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Antidiabetic Activity of *Fraxinus xanthoxyloides* Bark Extract in Alloxan-induced Diabetic Rats

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Abstract

Fraxinus xanthoxyloides Wall. ex DC is a small tree of dry hills present in Northern parts of Pakistan. Leave, stem and bark of *F. xanthoxyloides* are used locally for the treatment of jaundice, malaria and pneumonia, internal injuries, rheumatism and bone fracture. *In vitro* and *in vivo* anti-diabetic activity of *F. xanthoxyloides* bark was explored for the first time, considering it a potential source of drug candidate. Powder of *F. xanthoxyloides* stem bark was extracted with methanol to obtain the crude extract and resultant was fractionated with solvents in escalating polarity. The evaporation of respective solvents was done and extract/fractions were dried and stored at 4°C for further investigation. Among all the extract/fractions, n-hexane fraction (FXBH) showed the powerful inhibition of α-amylase (IC_{50} =33.38 µg/ml) comparable to the Acarbose (35.8 µg/ml) as well as powerful inhibition of α- glucosidase (IC_{50} =245.6 µg/ml) comparable to Acarbose (12.53 µg/ml). HPLC-DAD analysis of FXBH showed the presence of Gallic acid, Catechin, Caffeic acid, Ferulic acid and Querctin. *In vivo* antidiabetic potential of FXBH extract was evaluated through a trial of 15 days on Sprague Dawley rats. Biochemical parameters like serum Triglyceride, Low-density lipoprotein, Cholesterol, Lipase, Amylase, Alanine aminotransferase, Aspartate aminotransferase, Creatinine, Urea and C-reactive protein levels were decreased along with HBAIC while serum High-density lipoprotein was increased in rats treated with FXBH when compared to diabetic control. Histopathological analysis of pancreas of rats demonstrated the restoration of beta cells. In conclusion, *F. xanthoxyloides* bark has clinical potential for the treatment of diabetic diseases.

Key Words: *Fraxinus xanthoxyloides, Alpha amylase, Alpha glucosidase, Alloxan Monohydrate, Histopathology*