

In vitro antioxidant activity and effect of ethanolic extract of *Curcuma leucorrhiza* Roxb. on *in vivo* antioxidant status of diabetic rats

Ashmita Debnath^{1,2*}, L Inaotombi Devi³, L Reena Devi⁴, Parthasarathi Behera¹, Jagan Mohanarao Gali¹, Hemen Das¹, Prava Mayengbam¹, Lalnunluangi Hmar¹ & M Ayub Ali^{1*}

¹College of Veterinary Sciences & AH, CAU, Selesih, Aizawl 796015, Mizoram, India

²Division of Animal Biochemistry, ICAR- Indian Veterinary Research Institute, Izatnagar, Bareilly 243122, Uttar Pradesh, India

³Department of MLT, RIPANS, Aizawl 796001, India

⁴Department of Chemistry, Pravabati College, Mayang, Imphal 795132, Manipur, India

Received 19 December 2024; revised 01 June 2025

Medicinal plants possess secondary metabolites such as flavonoids, phenolic acids, and tannins, which exhibit significant antioxidant activity by scavenging free radicals. *Curcuma leucorrhiza* Roxb. is a medicinal plant known for its antiseptic, anti-inflammatory and antioxidant properties. This study evaluates the *in vitro* antioxidant potential of its rhizome extracts and assesses the effect of its ethanolic extract on *in vivo* antioxidant status in streptozotocin (STZ) induced diabetic rats. Extracts prepared using chloroform, ethanol, methanol, petroleum ether, aqueous and 50% ethanol were tested via DPPH radical scavenging, FRAP and total phenolic content (TPC) assays. The methanol extract exhibited the highest activity, followed by ethanol. For *in vivo* studies, 30 male Wistar rats were divided into five groups (n=6) viz. normal control (Group-I), diabetic untreated (Group-II), metformin treated (5 mg/kg bw, Group-III) and ethanolic extract (absolute) treated (100 and 200 mg/kg bw, Groups IV and V). Treatment with 200 mg/kg ethanolic extract significantly restored antioxidant markers in diabetic rats, comparable to metformin treatment, reducing malondialdehyde ($P<0.01$) and increasing catalase ($P<0.05$), superoxide dismutase ($P<0.01$) and glutathione peroxidase ($P<0.05$) levels. These findings support the ethnomedicinal use of *Curcuma leucorrhiza* Roxb. and indicate its potential as a natural antioxidant therapy for diabetes associated oxidative stress. Further research is warranted to isolate active compounds, DNA sequence based molecular characterization and evaluate long-term efficacy.

Keywords: Free radicals, Oxidative stress, Phenolic content, Rhizome, Streptozotocin

*Correspondence:

E-mail: ayubali1969@gmail.com (MAA);
drashmitadn11@gmail.com (AD)