Pharmacological Evaluation of *Delonix regia* Extract on Clozapine-Induced Body Weight Gain and Lipid Metabolism in SD Female Rats.

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Abstract: Second-generation antipsychotics like Clozapine are frequently used to treat bipolar disorder and schizophrenia, but they also have serious metabolic side effects include weight gain and dyslipidemia. The purpose of this study is to assess the pharmacological potential of *Delonix regia* (DLR) extract in reducing lipid abnormalities and body weight gain caused by Clozapine in female Sprague-Dawley (SD) rats.A total of five groups of female rats were randomly assigned: control, Clozapine treated, Clozapine + DLR extract-treated, . For 21 days, the *Delonix regia* extract was given orally at a dose of 100,200 and 400 mg/kg/day, whereas clozapine was given at a dose of 2 mg/kg/day. Periodically, measurements were made of body weight, food consumption, and lipid profile parameters (total cholesterol, triglycerides, HDL, and LDL). Hepatic lipid buildup was also evaluated by histopathologically analyzing liver tissue.In comparison to the clozapine -only group, the results showed that co-administration of DLR extract significantly decreased clozapine -induced weight gain and improved serum lipid profiles. Histological results confirmed that *Delonix regia* had a protective impact on liver morphology. According to these results, *Delonix regia* may present a viable herbal remedy to lessen the metabolic side effects brought on by antipsychotics, therefore improving the long-term safety profile of clozapine treatment.

Keywords: *Delonix regia*, Clozapine , Weight gain, Lipid metabolism, Sprague-Dawley rats, Antipsychotic-induced dyslipidemia.

Introduction : While atypical antipsychotics are a mainstay of psychiatric pharmacotherapy for the treatment of schizophrenia and psychiatric illnesses, severe metabolic adverse effects, including insulin resistance, diabetes, and obesity, especially from clozapine and olanzapine, have attracted increasing concern. These adverse effects could lead to increased morbidity and

mortality and impair drug adherence and quality of life for patients. In recent years, Researchers have proposed several potential mechanisms for atypical antipsychotic-induced weight gain, including modulation of neurotransmitter action at the central level and involvement of body weight regulatory hormones such as leptin and ghrelin, resulting in increased appetite and reduced ability to perceive the feeling of satiety .The metabolic challenges faced by patients with schizophrenia (SCZ) impose significant burdens on themselves, their families, and society at large [1]. These metabolic disturbances are frequently associated with the use of antipsychotic medications [2]. Initially, the introduction of antipsychotics represented a breakthrough in managing SCZ symptoms and reducing recurrent hospitalizations [3]. Currently, the first-line antipsychotics in clinical practice are second-generation antipsychotics, including Clozapine (CLO), risperidone, collectively known as atypical antipsychotic drugs (AAPD), which exhibit excellent efficacy. Unfortunately, some AAPDs are also associated with metabolic side effects, such as weight gain, hyperglycemia, dyslipidemia, and cardiovascular complications [4]. Clozapine, a widely prescribed second-generation antipsychotic, has been clinically linked to ignificant metabolic side effects, particularly weight gain and dyslipidemia. These adverse effects not only reduce medication adherence but also contribute to long-term comorbidities such as type 2 diabetes, cardiovascular disease, and hepatic steatosis. Globally, the incidence of antipsychotic-induced weight gain is reported in up to 80% of patients within the first year of treatment, disproportionately affecting female patients.

Table no 1 :Taxonomical classification of *Delonix regia*

Kingdom	**Plantae**
Division	Magnoliophyta
Subdivision	Spermatophyta
Class	Magnoliopsida
Subclass	Rosidae
Order	Fabales
Family	Fabaceae
Genus	Delonix
Species	*Delonix regia*

Delonix is a genus of flowering plants in the pea family, Fabaceae and subfamily Caesalpinioideae. This genus contains trees that are native to Madagascar and East Africa. By far the best known species is the Royal Poinciana (*D. regia*). The name of the genus is derived from the Greek words ‘delos’ meaning ‘evident,’ and ‘onyx’ meaning "claw," that refers to the petals[1]. Delonix erect unarmed tree. Leaves are abruptly bipinnate, leaflets are many but small and stipules are small. Flowers are large, showy, in terminal corymbs, bracts small. Calyx tube is very short, 5 lobes, valvate and subequal. Petals are 5, orbicular, imbricate, clawed, subequal. Margins are fimbriate. Stamens are 10 free, declinate, longexserted. Filaments are villous below and anthers are uniform. Ovary is subsessile, many ovuled. Style filiform and stigma truncate, ciliolate.

