and 12 (20%) in the 51-55 age group. This data suggested that the disease is more prevalent in the people between the ages of 35 and 50.

Highest incidence of 30 (50%) was in upper middle, followed by 18(30%) in lower middle class and 12 (20%) in poor respectively. The present study demonstrates that diabetes mellitus is more prevalent among the upper middle socioeconomic class. This finding is not in accordance with the findings suggested by Connolly V. et al. This may be due to the small sample size of study and the subject only confined to the patients attending our hospital, the majority of whom were from middle-class and lower-class backgrounds [19].

The mean scores of all subjective parameters in test group were compared statistically by using Friedman test for intragroup comparisons, showed significant difference on some subjective parameters like tiredness ($p < 0.05$), and unexplained weight loss ($p < 0.01$); while there was no effect on polyuria ($p > 0.05$), polydipsia ($p > 0.05$), polyphagia ($p > 0.05$), progressive weakness at 45th day compared with baseline.

Table 1 Effect of the Test Drug on Objective Parameters in Group A (N=30)

Parameters	0 Day	15th Day	30th Day	45th Day
FBS	172.20±8.22	190.80±12.04	152.50±4.50	132.20±2.82
PPBS	266.10±8.07	241.30 ±9.15	213.05 ±7.98	212.95 ±10.72
Urine Sugar	1.12±0.16	0.77±0.15	0.75±0.16	0.30±0.09
HbA1c	8.18±0.24	-	-	7.10±0.21

Table 2 Effect of the Standard Control Drug on Objective Parameters in Group B (N=30)

Parameters	0 Day	15th Day	30th Day	45th Day
FBS	194.60±11.08	173.50±9.84	154.05±9.16	194.20±9.46
PPBS	284.90±6.75	256.10 ±9.28	274.6 ±7.94	235.75 ±10.40
Urine Sugar	0.90±0.17	1.00±0.17	0.75±0.16	0.75±0.16
HbA1c	7.75±0.31	-	-	7.13±0.24

