Toxicity studies, Hypoglycaemic activity of *Cupressus torulosa* needles and recognition of active molecules

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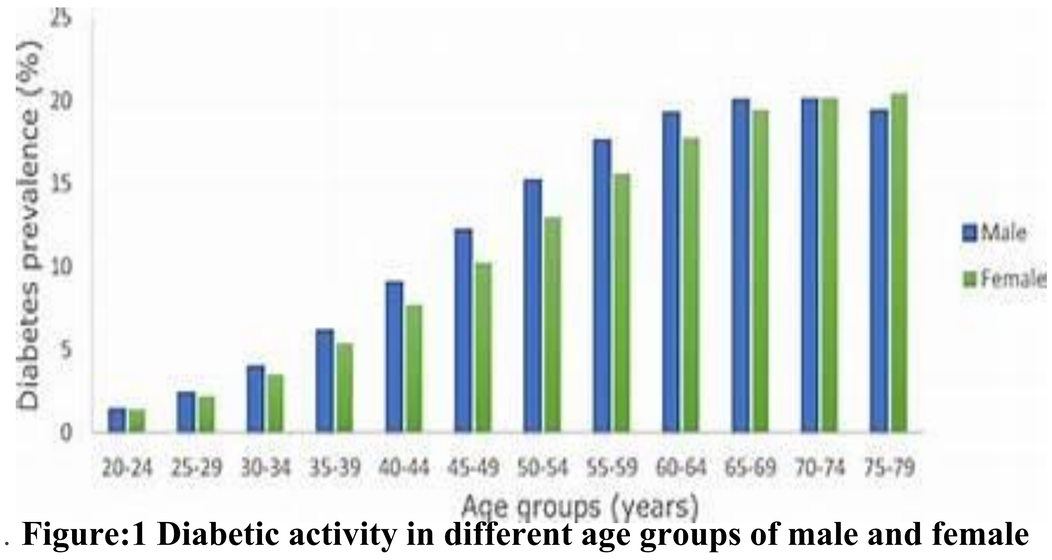
Introduction

Worldwide diabetes mellitus is one of the chief health and economic problem. It is indicated by elevated levels of blood glucose resulting from deficits in insulin production, insulin action, or both. Diabetes has affected 6% of the world's population. Type II diabetes accounts for 90–95% of all diabetic cases.

C. torulosa (Family: Cupressaceae, Genus: Cupressus, Species: Torulosa) a herbal medicinal plant belonging to the old world cupressus. Found to exist in warm and temperate climatic conditions. *C. torulosa* is indigenous to India. It is widely distributed at an altitude of 1800 to 3300 m throughout India, Nepal, Tibet, Pakistan and Bhutan. In India, Bhutan, Nepal it is known by the common names of Himalayan cypress or Bhutan cypress, Surai, Raj sallo, Dhupi.



. **Figure:1 Diabetic activity in different age groups of male and female**

Objective

The search for new bioactive products with antidiabetic activity has led to the present study, whose aims were to investigate the potential antidiabetic effect (hypoglycemic) of the 25% aqueous methanol extract of *C. torulosa* needles. These are evaluated first time for its antidiabetic properties both *in vitro* and *in vivo*.

Methodology

- The needle samples of *C. torulosa* were collected from 10 different locations of Indian states of Uttrakhand and Himachal Pradesh
- The needle samples were lyophilized at -40°C for 3 days, extracted with 25% aqueous methanol.
- Total Phenolic content (TPC) and Total Flavonoid Content (TFC) were determined.
- Population of location Gopeshwar was found to be with highest TPC and TFC content and was further screened for in vitro and in vivo anti-diabetic activity.
- Before assessing the in vivo Hypoglycaemic ability of the test extract (AM extract), its acute toxicity was determined according to OECD 423 guidelines.
- In Vitro antidiabetic activity was done using α -Glucosidase Inhibition Assay and in vivo Anti-Hyperglycemic Activity of a Single Dose and Repeated Dose of the Extracts in STZ-Induced Diabetic Mice.
- After finding positive results in the testing, we screened the above extract for active molecules using **LC-QTOF-MS** analysis.