The present study aims to evaluate the pharmacological effect of *Delonix regia* extract on body weight gain and lipid metabolic alterations induced by chronic Clozapine administration in SD female rats. Specific objectives include assessing changes in serum lipid profile, hepatic lipid accumulation, and associated behavioral and histopathological parameters. The study is designed to address existing therapeutic gaps by validating a safe, plant-based alternative to manage antipsychotic-induced metabolic disturbances.

Phytoconstituents : i. Stem bark: Flavanoids, alkaloids, saponins, sterols, stigmasterols, carotene, hydrocarbons phytotoxins, beta sitosterol, lupeol, p-methoxybenzaldehyde, isolupeol, carotene, phenolic acids.[10,11] ii. Root bark: Glycosides, tannins, alkaloids, sterols, terpenoids and carbohydrates.[12] iii. Flowers: Flavanoids, tannins, alkaloids, saponins,steroids,carotenoids [lycopene, phytoene,beta carotene,prolycopene,neolycopene],phenolic acid[gallic acid, protocatochuic acid, salicyclic acid, transcinammic acid and chlorogenic acid], anthocyanins [cyanidin-3-glucoside and cyanidin-3-gentiobioside and beta sitosterol.

Fig no :1 *Delonix regia*

Materials and methods :

Materials

Clozapine (API grade) was procured from a certified pharmaceutical supplier. Biochemical assay kits for lipid profile parameters (total cholesterol, triglycerides, HDL, LDL, and VLDL) were obtained from Erba Mannheim, Germany. Assay kits for oxidative stress markers (MDA, SOD, CAT, GSH) were purchased from Elabscience, USA. All chemicals and reagents used for phytochemical screening and experimental procedures, including ethanol, formalin (10%), normal saline, and glucose for OGTT, were of analytical grade and sourced from HiMedia Laboratories Pvt. Ltd., India.

Methods

Collection, Authentication, and Preparation of Plant Material

The plant *Delonix regia* L. was collected during the month of September at its peak maturity stage to ensure optimal phytochemical content. A herbarium specimen of the plant was prepared according to standard botanical documentation protocols. This specimen was authenticated by JES SND college of science college Babhulgaon Yeola .

Extraction of Plant Material

Preparation of *Delonix regia* Aqueous Extract :-

A hundred grams of powdered fruit was extracted for aqueous extraction using distilled water (200 mL) in the Soxhlet extraction method for 12 h. Using a rotating evaporator at 40 ◦C and reduced heat, the extract was almost completely evaporated (gummy residue). It was found that the yield was 12 percent. The gum residue was dissolved in a sufficient quantity of sterile water and preserved at a temperature of −20 ◦C before use [16].

Dose Selection

An acute oral toxicity study of the hydroalcoholic extract of *Delonix regia*. was conducted in Wistar albino rats following OECD guideline 423. A single dose of 2000 mg/kg was administered orally, and no signs of toxicity, behavioral changes, or mortality were observed over a 14-day period, confirming the extract's safety at this level. Based on these findings, doses of ,100,200 and 400 mg/kg were selected for the pharmacological study to ensure efficacy assessment within a safe and well-tolerated range.

Experimental Animals

Female Sprague-Dawley rats weighing 180 ± 10 g were procured from National Lacsmi BioFarm, Aundh, Pune (CCSEA Registration Number: 1277/PO/RcBt/S/09/CCSEA). The animals were housed under controlled environmental conditions (temperature 22–25°C, relative humidity 65–70%) with a 12:12-hour light-dark cycle. They were provided with standard pellet diet and water ad libitum throughout the study period.

