Synthesis and characterization of zinc-3 hydroxy flavone, and evaluation of its antidiabetic efficacy in streptozotocin induced diabetic rats

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ABSTRACT

The use of metals in therapeutic drugs becomes increasingly important over the last couple of decades resulting in a variety of exciting and valuable metallopharmaceutical drugs. Zinc is essential in the physiology of insulin and has prominent roles in the structural and functional aspects of insulin. Though zinc, mimics most of the actions of insulin, zinc complexes so far tested for their antidiabetic potential exerts significant toxicity. Flavonoids are known for their wide range of beneficial effects on human health especially in quenching oxidative stress, and preventing secondary complications. Hence, the development of zinc complexes with various ligands in order to reduce the toxicity of zinc continues. In the present study, we have designed and synthesized a novel zinc complex using 3-hydroxy flavone (flavonol) as an organic ligand. The metallo-complex was characterized by spectral studies and antidiabetic potential was evaluated in streptozotocin induced experimental diabetes in rats. The spectral data provides information that complexation involves the binding of zinc ion with α hydroxyl keto group of the 3-hydroxy flavone (flavonol). Acute toxicity and dosage fixation studies revealed that the Zn-flavonol complex is non toxic and oral administration of the complex at a concentration of 5 mg/kg b.w/rat/day for 30 days to STZ induced diabetic rats showed significant reduction in blood glucose, glycosylated hemoglobin (HbA1c), urea, uric acid and creatinine with concomitant improvement in plasma insulin and C-peptide levels. The reduced activities of serum AST, ALT and ALP in the diabetic rats treated with the complex revealed the non-toxic nature of the zinc-flavonol complex.

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