

Protective effect of oryzanol isolated from crude rice bran oil in experimental model of diabetic neuropathy

Somsuvra B. Ghatak

Nirma University, India

Abstract

Several studies have implicated the involvement of poor glycemic control and oxidative/nitrosative stress in the development of diabetic neuropathic pain, an important microvascular complication affecting more than 50% of diabetic patients. However, lack of understanding of the underlying etiology, development of tolerance, inadequate relief and possible toxicity associated with classical antinociceptives warrant the investigation of the novel agents for relief. Therefore, the present study was carried out to investigate the effect of oryzanol (OZ), a commercially-important potent antioxidant component isolated from crude rice bran oil (cRBO), in streptozotocin (STZ)-induced diabetic neuropathy in rats. After 8 weeks, diabetic rats developed neuropathy which was evident from decreased tail-flick latency (thermal hyperalgesia) and increased nociceptive behavior during the formalin test of persistent chemical irritation to the paw. This was accompanied by decreased motor coordination based on the evaluation of neuromuscular strength. Na⁺ K⁺ ATPase, a biochemical marker associated with the development of diabetic neuropathy, was significantly inhibited in the sciatic nerve of diabetic animals. The activities of antioxidant enzymes and lipid peroxidation levels were significantly elevated in diabetic rats, indicating the involvement of oxidative stress in diabetic neuropathy. Chronic treatment with oryzanol (OZ) (50 and 100 mg/kg) per oral (*p.o.*) and standard drug glibenclamide (GI) (10 mg/kg, *p.o.*) significantly attenuated the behavioral as well as biochemical changes associated with diabetic neuropathy. The findings provide experimental evidence to the protective effects of OZ on hyperglycemia-induced thermal hyperalgesia and oxidative stress which might be responsible for diabetes induced nerve damage.

Biography

Somsuvra B. Ghatak is currently a Ph.D. Research Scholar at the Department of Pharmacology, Nirma University, India. He has been awarded with the Junior Research Fellow- Professional (INSPIRE) Fellowship by the Department of Science & Technology, Govt. of India, in 2010 for a period of 5 years. He has received the Gold Medal for being the 'BEST STUDENT' of the Masters of Pharmacy program in 2008. He has published 15 papers in reputed national and international journals till date. He has one and half years of industrial experience in pharmacokinetics and technical writing in the field of clinical research.