Experimental Design and Grouping

The study was designed to assess the protective effects of *Delonix regia* extract against Clozapine-induced metabolic alterations. Following an acclimatization period, female Sprague-Dawley rats were randomly divided into five groups (n = 5 per group). Group I (normal control) received the vehicle (0.1 N HCl neutralized with 0.1 N NaOH) intraperitoneally in two equal doses at 12-hour intervals.Group II (disease control) was administered Clozapine 2mg/kg divided into 2 dose /day i.p, split into two doses 12 hours apart, for 21 consecutive days.Group III (Test 1) in which Clozapine 2mg/kg divided into 2 dose /day i.p + DLR 100mg/kg/day p.o.Group IV (Test II) in which Clozapine 2mg/kg divided into 2 dose /day i.p + DLR 100mg/kg/day p.o and Group V (Test III) in which Clozapine 2mg/kg divided into 2 dose /day i.p + DLR 400mg/kg/day p.o

Body weight, food intake were monitored daily, and assessed on days 1 and 21. On day 22, an oral glucose tolerance test (OGTT) was performed with glucose levels recorded at 0, 30, 60, and 120 minutes, followed by retro-orbital blood collection for lipid profile analysis (TG, TC, HDL, LDL, VLDL) after centrifugation at 5000 rpm for 15 minutes. Subsequently, animals were sacrificed, and the liver were excised and weighed. Liver tissues were preserved in 10% formalin for histopathological studies and processed separately to analyze oxidative stress biomarkers, including MDA, GSH, CAT, and SOD.

Measurement of Food intake and Body Weight

Daily monitoring of food intake and body weight was performed by measuring the difference between the quantity provided and the amount remaining after 24 hours for each cage. The intake was calculated in grams for food . Body weight of each rat was recorded individually on day 0 (prior to treatment initiation) and subsequently on days 7, 14, and 21 to assess the progression of Clozapine-induced weight gain and the modulatory effect of *Delonix regia* extract.

Organ Collection, Processing, and Weight Analysis

Following blood collection, rats were anesthetized, and the liver, and abdominal fat were carefully excised. The organs were washed with normal saline to remove blood residues, blotted dry, and weighed using an analytical balance. Relative organ weights were calculated and expressed as a percentage of the final body weight of each rat. Liver and kidney tissues were preserved for histopathological examination, while visceral fat was quantified to assess fat accumulation. These measurements were used to evaluate the extent of Clozapine-induced changes and the modulatory effect of *Delonix regia* extract on visceral adiposity.

Statistical Analysis

All experimental data were expressed as mean ± standard deviation (SD). Statistical comparisons among the groups were performed using one-way analysis of variance (ANOVA) followed by Tukey's post hoc test to determine intergroup significance. A p-value of less than 0.05 was considered statistically significant. Graph Pad Prism version 9.0 (GraphPad Software Inc., USA) was used to carry out all statistical analyses and graphical representations.

4.Result

Table 2: Results of Preliminary Phytochemical Investigation of *Delonix regia* Extract

Sr. No.	Phytochemical Class	Sub-test Performed	Inference
1	Alkaloids	Mayer's test	+
		Wagner's test	+
2	Flavonoids	Shinoda test	+
3	Tannins	Ferric chloride test	+
4	Saponins	Foam test	+
5	Steroids	Salkowski test	–
6	Glycosides	Keller-Kiliani test	+
7	Phenolic compounds	Ferric chloride test	+
8	Terpenoids	Salkowski test	+
9	Carbohydrates	Molisch's test	–
		Fehling's test	–
10	Proteins and Amino acids	Biuret test	–

'+' indicates presence; '–' indicates absence in the hydroalcoholic extract of *Delonix regia*.

Effect of *Delonix regia* on Body Weight in Clozapine-treated Rats

The body weight of the animals was recorded at 3-day intervals throughout the study period. As shown in Table 4.1 and Figure 4.1, rats in the Disease Control (DC) group, which received Clozapine (5 mg/kg/day), showed a significant increase in body weight compared to the Normal Control (NC) group starting from day 9 and continuing through the end of the treatment period. Co-administration of *Delonix regia* at doses of 100 mg/kg/day (DLR1), 200mg/kg/day (DLR2), and 400 mg/kg/day (DLR3) significantly attenuated this Clozapine-induced weight gain in a dose-dependent manner. The highest dose of *Delonix regia* (400 mg/kg/day) showed the most significant reduction in body weight compared to the disease control group.

