TREATMENT OF TYPE 2 DIABETES WITH KALANCHOE PINNATA PREPARATION

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Diabetes

Hormonal condition where blood sugar levels are not maintained

<table>
<thead>
<tr>
<th>Type 1</th>
<th>Type 2</th>
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</thead>
<tbody>
<tr>
<td>• Deficient manufacturing of insulin by the pancreas</td>
<td>• Failure of body’s cells to use insulin properly</td>
</tr>
<tr>
<td></td>
<td>• Accounts for approximately 90% of all diabetes globally</td>
</tr>
</tbody>
</table>

Currently there is no cure for the disease
Kalanchoe pinnata

- Miracle plant
- Moist, sturdy, tuberous, hairless stem
- Leaves are simple and thick with 3-5 lobes
- Flowers hang loosely with orange-red coloration
- Ability to produce plantlets on the superficial edges of its leaves
Objective

- *K. pinnata* is known to treat wounds, hypertension, diabetes, it is used as an anti-fungal, anti-bacterial, anti-inflammatory, anti-leishmanial and many more ailments.

- Lack of scientific research to support the use of *K. pinnata* for the treatment of many diseases.

- This study evaluated the potential role of aqueous *K. pinnata* preparation in the treatment of Type 2 Diabetes.
# Experimental design summary

<table>
<thead>
<tr>
<th>Groups (6 rats/grp)</th>
<th>Diet Composition (21 days)</th>
<th>IP Injection (Day 14)</th>
<th>Dietary Supplement (4 weeks excluding the first 21 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Normal rat diet</td>
<td>Citrate buffer</td>
<td>Normal rat diet/ euthanized on day 49</td>
</tr>
<tr>
<td>High fat diet</td>
<td>High fat diet</td>
<td>Citrate buffer</td>
<td>Normal rat diet/ euthanized on day 49</td>
</tr>
<tr>
<td>Diabetic</td>
<td>High fat diet</td>
<td>35 mg of Streptozotocin in Citrate buffer/Kg body Wt.</td>
<td>Normal rat diet/ euthanized on day 49</td>
</tr>
<tr>
<td><em>K. pinnata</em></td>
<td>High fat diet</td>
<td>35 mg of Streptozotocin in Citrate buffer/Kg body Wt.</td>
<td>Normal rat diet + <em>K. pinnata</em> via gavage/ euthanized on day 49</td>
</tr>
<tr>
<td>Metformin</td>
<td>High fat diet</td>
<td>35 mg of Streptozotocin in Citrate buffer/Kg body Wt.</td>
<td>Normal rat diet + Metformin via gavage/ euthanized on day 49</td>
</tr>
</tbody>
</table>
Results:

Body Weight, Food and Fluid Intake of Type 2 Diabetic Rats Administered Aqueous Preparation of *Kalanchoe pinnata*

Figures that share different letter superscripts are significantly different (P < 0.05)

Significant decrease in the final weight of the *K. pinnata* treated group compared to all groups

Significant decrease in fluid consumption compared to the diabetic group

Significant increase in food consumption compared to the control

Figures that share different letter superscripts are significantly different (P < 0.05)
Results:

Effect of Aqueous *Kalanchoe pinnata* Preparation on Serum lipid profile

Significant increase in HDL levels in the group treated with *K. pinnata* or metformin compared to the diabetic group.

Metformin administration significantly increased triglyceride levels compared to the group administered with *K. pinnata*.

Figures that share different letter superscripts are significantly different (P < 0.05).
Results:

Liver Function Enzymes in the Serum of Type 2 Diabetic Rats Administered Aqueous Preparation of *Kalanchoe pinnata*

Figures that share different letter superscripts are significantly different (P < 0.05). ALP = Alkaline Phosphatase and ALT = Alanine Amino Transferase

Significant increase in ALP activity in the group treated with *K. pinnata* compared to all groups

Significant increase in ALT activity in the *K. pinnata* treated group compared to all groups

Figures that share different letter superscripts are significantly different (P < 0.05). ALP = Alkaline Phosphatase and ALT = Alanine Amino Transferase
Results:

Kidney Function Enzyme in Type 2 Diabetic Rats Administered Aqueous Preparation of *Kalanchoe pinnata*

![Graph showing uric acid concentration in different groups.](image)

Significantly elevated in the group treated with *K. pinnata* compared to all groups

Figures that share different letter superscripts are significantly different (P < 0.05)
Results:

Treatment with *K. pinnata*...

- Reduced fasting blood glucose by 29% compared to 40% reduction in the group treated with metformin.
- Significant (*P* < 0.05) increase in HDL levels in the group treated with *K. pinnata* or metformin compared to the diabetic group.
- Metformin administration significantly (*P* < 0.05) increased triglyceride levels compared to the group administered with *K. pinnata*.
- Significant (*P* < 0.05) increase in alkaline phosphatase (ALP) and alanine amino transferase (ALT) activity in the *K. pinnata* treated group compared to all groups.
- Uric acid levels were significantly (*P* < 0.05) elevated in the group treated with *K. pinnata* compared to all groups.
Conclusion

- Lowered blood glucose and increased HDL levels
  - *Beneficial in the management of T2D*
- Traditional use of *K. pinnata* in the management of the disease should be done with caution due to the observed increases in:
  - *ALP, ALT activities and uric acid levels*
  - *indicative of organ damage*
- There is no data to support the traditional use of *K. pinnata*.
- This study was conducted to establish the beneficial and adverse effects of *K. pinnata* in the treatment of T2D.
Acknowledgments

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  - Gabriel Diaz
  - Maria Quintanilla
  - Mark Kirby

- Finally, I’d like to thank my family for their support and encouragement.
References


QUESTIONS?