Results

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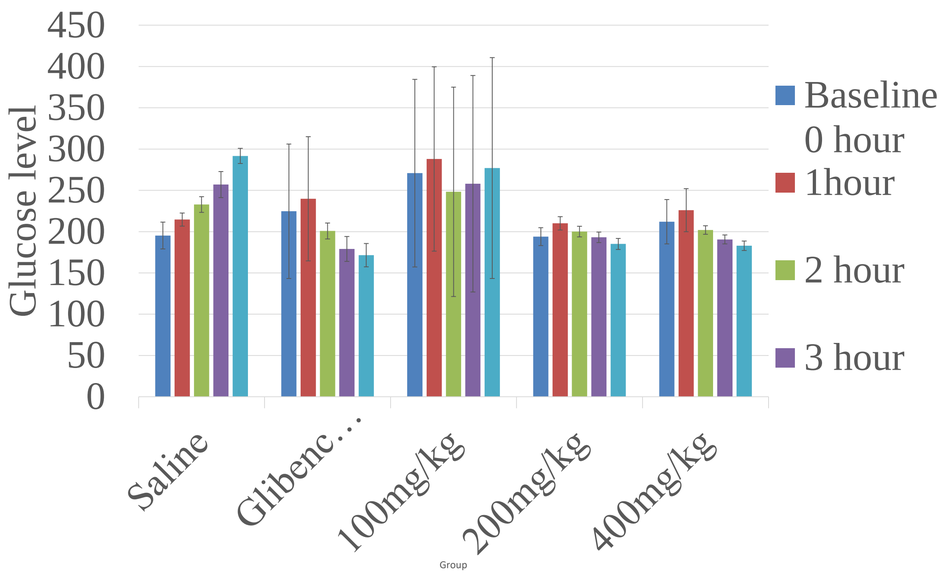

. **Figure:2 Single dose hypoglycemic Activity of AM Extract of *C. torulosa***

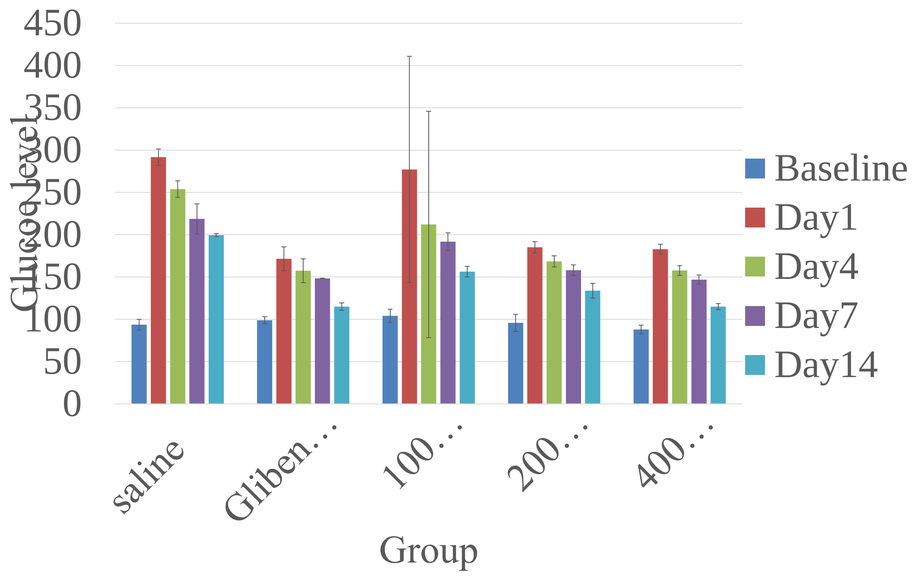

Figure:3 Multiple dose hypoglycemic Activity of AM Extract of *C. torulosa*

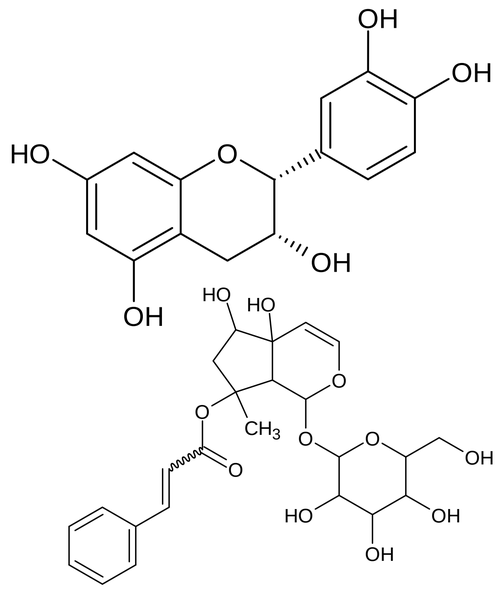

Figure:4 Structure of active hypoglycemic molecules as detected by LC-QTOF-MS studies (i) (-)-Epicatechin (ii) Harpagoside

Conclusion

The significant reduction in BGL levels of mice on 4th hour and 14th day was seen as compared to the control. Therefore, the AM extract qualifies as a safe and successful candidate for Hypoglycaemic activity, more over in our LC- QTOF- MS analysis we found that (-)-Epicatechin and Harpagoside are the active molecules behind the above-mentioned activity

Related Literature

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2. Harris MI, Hadden WC, Knowler WC, Bennett PH. Prevalence of diabetes and impaired glucose tolerance and plasma glucose levels in U.S. population aged 20–74. Diabetes 1987, 36:523–534.
3. Dennery PA. Introduction to serial review on the role of oxidative stress in diabetes mellitus. Free Radic Biol Med 2006, 40(1):1–2.