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Moringa Seeds Extract (*Moringa oleifera*, Lam.) inhibits the progression of kidney impairment through increasing renal Superoxide Dismutase (SOD) expression and lowering renal biomarkers level in metabolic syndrome rat model

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Objectives: Metabolic syndrome could lead to organ damaged, including kidney, leading to endogen antioxidant suppressing and renal impairment. Moringa seeds (*Moringa oleifera*, Lam.) contain plenty of secondary metabolites rich in antioxidants. This study aimed to investigate the effect of Moringa seeds extract to renal function improvement by increasing SOD expression in kidney and measuring renal biomarkers in metabolic syndrome white rats (*Rattus norvegicus*) model.

Methods: This laboratory experimental method study design used twenty-four male Wistar rats which were assigned into 4 groups. Renal biomarkers levels were measured first at day 1. K1 (control) were fed with standard pellet, K2, K3 and K4 were fed with high-fat high-fructose diet for 50 days. Renal biomarkers levels were then measured. Ethanolic extract of Moringa seeds were administered at dose of 150mg/kgbw for K3 and 200mg/kgbw weight for K4. After 28 days, renal biomarkers levels were measured again, rats then were terminated and the kidneys were removed for histological study using immunochemistry staining.

Results: Mann whitney test of tubules SOD expression showed that there were significant difference between K1-K2, K2-K3, and K2-K4 ($p < 0.05$), while on glomerulus, there were significant difference between all groups ($p < 0.05$), except K3-K4. Friedman test and One-way ANOVA test showed that ethanolic extract of moringa seeds for 28 days could significantly reduce serum creatinine levels ($p = 0.028$ and $p = 0.018$). Paired T Test and One-way ANOVA test also showed that ethanolic extract of moringa seeds for 28 days could significantly reduce uric acid levels ($p = 0.001$)

Conclusions: Moringa seeds extract at dose of 150 mg/kgBW and 200 mg/kgBW significantly increased the expression of SOD expressions and lowered renal biomarkers in metabolic syndrome Wistar rats (*Rattus norvegicus*) model. Therefore, this research suggests that moringa seeds could be complementary therapy for chronic kidney disease.