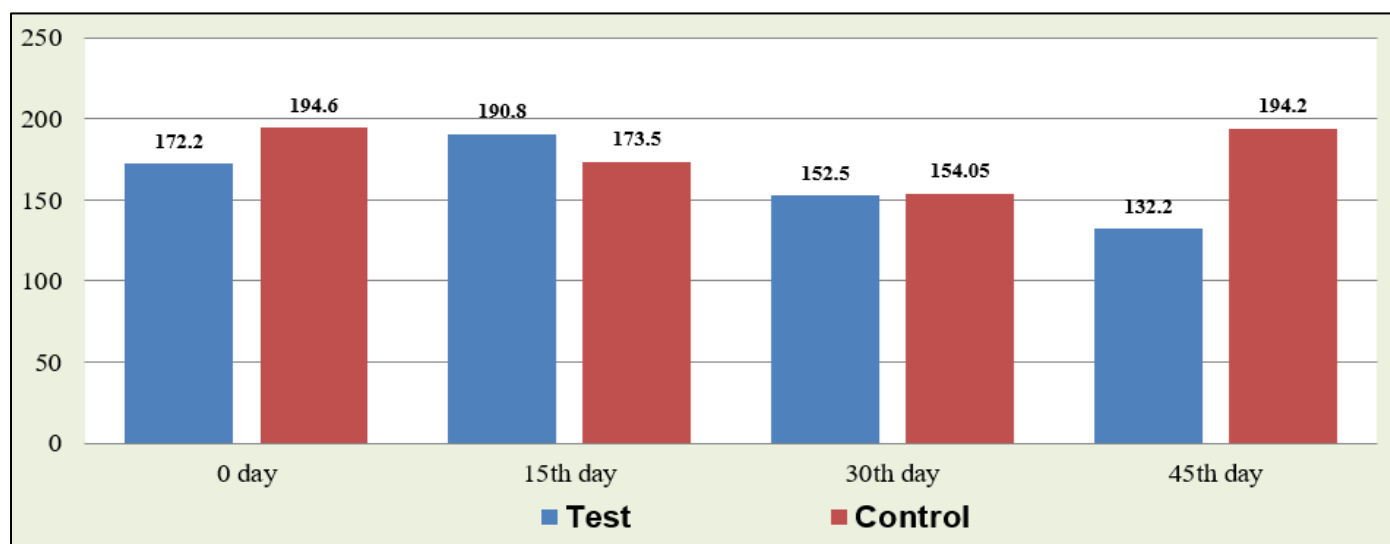


Fig 1 Effect of Drugs on FBS

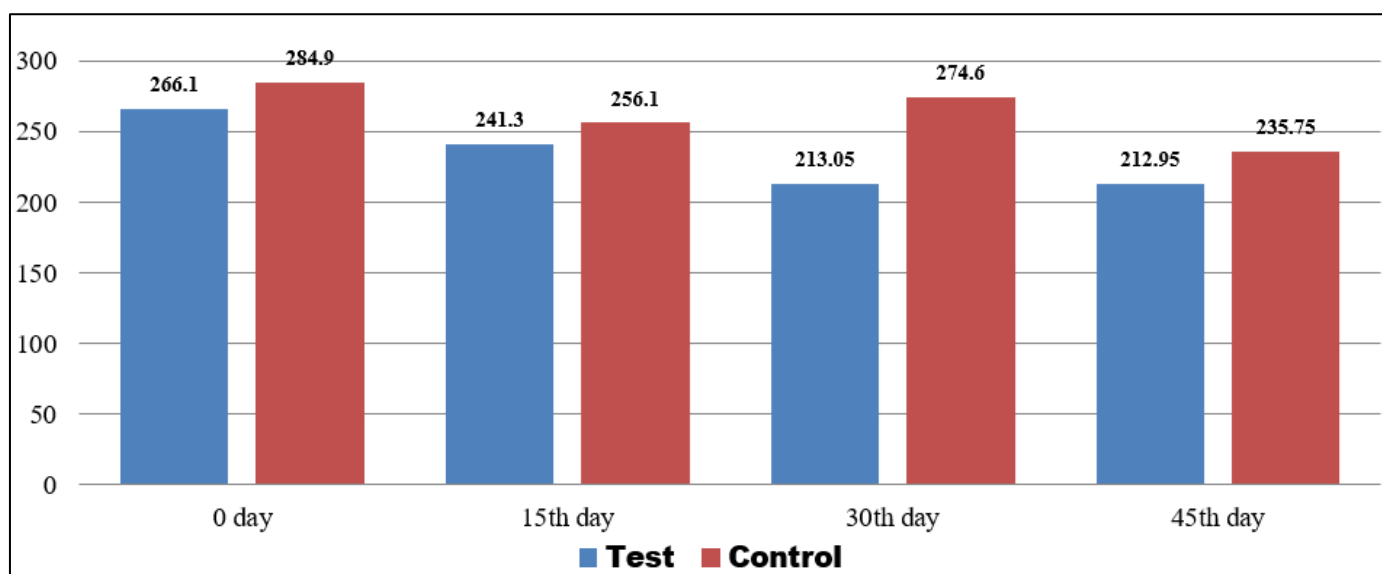


Fig 2 Effect of Drugs on PPBS

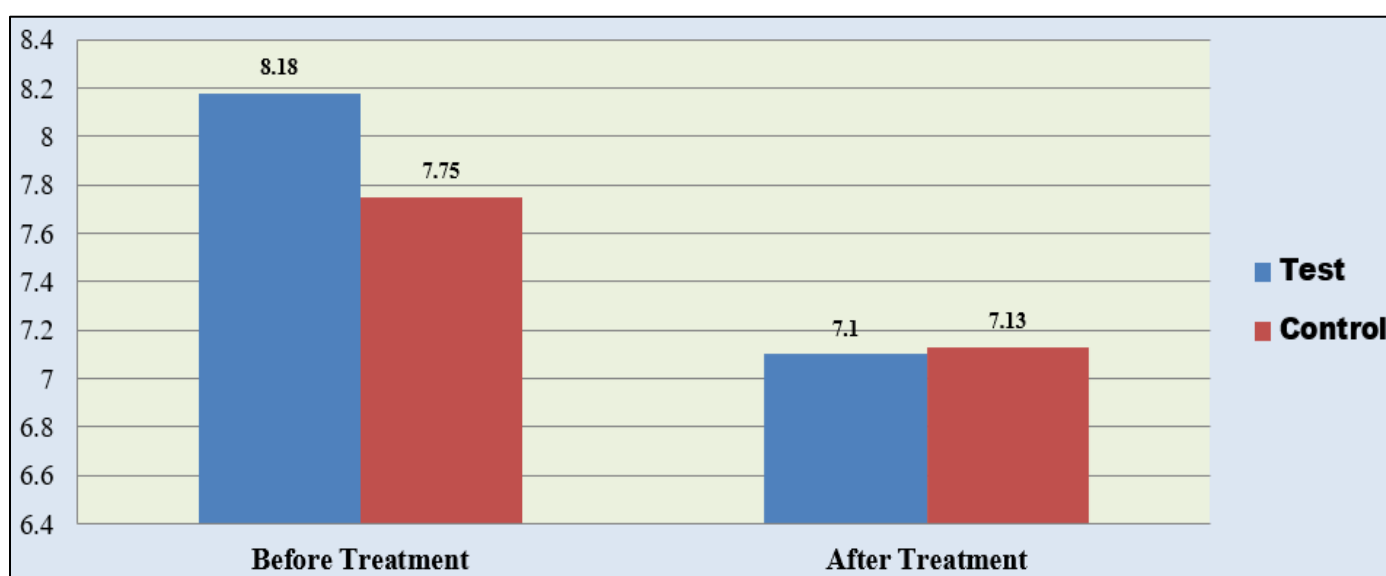


Fig 3 Effect of Drugs on Hb1AC

The Mean $\pm$ Standard Error of Mean (SEM) values for objective parameters were analyzed and compared. Fasting blood sugar (FBS) levels in both the Test group (Group A) and the Standard Control group (Group B) were statistically evaluated using one-way ANOVA followed by Tukey-Kramer multiple comparison tests for inter-group analysis.

In Group A, the reduction in FBS levels from baseline to the 45th day was statistically significant ($p < 0.001$), indicating a strong therapeutic effect. In contrast, Group B also show a statistically significant change in FBS levels over the same period ($p > 0.05$). Furthermore, inter-group comparison at day 45 revealed a statistically significant difference between the two groups ($p < 0.05$), suggesting that the intervention used in the Test group had a greater impact on glycemic control compared to the standard treatment. (Fig No. 1). The Mean $\pm$ Standard Error of Mean (SEM) values for postprandial blood sugar (PPBS) were analyzed in both the Test group (Group A) and the Control group (Group B). Statistical analysis was performed using one-way ANOVA

followed by the Tukey-Kramer multiple comparison test for inter-group evaluation.

