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Evaluation of embelin alone and its combination with metformin on diabetic nephropathy.

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Objectives: Natural products have been gaining recognition and are becoming a significant part of research in the area of drug development and discovery. Phytochemicals derived from these sources have been comprehensively studied and have displayed a wide range of activities. Embelin, a major constituent of *Embelia ribes* is therapeutically evaluated for antihyperglycemic potential against alloxan induced diabetes in rats. This study was aimed to investigate the therapeutic potential of Embelin and its combination with metformin on Alloxan-nicotinamide-induced diabetic nephropathy

Methods: Type 2 diabetes in rats was induced with Alloxan-nicotinamide. The diabetic rats were treated with Embelin (50 mg/kg, p.o.) alone or Embelin + metformin. Various parameters of renal function tests such as serum creatinine, urea, uric acid, and markers of oxidative stress such as renal malondialdehyde (MDA) level, superoxide dismutase (SOD), and catalase (CAT) activities were measured. Tumor necrosis factor-α (TNF-α), myeloperoxidase (MPO) activity, transforming growth factor-β (TGF-β), and nitrite content were estimated in renal tissues. All treated animal were subjected to histopathological changes of kidney.

Results: Diabetic rats showed a significant reduction in renal function, which was reflected with an increase in serum urea, serum creatinine, uric acid. In addition, alloxan-nicotinamide caused renal tubular damage with a higher MDA level, depletion of SOD and CAT activity and glutathione (GSH) level. Moreover, TNF-α, MPO activity, TGF-β, and nitrite content were significantly increased in diabetic rats, while treatment with Embelin or metformin or their combination ameliorate alloxan-nicotinamide induced renal damage due to improvement in renal function, oxidative stress, suppression of TNF-α, MPO activity, TGF-β and nitrite content along with histopathological changes.

Conclusions: This finding suggests that the treatment with Embelin with metformin showed significant nephroprotective effect against alloxan-nicotinamide-induced DN. The results aso showed that embelin has potential hypoglycemic effect along with recovery of liver, kidney and pancreas functions.