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Anti-diabetic Potential of *Vitis vinifera* Root Extract Against Streptozotocin Induced Diabetic Rats

SURESH KUMAR, SUNIL SHARMA AND SUMAN

See end of the article for authors' affiliation

Correspondence to :
SURESH KUMAR
Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, HISAR (HARYANA) INDIA
pharm.vermasuresh@gmail.com

ABSTRACT

India has become the diabetic capital of the world with highest number of patients suffering from this metabolic disorder affecting children, youth and senior citizens of our country. Therefore, this project was undertaken to investigate the potential of grape root in the management of Streptozotocin-induced hyperglycemia in rats. The anti-diabetic activity of 95% ethanolic extract of roots of *Vitis vinifera* (commonly known as Angoor) was investigated. The dose 500 mg/kg of body weight appeared to be the effective dose as it caused the maximum lowering of the fasting blood glucose, in Streptozotocin-Nicotinamide induced Type II diabetic rats. The maximum hypoglycemic effect was observed at the 4th h to which the study has been conducted. Administration of the effective dose of the extract to diabetic rats for 15 days showed favorable effects not only on fasting blood glucose, but also on cholesterol and liver glycogen levels. *Vitis vinifera* reflected a high margin of safety, as no mortality was observed even after the administration of the extract at the dose of 5g/kg body weight. Thus *Vitis vinifera* root appears to be a promising candidate for developing a new Anti-diabetic remedy.

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Diabetes mellitus (DM) consists of a group of syndromes characterized by hyperglycemia; altered metabolism of lipids, carbohydrates, and proteins; and an increased risk of complications and premature mortality, accounting for at least 10% of total health care expenditure in many countries (King *et al.,* 1998). The prevalence of diabetes for all age-groups worldwide is projected to rise from 171 million in 2000 to 366 million in 2030 (Amos *et al.,* 1997). Persons with undiagnosed diabetes are known at high risk of cardiovascular disease (WHO, 2003).

Vitis vinifera L. (common grapevine, European grape) has been used as a food and a beverage, as well as a remedy against various complaints in traditional medicine worldwide since ancient times. Leaves of the plant have been used to stop bleeding and to treat inflammatory disorders and pain (Bombardelli and Morazzonni, 1995; Baytop, 1999). Leaves are also recorded to reduce blood glucose levels in diabetics as a folk remedy. The chemical composition and biological activities of the fruit and seed of the grape have been extensively investigated (Bombardelli and Morazzonni, 1995; Gabetta *et al.,* 2000; Delaunay *et al.,* 2002; Dieguez´ *et al.,* 2003; Fan *et al.,* 2004). The leaves of plant are rich in tannins, flavonoids, procyanidins and also contain organic acids, lipids, enzymes and vitamins (Bombardelli and Morazzonni, 1995; Hebash *et al.,* 1991; Hmamouchi *et al.,* 1997; Felicio *et al.,* 2001). Although the studies conducted on biological effects of the roots of plant are limited. Additionally, anti-diabetic potential of *Vitis vinifera* roots have not been evaluated so far. In the light of these findings, study was carried out to evaluate the anti-diabetic activity of the alcoholic extract of *Vitis vinifera* roots on normoglycaemic, hyperglycaemic and Streptozotocin-induced diabetic rats.

MATERIALS AND METHODS

Plant material:

The roots of *Vitis vinifera* collected from the local field of Hisar, Haryana (India) was identified by Dr. H.B. Singh, Head, Raw Materials Herbarium and Museum, National Institute of Science Communication and Information Resources (NISCAIR), India with Ref. no. 2008-2009/1020/51. The plant