Table 3 : Effect of *Delonix regia* on body weight in Clozapine-treated female SD rats for 21 days

Days	Normal Control	Clozapine (5 mg/kg)	Clozapine + *Delonix regia* (100 mg/kg)	Clozapine + *Delonix regia*(200 mg/kg)	Clozapine + *Delonix regia* (400mg/kg)
Day 3	188.6 ± 4.21	1.90 ± 3.86	182.4 ± 3.18	191.6 ± 2.84	191.9 ± 3.08
Day 6	186.2 ± 3.43	195.3 ± 5.18	193.8 ± 3.27	172.9 ± 3.15	192.4 ± 3.19
Day 9	189.8 ± 3.57	21.6 ± 4.53*	187.5 ± 3.48#	195.2 ± 3.35#	193.1 ± 3.23##
Day 12	194.1 ± 3.76	209.8 ± 4.99**	199.3 ± 3.37#	197.1 ± 3.23##	193.8 ± 3.37##
Day 15	199.3 ± 3.92	243.5 ± 5.17**	194.7 ± 3.69#	198.6 ± 3.51##	186.5 ± 3.33##

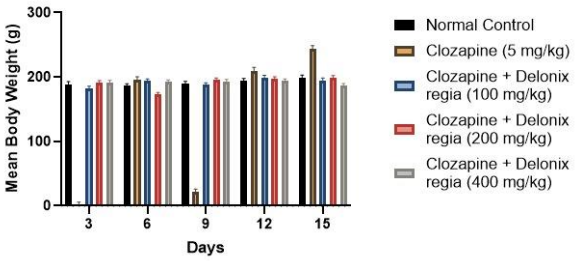

Fig no 2 :Effect of *Delonix regia* on body weight in Clozapine-treated female SD rats. Values are expressed as mean ±DLR (n=5). *p<0.05, p<0.01 vs. Normal Control group; #p<0.05, ##p<0.01 vs. Disease Control group.

Table 4: Effect of *Delonix regia* Extract on Cumulative Group-wise Mean Food Intake (g), Body Weight Gain (%) on Day 7, 14, and 21 in Clozapine-Induced Obese Rats

Group	Parameter	Day 7	Day 14	Day 21
Normal Control	Body Weight Gain	3.75 ± 0.63	6.10 ± 1.15	9.02 ± 1.08
	Food Intake	136.12 ± 5.46	252.47 ± 7.64	384.12 ± 9.01
Clozapine Control	Body Weight Gain	6.80 ± 1.25	10.29 ± 1.20	15.36 ± 1.52
	Food Intake	149.11 ± 4.10	280.02 ± 5.13	490.06 ± 7.40
DLR100 mg/kg + Clozapine	Body Weight Gain	5.25 ± 1.05	7.49 ± 0.90	11.03 ± 1.06
	Food Intake	144.20 ± 3.28	261.80 ± 5.32	396.20 ± 8.05
DLR 200 mg/kg + Clozapine	Body Weight Gain	4.53 ± 0.95	6.48 ± 0.88	9.96 ± 0.89
	Food Intake	129.75 ± 3.79	267.08 ± 6.23	397.34 ± 7.22
DLR 400 mg/kg + Clozapine	Body Weight Gain	3.90 ± 0.73	5.94 ± 0.85	8.95 ± 0.85
	Food Intake	129.32 ± 3.90	253.67 ± 6.16	385.47 ± 8.12

DLR= *Delonix regia* extract; Values are expressed as mean ± DLR (n = 5 per group).

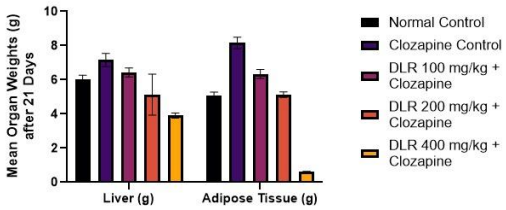

Fig no :3 Effect of *Delonix regia* on weekly food intake in Clozapine-treated female SD rats. Values are expressed as mean ± DLR (n=5). *p<0.05, p<0.01 vs. Normal Control group; #p<0.05, ##p<0.01 vs. Disease Control group.

Results of Organ Weight Analysis

Table 5: Effect of *Delonix regia* Extract on Organ Weights (g) after 21 Days

Groups	Liver (g)	Adipose Tissue (g)
Normal Control	6.04 ± 0.23	5.05 ± 0.23
Clozapine Control	7.15 ± 0.39	8.15 ± 0.34
DLR 100 mg/kg + Clozapine	6.43 ± 0.26	6.34 ± 0.26
DLR 200 mg/kg + Clozapine	5.13 ± 1.20	5.13 ± 0.16
DLR 400 mg/kg + Clozapine	3.90 ± 0.15	0.60 ± 0.04

Values are presented as mean ± DLR (n = 5).

