

Effects of Licorice and its bioactive compound on oxidative stress in rat pancreatic islets

M. Rahimifard^{1,*}, M. Navaei-Nigjeh², S. Mirzaei³, A. Nilli Ahmadabadi⁴, M. Baeri⁴, A. Mohammadirad⁴, M. Abdollahi⁴

¹Faculty of Science and Agriculture, Payame Noor University of Tehran, Tehran, Iran

²Faculty of New Sciences and Technologies, University of Tehran, Tehran, Iran

³Pharmaceutical Branch, Islamic Azad University of Medical Sciences, Tehran, Iran

⁴Faculty of Pharmacy and Pharmaceutical Sciences Research Centre, Tehran University of Medical Sciences, Tehran, Iran

Background and Aims: Licorice root is a traditional medicine used mainly for the treatment of peptic ulcer, hepatitis C, and pulmonary and skin diseases, although it has several other useful pharmacological properties such as antiinflammatory, antiviral, antimicrobial, antioxidative, anticancer activities, immunomodulatory, hepatoprotective and cardioprotective effects. One of the bioactive components of this plant is Glycyrrhizic acid (GA) which is normally being considered to be the main biologically active component. In the present study, the effects of Licorice extract and GA on the function and level of reactive oxygen species (ROS) in isolated rat pancreatic islets were evaluated.

Methods: Islets were isolated and incubated in RPMI 1640 for 24 hours then were exposed to different doses of plant extractions in 1, 10, 100 and 1000 µg/ml and logarithmic doses of GA for 24 hours. At the end, cell viability and ROS production were measured by MTT and fluorometric methods. Also rate of insulin secretion was tested.

Results: At the selected doses for both plant extract and GA, no toxicity was seen. Measuring insulin secretion for Licorice extract showed a reduce rate of insulin by increasing the dose and also GA at the lowest concentration significantly increased insulin secretion in response to stimulation by glucose (16.7 mM). Decreasing rate of ROS at 1µM of GA and 1µg/ml of Licorice extract were observed.

Conclusions: Both plant extract and its bioactive component are safe and both can reduce oxidative stress and increase insulin secretion at the same dose. It should be because of GA is the most effective compound of Licorice.

Keywords: Licorice extraction; Glycyrrhizic Acid; Isolated rat pancreatic islets; Oxidative stress