



Anti-Diabetic Activity of *Glycyrrhiza glabra* - An *In vitro* Study

P.S.Karthikeson, Lakshmi.T*

Department of Pharmacology, Saveetha dental college & Hospitals, Chennai, India.

*Corresponding author's E-mail: lakshmi@saveetha.com

Received: 20-02-2017; Revised: 18-03-2017; Accepted: 25-04-2017.

ABSTRACT

The aim of the study is to investigate the *in vitro* anti diabetic activity of *Glycyrrhiza glabra* using alpha amylase activity. Diabetes mellitus commonly referred to as diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination, increased thirst and increased hunger. If left untreated, it may lead to many complications such as diabetic ketoacidosis, coma or death. Serious long term complications include heart disease, stroke, kidney failure, foot ulcer etc. The root of *Glycyrrhizaglabrais* knows as *liquorice*. It has various medicinal uses. It is cited as belonging to plants that reduce blood sugar levels. *Liquorice* can help to treat diabetes. It possesses hypoglycaemic properties and its consumption helps in lowering glucose or sugar in blood. Alpha amylase method is used to demonstrate the Anti-diabetic activity. The present study targets the potential use of *Glycyrrhiza glabra* which could be an alternative approach for many diseases such as Diabetes.

Keywords: Anti diabetic, diabetes, Alpha amylase, *Glycyrrhiza glabra*.

INTRODUCTION

Diabetes mellitus commonly referred to as diabetes¹⁻³, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination, increased thirst and increased hunger^{4,5}. If left untreated, it may lead to many complications such as diabetic ketoacidosis, coma or death.⁶ Serious long term complications include heart disease, stroke, kidney failure, foot ulcer etc. The root of *Glycyrrhizaglabrais* knows as *liquorice*. It has various medicinal uses.^{7,8} It is cited as belonging to plants that reduce blood sugar levels. *Liquorice* can help to treat diabetes.⁹ It possesses hypoglycaemic properties and its consumption helps in lowering glucose or sugar in blood.¹⁰

In this study, the *in vitro* anti diabetic activity of *Glycyrrhiza glabra* Root using alpha amylase inhibitory assay is discussed in detail.

MATERIALS AND METHODS

Plant Material

Glycyrrhiza glabra extract is obtained from Green chem. Herbal extractions & Formulations, Bengaluru.

METHODOLOGY

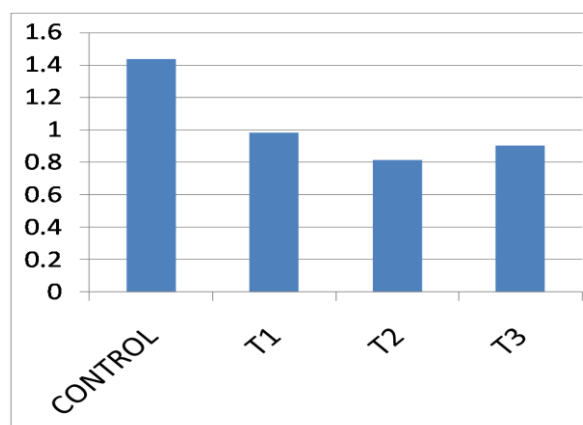
100 µl, of the test extract was allowed to react with 200 µl of α amylase enzyme and 100 µl of 2mM of Phosphate buffer (pH 6-9). After 20 minute incubation, 100 µl of 1% starch solution was added. The same was performed for the controls where 200 µl of enzyme was replaced by buffer, after incubation for 5 minutes, 500 µl of di nitro salicylic acid reagent was added to both control and test. They were kept in boiling water bath for 5 minutes. The

absorbance was recorded at 540 nm using spectrophotometer and the percentage inhibition of α amylase was calculated using the formula

$$\% \text{ inhibition} = \frac{100 \times (\text{Control} - \text{test})}{\text{Control}}$$

RESULTS & DISCUSSION

Control	1.4349
Acarbose	
T1	0.9832
T2	0.8140
T3	0.9020
%Inhibition	80.788



Type 2 diabetes is a progressive condition in which the body becomes resistant to the normal effects of insulin and/or gradually loses the capacity to produce enough insulin in the pancreas^{11, 12}. We do not know what causes



type 2 diabetes. Type 2 diabetes is associated with modifiable lifestyle risk factors. Type 2 diabetes also has strong genetic and family related risk factors. Symptoms include constant hunger, fatigue, weight loss, persistent thirst, blurry vision, itchy skin, dry mouth etc.¹³

Its development can be prevented or delayed in people with impaired glucose tolerance by implementing lifestyle changes or the use of therapeutic agents. Some of these drugs have been obtained from plants or have a microbial origin Picnogenol, acarbose, miglitol, and voglibose are the antidiabetic products of natural origin.^{14,15}

