

## Anti-Hyperglycemic Effects and Chemical Analysis of *Allium sativum* Bulbs Growing in Sudan

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**Abstract :** Hyperglycemia and diabetes have been treated with several medicinal plants for a long time, meanwhile reduce associated side effects than the synthetic ones. Therefore, the search for more effective and safer anti-diabetic agents derived from plants has become an interest area of active research. *A. sativum*, belonging to the Liliaceae family is well known for its medicinal uses in African traditional medicine, it used for treating of many human diseases mainly diabetes, high cholesterol, and high blood pressure. The present study was carried out to investigate the anti-hyperglycemic effect of the extracts of *A. sativum* bulb growing in Sudan on glucose-loaded Wistar albino rats. *A. sativum* bulbs were collected from local vegetable market at Khourtoom/ Sudan in a fresh form, identified and authenticated by taxonomist, then dried, and extracted with solvents of increasing polarity: petroleum ether, chloroform, ethyl acetate and methanol by using Soxhlet apparatus. The effect of the extracts on glucose uptake was evaluated by using the isolated rats hemidiaphragms after loading the fasting rats with glucose, and the anti-hyperglycemic effect was investigated on glucose-loaded Wistar albino rats. Their effects were compared to control rats administered with the vehicle and to a standard group administered with Metformin standard drug. The most active extract was analyzed chemically using GC-MS analysis compared to NIST library. The results showed significant anti-diabetic effect of extracts of *A. sativum* bulb growing in Sudan. Addition to the hypoglycemic activity of *A. sativum* extracts was found to be decreased with increase in the polarity of the extraction solvent; this may explain the less polarity of substance responsible for the activity and their concentration decreased with polarity increase. The petroleum ether extract possess anti-hyperglycemic activity more significant than the other extracts and the Metformin standard drug with p-value 0.000\*\* of 400mg/kg at 1 hour, 2 hour and four hour; and p-value 0.019\*, 0.015\* and 0.010\* of 200mg/kg at 1 hour, 2 hour and four hour respectively. The GC-MS analysis of petroleum ether extract, with highest anti -diabetes activity showed the presence of Methyl linolate (42.75%), Hexadecanoic acid, methyl ester (10.54%), Methyl  $\alpha$ -linolenate (8.36%), Dotriacontane (6.83), Tetrapentacontane (6.33), Methyl 18-methylnonadecanoate (4.8), Phenol,2,2'-methylenebis[6-(1,1-dimethylethyl)-4-methyl] (3.25), Methyl 20-methyl-heneicosanoate (2.70), Pentatriacontane (2.13) and many other minor compounds. The most of these compounds are well known for their anti-diabetic activity. The study concluded that *A. sativum* bulbs extracts were found to enhanced the reuptake of glucose in the isolated rat hemidiaphragm and have antihyperglycemic effect when evaluated on glucose-loaded albino rats with petroleum ether extract activity more significant than the Metformin standard drug.

**Keywords :** Allium, anti-hyperglycemic, bulbs, sativum

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