Introduction
In metabolic syndrome (MS), insulin resistance and beta-cell damage due to oxidative stress play roles in the pathogenesis of type 2 diabetes mellitus. Moringa oleifera have shown antihyperglycemic, antioxidants, and anti-inflammatory activity to stimulate beta cell regeneration. This study aimed to analyze the effect of Moringa oleifera, Lam. roots extract on insulin and GLUT-2 expression of MS rats model.

Method
- Thirty male Wistar-strain rats were randomly assigned into five groups.
  - G1 (control) was fed only with a standard pellet for 56 days.
  - G2 (control negative), G3, G4, and G5 were fed with a high-fat diet for 24 days and streptozotocin-nicotinamide (STZ-NA) injection on the 26th day.
  - G3 was given 150mg/kgBW of Moringa roots extract for 28 days.
  - G4 was given 250mg/kgBW of Moringa roots extract for 28 days.
  - G5 was given 350mg/kgBW of Moringa roots extract for 28 days.
- Then rats were sacrificed, and the pancreatic tissues were taken for anti-insulin and anti-GLUT-2 antibodies staining.
- Insulin and GLUT-2 expression data were calculated by Intensity Distribution Score (IDS). The data were analyzed using the Kruskal-Wallis test followed by the Mann-Whitney post hoc test.

Result
- Figure 2. Mean Levels of MS Serum Parameters Day-0
- Figure 3. Mean Levels of MS Serum Parameters Day-28
- In the present study, several criteria of MS were achieved. Figure 1 shows the increase (>8%) in body weight after high-fat diets and induction of STZ-NA. Figure 2 and 3 shows the value of MS parameters before and after MS induction.
- Figure 4. Mean IDS on Insulin and GLUT-2 Expression of Rat Pancreatic Tissue
- Figure 4 shows the insulin and GLUT-2 expression were poor in control negative group (G2) and significantly increased with the Moringa treatment groups (G4 and G5).

Conclusion
- This study showed that Moringa oleifera, Lam. roots extract increased the insulin and GLUT-2 expression in the metabolic syndrome rats model.
- It could be due to free radical scavenging and reactive oxidative stress-reducing ability by antioxidant properties of Moringa.

Reference

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