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Urtica dioica Improves Glucose Control in Diabetes on the Basis of Animal Studies

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A comprehensive review on the *Urtica dioica* (common nettle) was recently published (Mehri *et al*., 2011) that revealed a lot of information about its efficacy and safety for management of type 2 diabetes and its complications. *Urtica dioica* has a long use tradition as an expectorant, antidiarrheal and for treatment of menstrual, hemorrhage, diabetes, rheumatism, eczema and anemia. Although at present, nettle root has a prominent position for treatment of Benign Prostatic Hyperplasia (BPH) (Akbay *et al*., 2003), several beneficial medical properties are currently attributed to this plant, such as antidiabetic, anti rheumatoid arthritis or osteoarthritis and diuretic (Chrubasik *et al*., 2007).

On the basis of Mehri *et al*. (2011) review, the most animal studies are in favor of benefits of *U. dioica* in diabetes, but only one human study showed efficacy of this herb when used in combination in the form of Glucolevel tablets. Moreover, one case study has been reported about hypoglycemia after taking herbal remedy for benign prostatic hypertrophy (Edgcumbe and McAuley, 2008). Nevertheless, latest researches on the pharmacological effects of isolated compounds from *U. dioica* support these findings (Chrubasik *et al*., 2007). In the recent year, dietary polyphenolic phytochemicals have received considerable recent attention as alternative candidates for treatment of diabetes (Rahimi *et al*., 2005; Momtaz and Abdollahi, 2010) and evidences confirm that *U. dioica* is a rich source of polyphenolic compounds (Chrubasik *et al*., 2007). One of the main bioactive isolated phenolic Compounds, Chlorogenic Acid (CGA), from this plant has been found as a potent hypoglycemic (Karthikesan *et al*., 2010) agent and antioxidant (Kahkonen *et al*., 2001). CGA can decrease the blood glucose levels and inhibit glucose-6-phosphatase (G-6-Pase), the key enzyme that catalyzes the final step of glycogenesis (release of glucose from the liver) (Hoseini *et al*., 2006) and gluconegensis (promotes the uptake of glucose by liver cells) and regulate overproduction of both glucose by inhibiting G-6-pase; thereby it controls glycemic status in type 2 diabetes (Karthikesan *et al*., 2010). Moreover, some flavonol glycosides have been found in this plant such as rutin that may potentially play a positive role in carbohydrate metabolism and protection of the functional β-cells to increase secretion of insulin from islets in diabetes (Prince and Kamalakkannan, 2006). Furthermore, compounds that structurally related cyclical peptides have shown to facilitate glucose uptake by forming unique glucose permeable pores (Domola *et al*., 2010).

Consideration all these findings, as well as data in the review by Mehri *et al*. (2011), it is apparent that *U. dioica* can decrease blood glucose by several mechanisms including pancreatic and extra pancreatic mechanisms especially antioxidant potentials (Hasani-Ranjbar *et al*., 2009). Despite its protective functions, few accessible research data showed that *U. dioica* causes some side effects in the kidney and liver (Mehri *et al*., 2011). Probably some compounds in *U. dioica* can cause kidney and other internal organs damage. For instance, one investigation on Chinese herbal medicine indicated that CGA induces liver and kidney injury in dogs (Li *et al*., 2010). However,

Setarud (IMOD)™ that is a combination of *Urtica* and two other extracts has shown antidiabetic activity (Mohseni-Salehi-Monfared *et al.*, 2010) without any serious side effects (Khairandish *et al.*, 2009) or genotoxic adverse effects (Khorram Khorshid *et al.*, 2008).

Although, there is no evidence that *U. dioica* directly produces renal or hepatic toxicity in human, but it should be standardized on the basis of active compounds and for more information on toxic doses and mechanisms. Therefore, high-profile animal and clinical studies should be planned. As combined herbal formulation containing nettle has been shown to be effective and safe for control of hyperglycemia (Said *et al.*, 2008), type 2 diabetic patients can receive them as a supplement and regularly renal and hepatic function can be monitored in these patients.

REFERENCES

Akbay, P., A.A. Basaran, U. Undeger and N. Basaran, 2003. *In vitro* immunomodulatory activity of flavonoid glycosides from *Urtica dioica* L. Phytother. Res., 17: 34-37.