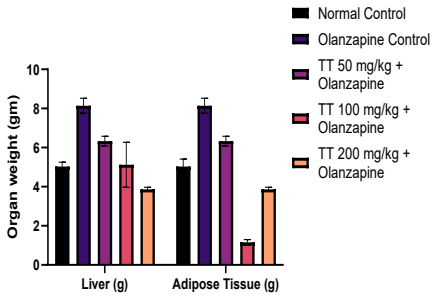

Fig no 4 :Effect of *Delonix regia* on HDL-cholesterol levels in Clozapine-treated female SD rats. Values are expressed as mean ± DLR (n=5). p<0.01 vs. Normal Control group;m#p<0.05, ##p<0.01 vs. Disease Control group.

Results of Biochemical Assays

Table 6: Oxidative Stress Markers in Liver Tissue

Groups	MDA (nmole/gm tissue)	CAT (µmol H_2O_2/gm tissue)	SOD (U/gm tissue)	GSH (µg/gm tissue)
Normal Control	38.63 ± 2.0	7.97 ± 0.10	0.36 ± 0.05	1275 ± 45.0
Clozapine Control	55.55 ± 3.9	7.75 ± 0.06	0.60 ± 0.05	824.5 ± 25.0
DLR 100 mg/kg + Clozapine	58.49 ± 3.0	7.84 ± 0.06	0.36 ± 0.07	905.5 ± 22.0
DLR 200 mg/kg + Clozapine	36.10 ± 2.1	7.96 ± 0.08	0.30 ± 0.07	947.5 ± 20.0
DLR 400 mg/kg + Clozapine	28.99 ± 1.8	7.90 ± 0.06	0.15 ± 0.06	1097 ± 25.0

Values are presented as mean ± DLR (n = 5).

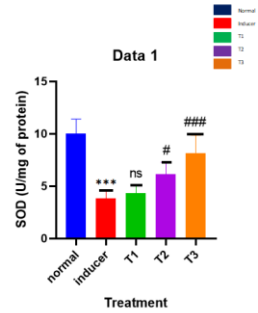

Fig no :5 Effect of *Delonix regia* on SOD activity in Clozapine-treated female SD rats. Values are expressed as mean ± DLR (n=5). p<0.01 vs. Normal Control group; #p<0.05, ##p<0.01 vs. Disease Control group.

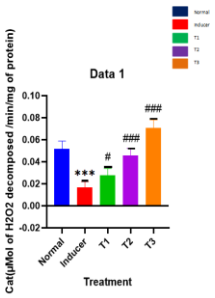

Fig no :6 Effect of *Delonix regia* on CAT activity in Clozapine-treated female SD rats. Values are expressed as mean ± DLR (n=5). p<0.01 vs. Normal Control group; #p<0.05, ##p<0.01 vs. Disease Control group.

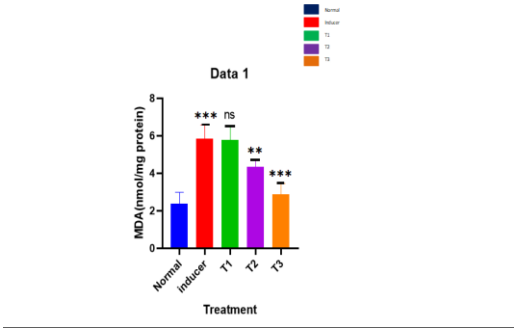

Fig no : 7 Effect of *Delonix regia* on MDA activity in Clozapine-treated female SD rats. Values are expressed as mean ± DLR (n=5). p<0.01 vs. Normal Control group; #p<0.05, ##p<0.01 vs. Disease Control group.

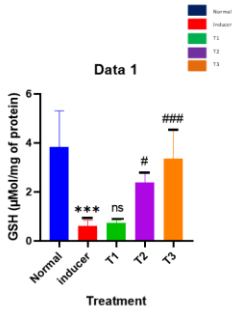

Fig no : 8 Effect of *Delonix regia* on GSH activity in Clozapine-treated female SD rats. Values are expressed as mean ± DLR (n=5). p<0.01 vs. Normal Control group; #p<0.05, ##p<0.01 vs. Disease Control group.

