IJPT
1735-2657/07/62-239-240
IRANIAN JOURNAL OF PHARMACOLOGY & THERAPEUTICS

IJPT 6:239-240, 2007

RIDR

SHORT COMMUNICATION

The Effect of Aqueous Extract of the Leaves of Eucalyptus Globules on the Blood Glucose Level in Fasted Rats

SHAHBAA MUSLEM ISMAIL

For author affiliations, see end of text.

Received June 25, 2007; Revised December 8, 2007; Accepted January 21, 2008

This paper is available online at *http://ijpt.iums.ac.ir*

ABSTRACT

The aim of this study is to determine the effect of the aqueous extract of the leaves of Eucalyptus globules on blood glucose level in fasted rats, and to find a new medical adjunct to anti-diabetes drugs. The aqueous extract of Eucalyptus was administered in various doses (150-400 mg/kg) orally. Blood glucose level was checked 2-6 h after treatment. The study showed that oral administration of the extract (250 mg/ kg) resulted in significant decrease in blood glucose level peaking at 4 hours, in a dose-dependent manner ($p< 0.0005$). This effect declined after 6 hours of feeding in all the doses examined (150 , 250 , 400 mg/kg body weight).These data indicates that Eucalypyus globules represents an effective anti-hyperglycemic adjunct for the treatment of diabetes and a potential source for the discovery of new orally-active agent in future .

Keywords: *Eucalyptus globules, Antihyperglycemic plant,Ddiabetes mellitus*

Plants have been considered as a source of medicinal agents for the treatment of various diseases. Although present therapy for diabetes mellitus relies on an arsenal of drugs developed since the introduction of insulin [1], many traditional plants treatments for diabetes mellitus have been described [2-45], few received scientific or medical scrutiny. Eucalyptus globules (eucalyptus, blue gum tree) are traditionally used to treat diabetes in South America, Africa, and Asia [6], the medicinal part of the plant are the leaves from which tea is made [7].

The use of Eucalyptus globules leaves in the treatment of diabetes mellitus was first advocated by Faulds [8]. Recent studies in streptozotocin diabetic mice confirm the anti-hyperglycemic efficacy of eucalyptus [9,10]. Also, Vallasensor & Lamadrid showed that Eucalyptus tereticonis exhibit anti-hyperglycemic activity upon using oral glucose tolerance test [11,12]. Leaves of eucalyptus are reported to contain eucalplol (cineol) together with rutin, terpineol, sesquiterpene, alcohols, aliphatic aldehydes , isoamyl alcohol ,ethanol terpenes and tannins [11]. The present study was undertaken to confirm the anti-hyperglycemic properties of three doses of the aqueous extract of the leaves of eucalyptus in normal fasted rats.

MATERIAL AND METHOD

Dried eucalyptus leaves were obtained from commercial source and a voucher specimen of the plant was identified at the National Herbarium of Iraq Botany Directorate in Abu-Ghraib. The leaves were shed dried at 25 C and homogenized to a fine powder and stored at room temperature 20°C until use. Aqueous extract of eucalyptus were prepared by decoction process of powdered material [10]. In brie, a suspension of 25 g of the Eucalyptus leaves powder in 100 ml of distilled water was stirred overnight (16 hours) at room temperature , and this was repeated for three consecutive times. The residue was removed by filteration and the extract was evaporated to dryness at a low temperature (40°C) under reduced pressure in a rotatory evaporator. The residual extract which was 25 % concentration were dissolved in normal saline whenever used in the experiments [2].

Male adult Wister rats (250-300 g weight) from a colony bred at college of Pharmacy animal house were used in this study. Animals were housed in an air-conditioned animal room and fed on pellets and water. Animals were deprived of food but allowed free access to tap water prior to the experiment. Collection of blood samples from rats was maintained by cardiac puncture

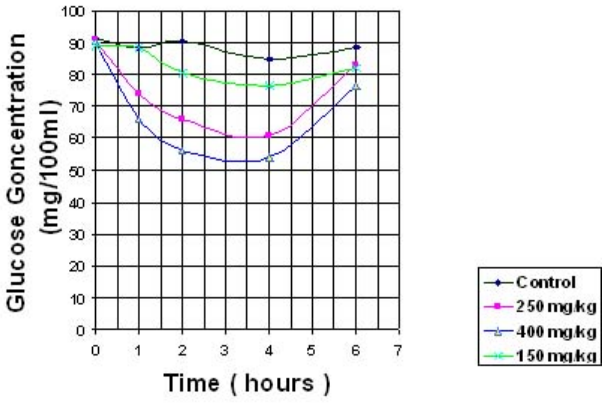

Fig 1. The effects of Different Doses of Eucalyptus on Blood Glucose Concentration

technique. The rats were slightly anaesthetized with sodium pentobarbitone administered intraperitoneally at a dose of 30 mg/kg body weight, 30 minutes prior to the experiments [2]. The whole blood glucose level was estimated using the arsenomolybdate methos [12]. Sodium floride (2 mg) and 6 mg potassium oxalate /1 ml blood were added to the blood tubes to inhibit glycolytic enzymes and to prevent blood coagulation.

