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Metformin and *Urtica pilulifera:* Comparable Effects and Similar Actions in Diabetes

Ahed J Alkhatib[1*] and Ilham Ahed Alkhatib[2]

[1]*Department of Legal Medicine, Toxicology of Forensic Medicine, School of Medicine, Jordan University of Science and Technology, Jordan*
[2]*Department of Pharmacy, Jordan University of Science and Technology, Jordan*

***Corresponding author e-mail: ajalkhatib@just.edu.jo**

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INTRODUCTION

The purpose of this editorial is to show our experience in using both metformin and *Urtica pilulifera* (*U. pilulifera*) as diabetic therapeutic options. In brief, we would like to give some information about *U. pilulifera* and metformin.

U. pilulifera is has been known since a long time in Palestinian and in Sinai [1-5]. *U. pilulifera* is one of the species of the family *Urticaceae.* From a morphological point of view, *U. pilulifera* is characterized by the stinging hairs that induce skin irritation [6]. From a traditional medicine point of view, the extract of *U. pilulifera* has been used as a stimulating tonic, blood purifying agent, and hemoglobin concentration enhancer [7]. Several studies have showed the efficacy of using *U. pilulifera as* oral anti-diabetic agents and anti- oxidant and anti-inflammatory effects in type 2 diabetic rat model [8].

From a historical point of view, medicinal plants have been used by human as a traditional way of providing relief to several diseases. There is no doubt in that many plant-derived compounds possess very important analgesic properties. Urtica dioica (UD) has been identified as a traditional herbal medicine. This study aimed to investigate the effect of UD extract and swimming activity on diabetic parameters through *in vivo* and *in vitro* experiments.

Fujita and Inagaki (2017) conducted a study about metformin and put emphasis on the use of metformin in lowering glucoses in type of type 2 diabetes. Furthermore, metformin has been recommended to be the first-line drug in recent treatment guidelines [9].

Metformin is extracted from the plant *Galega officinalis* [10]. Metformin mainly targets the liver, and it lowers the process of gluconeogenesis [11-15].

The results of our experiments

We conducted a series of studies using rat as an animal model to induce diabetes through alloxan injection. We used metformin and *U. pilulifera* as glucose lowering agents. Methodological approaches involved induction of diabetic model, measuring blood glucose for included animals. Our data showed that there were similar trends in the outcome of metformin and *U. pilulifera* in lowering blood glucose level significantly in diabetic treated groups compared diabetic groups ($p<0.05$). Further, we continued our studies and found that both can benefit in giving protection for liver and kidney in terms of

almost restoring the kidney and liver function tests significantly ($p<0.05$ in all cases). In further studies, we investigated the expression of both heat shock protein (HSP70) and inducible nitric oxide synthase (iNOS). Both metformin and *U. pilulifera* were able to increase the expression of HSP70 significantly ($p<0.05$) compared with non-treated diabetic groups. At the same time, both metformin and *U. pilulifera* decreased the expression of iNOS significantly ($p<0.05$)compared with non-treated diabetic groups [16,17].

Taken together, our results indicated that *U. pilulifera* can be another alternative to metformin and can be used for treating diabetes. The problem of *U. pilulifera* is that its effective dose is not achievable within routine use, and hence we invited pharmaceutical companies to think about producing *U. pilulifera* in therapeutic range.

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