In Group A, the reduction in PPBS levels from baseline to the 45th day was highly significant ($p < 0.001$), indicating a strong therapeutic effect of the test intervention. Group B also showed a statistically significant reduction in PPBS at the 45th day compared to baseline ($p < 0.05$), though to a lesser extent. Additionally, inter-group comparison at day 45 revealed a statistically significant difference ($p < 0.05$), further supporting the superior efficacy of the intervention used in the Test group (Fig No. 2). When the Mean $\pm$ SEM score of urine sugar in both groups were compared statistically by using Kruskal-Wallis test (Nonparametric ANOVA) with Dunn's multiple comparison tests for intergroup comparison. It was found that the difference between the mean scores of Group A (Test group) at 45th day with baseline was significant ($p < 0.05$), while in Group B (Control group) on 45th day compared with baseline was insignificant ($p > 0.05$). Intergroup comparison was also

significant ($p < 0.05$) at 45th day (Fig No. 3). The Mean $\pm$ Standard Error of Mean (SEM) values for glycated hemoglobin (HbA1c) were analyzed in both the Test group and the Control group. Statistical evaluation was conducted using one-way ANOVA followed by the Tukey-Kramer multiple comparison test for inter-group analysis. The results demonstrated a statistically significant reduction in HbA1c levels in both groups at the 45th day compared to their respective baseline values ($p < 0.05$). Additionally, the inter-group comparison at day 45 also revealed a significant difference ($p < 0.05$), indicating that the test intervention had a more pronounced effect on long-term glycemic control than the standard treatment. (Fig No. 4).