Four groups of fasted rats, six in each were used. Three groups were fed with 150, 250 or 400 mg/kg body weight of the aqueous crude extract of the Eucalyptus leaves dissolved in 2 ml normal saline. The forth group was fed with 2 ml normal saline and served as control group. Blood samples were collected at zero, 1, 2, 4 and 6 h after feeding the fasted rats with the three examined doses of eucalyptus aquous extract of leaves and the control . All the results were analyzed statistically using Student-t test for paired data of different levels of significance. All the results were represented as mean±standard error.

RESULTS

The mean of blood glucose level in normal fasted rats was 87.7 mg /100 ml ranging from 80-96 mg/100ml. Upon oral administration of 150 mg/kg of eucalyptus extract, there was no significant differences in the in blood glucose level between treated and control groups after 1 h , while it showed significant change after 2, 4, 6 hours ($p < 0.01$, $p < 0.01$, $p < 0.05$ respectively), as shown in Figure 1. Notably, 250 mg/ kg body weight of Eucalyptus leaves extract significantly lowered the fasting blood glucose levels at different time points ($p < 0.01$, $p < 0.0005$, $p < 0.00005$, $p < 0.05$ respectively) , whereas the effect of high doses (400 mg/kg) of the extract showed less potency in its blood glucose lowering effect, comparing to other concentration.

CONCLUSION

Eucalyptus was reported in early studies to be an anti-hyerglycemic agent in alloxan diabetic rabbits, with no effect on the blood glucose concentration in normal rats [13]. In the present study, the anti-hyperglycemic action of eucalyptus has been confirmed in fasted normal rats at various doses of the aqueous extract of the leaves. This study involves a comprehensive procedure to elucidate this point. The result proves that the eucalyptus extract causes a significant decrease in blood glucose level in fasted rats at three different doses. As shown in Figure 1, the onset of action of eucalyptus extract starts 1 hour after oral feeding, peaked within 4 hours, and declines 4 hours after treatment. Our results indicates that oral administration of aqueous extract of Eucalyptus globules leaves at the doses of 150 and 250 mg/kg body weight exhibits a significant, dose-dependent hypoglycemic effect in fasted rats , which represents an effective anti-hyperglycemic dietary adjuncts for treatment of diabetes mellitus and a potential source for discovery of new orally-active component for future dietary therapy. Further studies needed to find the active ingredient of the extract and its mechanism of action as well as the its possible toxicities.

REFERENCES

1. Bailey CJ, Flatt PR., eds. New anti diabetic drugs. Smith-Gordan. London.UK, 1990.
2. Al-Khazraji SM, Al-Shamaony LA, Twaij HAA. Hypooglycemic effect of Artemisia herbalba: effect of different parts and influence of solvents on hypoglycaemic activity. J Ethnopharmacol 1993; 40: 163-6.
3. Bailey CJ, Day C. Traditional treatments of diabetes. Diabetes care. 1989; 12: 553-64.
4. Gray AM, Flatt PR. Pancreatic and extrapancreatic effect of the traditional anti diabetic plants Medicago sativa (Alfalfa). Brit J Nutr 1997; 78: 325-34.
5. Duke JA. CRC Handbook of medical herbs. CRC Press Florida: 45.
6. Lewis J.Diabetes and insulin administration problems. Physiol Rev 1988; 29: 75-90.
7. Chiej R. The MacDonald Encyclopedia of Medicinal plants. MacDonald and Co. Ltd .London. UK. 1988.
8. Faulds G. Eucalyptus in the treatment of diabetes. Glascow Med J 1902; 57: 342-8.
9. Swanston-Flatt SK, Day C, Bailey CJ, Flatt PR. Traditional plant treatments for diabetes: study in normal and streptozotocin diabetic mice. Diabetologia 1990; 33: 462-4.
10. Gray AM, Flatt PR. Antihyperglycaemic action of Eucalyptus globules (eucalyptus) and associated with pancreatic and extrapancreatic effect in mice. J Nutr 1998; 128: 2319-23.
11. Villasenor IM, Lamadrid MR. Compaarative antihyperglycaemic potential of medicinal plants. J ethnopharmacol 2005; 104:129-31.
12. Astoor AM, King EJ. Colorimetric method for true suger in blood. In: King EJ and Walton IDP (Eds). Microanalysis in Medical Biochemistry. 3 rd. Edn. JA Churchill. Ltd. London. 1954: 25.
13. Bever BO, Zahnd GR. Plants with oral hypoglycemic agents. QJ Crude Drug Res 1979; 17: 139-96.

CURRENT AUTHOR ADDRESSES

Shahbaa Muslem Ismail, Pharmacy Department, Medical Technical Institute - Mansour,Technical Education Foundation, Baghdad, Iraq. E-mail: shahbaa1@yahoo.com