Chrubasik, J.E., B.D. Roufogalis, H. Wagner and S.A. Chrubasik, 2007. A comprehensive review on nettle effect and efficacy profiles, Part I: Herba urticae. Phytomedicine, 14: 423-435.

Domola, M.S., V. Vu, C.A. Robson-Doucette, G. Sweeney and M.B. Wheeler, 2010. Insulin mimetics in *Urtica dioica*: Structural and computational analyses of *Urtica dioica* extracts. Phytother. Res., 24: S175-S182.

Edgcumbe, D.P and D. McAuley, 2008. Hypoglycaemia related to ingestion of a herbal remedy. Eur. J. Emerg. Med., 15: 236-237.

Hasani-Ranjbar, S., B. Larijani and M. Abdollahi, 2009. A systematic review of the potential herbal sources of future drugs effective in oxidant-related diseases. Inflamm. Allergy Drug Targets, 8: 2-10.

Hoseini, S., H. Esmaily, M. Azadeh and A. Mohammad, 2006. Effects of sildenafil a phosphodiesterase 5 inhibitor on rat liver cell key enzymes of gluconeogenesis and glycogenolysis. Int. J. Pharmacol., 2: 280-285.

Kahkonen, M.P., A.I. Hopia and M. Heinonen, 2001. Berry phenolics and their antioxidant activity. J. Agric. Food Chem., 49: 4076-4082.

Karthikesan, K., L. Pari and V.P. Menon, 2010. Combined treatment of tetrahydrocurcumin and chlorogenic acid exerts potential antihyperglycemic effect on streptozotocin- nicotinamide-induced diabetic rats. Gen. Physiol. Biophys., 29: 23-30.

Khairandish, P., M. Mohraz, B. Farzamfar, M. Abdollahi and M.H. Shahhosseiny *et al.*, 2009. Preclinical and phase 1 clinical safety of Setarud (IMOD™), a novel immunomodulator. DARU, 17: 148-156.

Khorram Khorshid, H.R., Y.A. Novitsky, M. Abdollahi, M.H. Shahhosseiny and B. Sadeghi *et al.*, 2008. Studies on potential mutagenic and genotoxic activity of Setarud. Daru, 16: 223-228.

Li, B.Q., X. Dong, G.Q. Yang, S.H. Fang and J.Y. Gao *et al.*, 2010. Role of chlorogenic acid in the toxicity induced by Chinese herbal injections. Drug Chem. Toxicol., 33: 415-420.

Mehri, A., S. Hasani-Ranjbar, B. Larijani and M. Abdollahi, 2011. A systematic review of efficacy and safety of *Urtica dioica* in the treatment of diabetes. Int. J. Pharmacol., 7: 161-170.

Mohseni-Salehi-Monfared, S.S., E. Habibollahzadeh, H. Sadeghi, M. Baeeri, M. Abdollahi, 2010. Efficacy of Setarud (IMOD™), a novel electromagnetically-treated multi-herbal compound, in mouse immunogenic type-1 diabetes. Arch. Med. Sci., 6: 663-669.

Momtaz, S. and M. Abdollahi, 2010. An update on pharmacology of *Satureja* species; From antioxidant, antimicrobial, antidiabetes and anti-hyperlipidemic to reproductive stimulation. Int. J. Pharmacol., 6: 346-353.

Prince, P.S. and N. Kamalakkannan, 2006. Rutin improves glucose homeostasis in streptozotocin diabetic tissues by altering glycolytic and gluconeogenic enzymes. J. Biochem. Mol. Toxicol., 20: 96-102.

Rahimi, R., S. Nikfar, B. Larijani and M. Abdollahi, 2005. A review on the role of antioxidants in the management of diabetes and its complications. Biomed. Pharmacother., 59: 365-373.

Said, O., S. Fulder, K. Khali, H. Azaizeh, E. Kassis and B. Saad, 2008. Maintaining a physiological blood glucose level with Glucolevel, a combination of four anti-diabetes plants used in traditional Arab herbal medicine. Evidence-Based Complementary Alternative Med., 5: 421-428.