IV. DISCUSSION

The patients treated with *Anjeer* with Exercise and physical activity and Control drug with Exercise and physical activity both showed statistically significant difference on some subjective parameters like tiredness and unexplained weight loss; while there was no effect on polyuria, polydipsia, polyphagia and progressive weakness. The objective parameters were also assessed and analyzed in both groups. There was significant difference ($p < 0.001$) in FBS, PPBS and Urine sugar but no significant difference ($p > 0.05$) was observed on FBS and Urine sugar in Control groups. The significant difference ($p < 0.05$) was observed in HbA1c in both groups equally, it means that both test and control drug maintain average glycaemia round the clock in diabetics. HbA1c provide mean value of blood glucose level and useful index of average glycaemia over the preceding 6–8 weeks, considered most effective method for monitoring the effectiveness of diabetes treatment. The safety parameters assessed during the study—including haemogram, aspartate aminotransferase (AST), alanine aminotransferase (ALT), blood urea, serum creatinine, and electrocardiogram (ECG)—remained within normal limits throughout the treatment period. Based on clinical observations and outcome measures, the test formulation demonstrated efficacy in alleviating the symptoms of *Ziabetes Shakari* (Type 2 Diabetes Mellitus), notably contributing to reductions in urine glucose and HbA1c levels. Importantly, no significant adverse effects were reported in the treatment group during or after the intervention, and patient compliance with the regimen was generally high.

The study also observed a higher prevalence of *Ziabetes Shakari* among individuals from the upper-middle socioeconomic class. This observation contrasts with the findings of Connolly et al., who reported a greater burden among lower socioeconomic groups. The discrepancy may be attributed to the study's limited sample size and the fact that participants were primarily drawn from patients attending a single healthcare facility, which predominantly serves individuals from middle- and lower-income backgrounds [19].

Patients who do not receive pharmacological treatment and fail to adhere to dietary modifications or regular physical activity are at high risk of developing persistent

hyperglycemia and its associated complications within a short period of time.

In the present study, both the test and control groups demonstrated a degree of blood glucose regulation, with a noticeable reduction in hyperglycemia. These findings suggest that the intervention used in the test group exhibits an anti-diabetic effect. This observation is further supported by previous experimental studies that have demonstrated the hypoglycemic properties of *Ficus carica* (commonly known as *Anjeer*). The results highlight its potential role as a complementary therapy in diabetes management. [20, 21].

On the basis of classical literature, the properties of *Anjeer* (*Ficus crica* Linn.) i.e., *afal* includes *Mulattif* (Demulcent), *Muqawwi aam* (General tonic), *Mughazi* (Nutritive), *Muqawwi Jigar* (Hepatoprotective) and *Mufatteh Sudad* (Deobstruent) are the possible effects of test drug which has a significant effects on glucose levels on fasting as well as on postprandial levels, and on urine sugar respectively [22, 23, 24, 25, 26, 27].

Blood examination for Hb%, KFT and LFT was done before and after treatment to rule out toxicity in both groups. In Group A treated with *Anjeer* (*Ficus crica* Linn.) all the parameters remained within normal limits. However in some patients there was mild decrease in Hb%, but statistically it was not significant.

The results of this study suggest that the fruit of *Anjeer* plant (*Ficus carica* Linn.) may offer an alternative therapy option for obesity, type 2 diabetes, and oxidative stress. Furthermore, a detailed investigation of the test drug's mechanism of action is necessary to verify its use for therapeutic reasons.

V. CONCLUSION

Based on the observed results, *Anjeer* (*Ficus carica*) appears to be effective in alleviating certain clinical symptoms associated with *Ziabetes Shakri* (Type 2 Diabetes Mellitus), particularly fatigue and unexplained weight loss. It also demonstrated a significant ability to reduce urinary glucose levels and improve glycemic control, as indicated by reductions in HbA1c. No adverse effects were reported in the test group throughout the study period, and overall treatment compliance was satisfactory.

However, while these findings are promising, the efficacy and safety of *Ficus carica* as a therapeutic option for T2DM should be further validated through larger, multicenter randomized controlled trials.

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