The first medicinal plant described with a clear antidiabetic effect was *Galega officinalis* L. (Fabaceae), which has been prescribed since the Middle Age to treat diabetes mellitus. It has a great similarity to the antidiabetic drug metformin. The in vitro anti-diabetic study was carried to assess the α -glucosidase and α -amylase inhibitory activity of the extract to control postprandial hyperglycemia in Type-2 diabetes mellitus patients. The current study suggests that the presence of polyphenolic compounds of *Glycyrrhiza glabra* ethanolic root extract may have a prominent role in managing Type-2 diabetes. The α -amylase inhibitory activity of *Glycyrrhiza glabra* ethanolic extract has 80.788% inhibition as shown in graph and table.

CONCLUSION

Inhibition of α -glucosidase and α -amylase enzyme activity leads to a reduction in disaccharide hydrolysis which has beneficial effects on glycemic index control in diabetic patients and can reduce the incidence of post prandial hyperglycemia. As the plant extract was reported for having anti-diabetic activity in vivo, its activity was evaluated in vitro. In conclusion, the present study indicates that *Glycyrrhiza glabra* ethanolic root extract shows prominent antioxidant and anti-diabetic activity.

REFERENCE

1. Vickers, A., & Zollman, C. (1999). ABC of complementary medicine: Herbal medicine. *Bmj*, 319(7216), 1050-1053.
2. Drug Discovery from Natural Products. (2012). *RSC Drug Discovery*.
3. Predny, Mary L.; De Angelis, Patricia; Chamberlain, James L. 2006. Black cohosh *Actaea racemosa*: an annotated bibliography. Gen. Tech. Rep. SRS-97. Asheville, NC: U.S.

Department of Agriculture Forest Service, Southern Research Station. 99 p.

4. Fiore, C., Eisenhut, M., Ragazzi, E., Zanchin, G., & Armanini, D. (2005). A history of the therapeutic use of licorice in Europe. *Journal of Ethnopharmacology*, 99(3), 317-324.
5. Agarwal, A., Gupta, D., Yadav, G., Goyal, P., Singh, P. K., & Singh, U. (2009). An Evaluation of the Efficacy of Licorice Gargle for Attenuating Postoperative Sore Throat: A Prospective, Randomized, Single-Blind Study. *Anesthesia & Analgesia*, 109(1), 77-81.
6. Shibata S. Antitumor promoting and anti-inflammatory activities of licorice principles and their modified compounds. *Food Phytochemicals II: Teas, Spices and Herbs*. 1994, 308-321.
7. Yang L.; Liu Y. L.; Lin S. Q.; The determination of flavonoid in 6 kinds of licorice root by HPLC. *Acta Pharmaceutica Sinica*. 25, 1990, 840-848.
8. Visavadiya NP, Soni B, Dalwadi N. Evaluation of antioxidant and anti-atherogenic properties of *Glycyrrhiza glabra* root using *In vitro* models. *International Journal of Food Sciences and Nutrition* 60(2), 2009, 135-149.
9. Fenwick, G.r., J. Lutomski, and C. Nieman. "Licorice, *Glycyrrhiza glabra* L.—Composition, uses and analysis." *Food Chemistry* 38.2 (1990): 119-43. Web.
10. Kataria R, Hemraj, Singh G, Gupta A, Jalhan S, Jindal A *et al*. Pharmacological activities on *Glycyrrhiza glabra*—a review, *Asian J Pharm Clin Res* 6(1), 2013, 5-7.
11. Lakshmi.T., Geetha RV., "Glycyrrhizaglabra commonly known as licorice—a therapeutic review". *International Journal of Pharmaceutics and Pharmaceutical Sciences* 3, 2011, 20-25.
12. T.Lakshmi, R Anitha, RV Geetha. "Acacia catechu wild-A gift from ayurveda to mankind – A Review" *T.Ph.Res* 5 (2), 2011, 273-93.
13. N. Madhusudhanan, T Lakshmi, SG Kumar, KVRG Ramakrishnan, A Roy."In vitro antioxidant and free radical scavenging activity of aqueous and ethanolic flower extract of *Nymphaea alba*" *Int J Drug Dev Res* 3 (3), 2011, 252-258.
14. T.Lakshmi, R Ramasamy, R Thirumalai kumaran "Preliminary Phytochemical Analysis and In vitro anti-oxidant, FTIR Spectroscopy, Anti-diabetic activity of Acacia Catechu ethanolic seed extract" *Pharmacognosy Journal* 7 (6), 2015.
15. T.Lakshmi, N, Madhusudhan, R.Rajendran "Nymphaea alba Linn-An Overview" *Research Journal of Pharmacy and Technology* 6(9), 2013, 974-977.

Source of Support: Nil, Conflict of Interest: None.

