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### TITLE

### Experimental and clinical studies of the hypoglycemic, hypocholesterolemic and other beneficial properties of red onion (*Allium cepa* L.)

Imad M. Taj Eldin<sup>1\*</sup> and Elhadi M. Ahmed<sup>2</sup>

<sup>1</sup>Department of pharmacology, Faculty of pharmacy, University of Gezira, Wad Medani, Sudan

<sup>2</sup>Department of Chemistry and Pharmacognosy, Faculty of Pharmacy, University of Gezira, Sudan

**Background:** Diabetes mellitus is a debilitating and often life-threatening disease with increasing incidence affecting millions of people worldwide. Traditional herbal remedies have been widely used to lower blood glucose or decrease complications of diabetes; of these *Allium cepa* (red onion) was considered.

**Objectives:** The aim of this study was to investigate the relative potency of *Allium cepa*, with respect to its controlled hypoglycemic and hypocholesterolemic effects and other beneficial properties in experimental animals, normal human volunteers, and diabetic patients.

**Method:** In experimental animals, normal human volunteers, and diabetic patients, the fasting blood glucose, glucose tolerance test cholesterol and insulin levels were determined as well the prothrombin time test.

**Results:** The hydroalcoholic extract of *Allium cepa* (1g/4ml/kg) exhibited a significant hypoglycemic activity (36 mg/dl reduction in glycemia) compared to glibenclamide (31 mg/dl) in normal fasting experimental rabbits, 4 hours after oral administration. Glucose tolerance test was also investigated in which *Allium cepa* extract lowered the hyperglycemia by 53.66 mg/dl compared to glibenclamide (91 mg/dl). The effects of oral administration of red onion extract in animal models with alloxan-induced diabetic rats showed a moderate time dependent reductions in blood glucose, and had presented a significant decline after 20 days. Furthermore, its clinical improvement with increased survival rates in alloxan-induced diabetic rats was evident and it was found to be superior to glibenclamide.

In normal human subjects (n=7), the acute and chronic use of crude *Allium cepa* produced a remarkable decreases in the fasting blood glucose (11-16 mg/dl), serum cholesterol (4-34 mg/dl) and insulin (4-18 mc IU) levels and slight increase in the total body weights of volunteers when used in a daily dose of 100g for 30 days.

In the assessment of the hypoglycaemic activity of *Allium cepa* in type 1 diabetic patients (n=21), crude *Allium cepa* (100g) caused a considerably lowered value in the fasting blood glucose levels by about 89 mg/dl in relation to insulin (145 mg/dl) after 4 hours. In type 1 diabetic patients the ingestion of crude *Allium cepa* produced a significant reduction in the induced hyperglycemia (GTT) by about 127 mg/dl in relation to water (77 mg/dl) and the standard drug insulin (253 mg/dl).

In type 2 diabetic patients (n=21) 100g of crude *Allium cepa* reduced the initial fasting blood glucose levels by 40 mg/dl 4 hours later, compared to glibenclamide (81 mg/dl). The lowering effect of *Allium* on the induced hyperglycemia (GTT) in type 2 diabetic patients after ingestion of 75g dextrose was also noted.

An *in vitro* anticoagulant effects of *Allium cepa* was evident, when aqueous extract of *Allium cepa* was added in different volumes (25, 50 and 75 µL) to plasma samples of normal individuals (n=30), it significantly (P = 0.001) showed prolongation in the prothrombin time from 13±0.16 to 14.8±0.23, 17.1±0.33 and 19.5±0.36 seconds respectively.

**Conclusion:** Red onion has significant hypoglycemic, hypocholesterolemic, anticoagulant and antioxidant activities, and in addition to its nutritional value it may be used as a dietary supplement in the management of diabetes.

### Biography

Imad M. Taj Eldin has completed his Ph.D at the age of 44 years from University of Gezira, Sudan. He is the Deputy Dean and Head Department of Pharmacology, Faculty of Pharmacy, University of Gezira. He has published 10 papers in reputed journals.