Table no 7 :Results of total cholesterol, triglycerides, HDL, LDL, and VLDL

Groups	**Triglycerides (mg/dl)**	**Cholesterol (mg/dl)**	**HDL (mg/dl)**	**LDL (mg/dl)**	**VLDL (mg/dl)**
Normal Control	40.60 ± 1.9	46.25 ± 1.5	41.78 ± 0.5	–3.51 ± 1.2	8.11 ± 0.3
Clozapine Control	88.20 ± 3.4	62.55 ± 0.9	25.36 ± 0.9	19.55 ± 1.1	17.70 ± 0.6
DLR 100 mg/kg + Clozapine	63.15 ± 3.5	41.30 ± 0.8	36.15 ± 1.1	–6.48 ± 1.7	12.55 ± 0.8
DLR 200 mg/kg + Clozapine	50.03 ± 3.0	37.60 ± 0.7	29.67 ± 0.8	–2.02 ± 1.3	10.01 ± 0.7
DLR 400 mg/kg + Clozapine	48.40 ± 2.8	32.27 ± 1.2	28.15 ± 1.1	–5.60 ± 1.3	9.68 ± 0.5

Negative LDL values may result from formula limitations under altered triglyceride conditions. Data are expressed as mean ± DLR (n = 5).

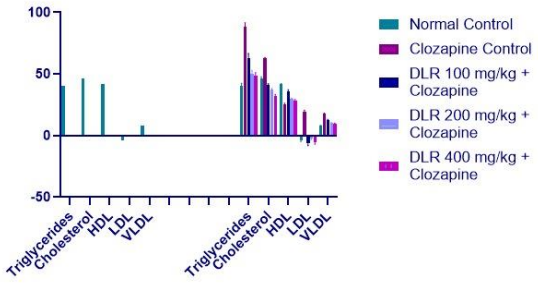

Figure :9 Effect of *Delonix regia* on HDL, LDL and VLDL level -cholesterol levels in Clozapine-treated female SD rats. Values are expressed as mean ± DLR (n=5). p<0.01 vs. Normal Control group; #p<0.05, ##p<0.01 vs. Disease Control group.

Effect of *Delonix regia* on Histopathological Changes

Histopathological examination of Liver tissue was performed to assess the protective effect of *Delonix regia* against Clozapine-induced hepatic damage. In contrast, the Disease Control group showed significant histopathological alterations, including hepatocellular degeneration, vacuolation, fatty changes, and infiltration of inflammatory cells. Treatment with *Delonix regia* dose-dependently ameliorated these Clozapine-induced histopathological changes. The high-dose *Delonix regia* group showed the most significant improvement, with liver histology closely resembling that of the Normal Control group.

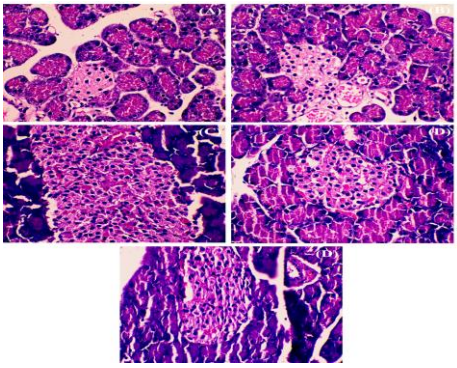

Figure:10 Photomicrographs of pancreas sections (H&E staining, 40×) from different experimental groups. (A) Normal Control: normal hepatic architecture; (B) Disease Control (Clozapine): severe hepatocellular degeneration, vacuolation, fatty changes, and inflammatory cell infiltration; (C) CLZ + DLR (100 mg/kg): moderate histopathological

changes; (D) Clozapine + DLR(200 mg/kg): mild histopathological changes; (E) Clozapine + DLR(400 mg/kg): minimal to absent histopathological changes, resembling normal pancreas architecture.

Discussion

The administration of Clozapine led to a progressive and statistically significant increase in body weight in the disease control (DC) group when compared to the normal control (NC) rats, with observable divergence beginning from day 9 and intensifying through day 21 . This finding reinforces the well-established metabolic side effect of Clozapine-induced weight gain. In contrast, *Delonix regia* co-treatment significantly mitigated this weight gain in a dose-dependent manner. The highest dose of *Delonix regia* (400 mg/kg/day, DLR3) was the most effective, maintaining body weights near baseline values throughout the study. Intermediate (200 mg/kg/day, DLR2) and low doses (100 mg/kg/day, DLR1) also showed attenuation, although less pronounced. Statistical significance was evident, particularly at later time points (days 15–21), where DLR2 and DLR3 groups demonstrated highly significant reductions (**$p<0.01$**) compared to the DC group..

This hyperglycemic response post-glucose challenge is indicative of Clozapine-induced glucose intolerance and insulin resistance. In contrast, *Delonix regia* administration at all tested doses substantially improved glucose disposal in a dose-dependent manner. The group receiving the highest dose (400 mg/kg/day, DLR3) showed near-normal glucose values at all time points, closely approximating those of the NC group and exhibiting significant reductions compared to the DC group (**$p<0.01$**). The DC group retained a minimal glucose-lowering response to insulin at both 30 and 60 minutes, while the DLR3 group showed a significant increase in insulin sensitivity (**$p<0.01$** vs. DC), with blood glucose reductions closely paralleling the NC group. Collectively, these results confirm *Delonix regia* efficacy in counteracting Clozapine induced glucose dysregulation by enhancing both glucose tolerance and insulin sensitivity .

The lipid profile analysis at the end of the treatment period demonstrated that Clozapine administration resulted in marked dyslipidemia in the disease control (DC) group, characterized by significant elevations in total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL), and very low-density lipoprotein (VLDL), along with a concomitant reduction in high-density lipoprotein (HDL) compared to the normal control (NC) group (Table 8.6; Figures 8.6–8.10). These findings confirm the adverse metabolic effects of chronic Clozapine use, which

mirrors clinical observations in antipsychotic-associated metabolic syndrome. The administration of *Delonix regia* to a statistically significant and dose-dependent improvement in all lipid parameters. Even at the lowest dose (100 mg/kg/day, DLR1), *Delonix regia* significantly reduced TC, TG, LDL, and VLDL levels ($p<0.05$) while increasing HDL. These improvements became more prominent with the intermediate (DLR2) and high doses (DLR3), with DLR3 producing values nearly indistinguishable from the NC group (**$p<0.01$** vs. DC group across all parameters) . The most pronounced effect was observed in the DLR3 group (400 mg/kg/day), where total cholesterol and triglyceride levels were reduced to 90.62 ± 8.17 mg/dL and 83.41 ± 7.68 mg/dL respectively—values much closer to the NC group. Similarly, LDL and VLDL levels were normalized, and HDL levels were significantly elevated, reaching 40.85 ± 3.81 mg/dL, nearly matching normal physiological values. These observations suggest that *Delonix regia* exerts potent lipid-modulating effects in addition to its glycemic benefits.*Delonix regia* treatment markedly reduced HbA1c in a dose-dependent manner, with the high-dose group (DLR3, 400 mg/kg/day) demonstrating values (5.68 ± 0.49%) comparable to those of the NC group (5.43 ± 0.48%). The intermediate (DLR2) and low doses (DLR1) also achieved significant reductions (**$p<0.01$** and $p<0.05$, respectively), supporting *Delonix regia* effectiveness in restoring long-term glycemic control.

The assessment of organ weights revealed that Clozapine treatment significantly increased the weights of vital organs such as the pancreas, kidney, heart, pancreas, and adipose tissue, while paradoxically reducing total fat content, reflecting systemic metabolic dysregulation and possible organ hypertrophy. Histological evaluation further substantiated the biochemical and anatomical findings. Pancreas sections from the DC group showed pronounced hepatocellular degeneration, fatty changes, vacuolation, and infiltration of inflammatory cells, confirming hepatotoxic effects of chronic administration .*Delonix regia* treatment significantly reduced sleeping time in a dose-dependent fashion, with the DLR3 group (52.87 ± 4.76 min) closely approximating NC levels (48.35 ± 4.37 min).

Conclusion

The pharmacological evaluation of *Delonix regia* extract demonstrated a significant protective effect against Clozapine-induced body weight gain and dyslipidemia in female Sprague-Dawley rats. Treatment with the extract resulted in a notable reduction in body weight, total cholesterol, triglycerides, LDL levels, and an increase in HDL levels compared to the clozapine-only group. These findings suggest that *Delonix regia* possesses anti-obesity and lipid-lowering properties, possibly due to its phytoconstituents such as saponins, flavonoids, and alkaloids, which may modulate lipid metabolism and energy balance. Further clinical investigations are recommended to confirm its therapeutic potential in managing antipsychotic-induced metabolic disturbances.

Reference :

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