



# HerbClip™

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**File: ■ Garlic (*Allium sativum*; Amaryllidaceae)**  
**■ Type 2 Diabetes**  
**■ Meta-analysis**

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**RE: Meta-analysis of Garlic Supplementation for Type 2 Diabetes Management**

Wang J, Zhang X, Lan H, Wang W. Effect of garlic supplement in the management of type 2 diabetes mellitus (T2DM): A meta-analysis of randomized controlled trials. *Food Nutr Res*. September 2017; 61(1):1377571. doi:10.1080/16546628.2017.1377571.

Type 2 diabetes mellitus (T2DM) is a growing health concern worldwide. It is most common in overweight young adults and mature populations. T2DM can lead to clinical depression, disabilities, and organ dysfunction or failure. Treatment usually includes diet control, exercise, hypoglycemic drugs, and insulin injections. Garlic (*Allium sativum*, Amaryllidaceae) bulb has been found to have many health benefits, including lowering blood pressure and blood glucose levels. Given its wide distribution, low cost, and apparent safety, garlic could play an important role in the management of T2DM. The goal of this meta-analysis of randomized controlled trials (RCTs) was to evaluate the efficacy and safety of garlic supplements in the management of T2DM and blood lipids.

Online databases PubMed, EMBASE, Cochrane Library, and China National Knowledge Internet were searched for human studies in English or Chinese that had been published prior to April 15, 2017. Inclusion criteria were RCTs with subjects between the age of 18 and 75 years diagnosed with T2DM and with no history of cardiovascular disease; therapeutic use of garlic extracts (those using raw garlic were excluded), and trials that included comparable baseline hypoglycemic and lipid-lowering drugs. For newly diagnosed T2DM patients, garlic was administered alone and previously diagnosed T2DM were administered a combination of garlic and hypoglycemic drugs or insulin. Outcome measures included fasting blood glucose, glycated hemoglobin (HbA1C), and other indexes of blood glucose and lipids. Effect on blood lipids was evaluated by total cholesterol, triglycerides, high-density lipoprotein (HDL) and low-density lipoprotein (LDL) regulation. Study quality was assessed using the Cochrane tool for risk of bias of RCTs.  $P < 0.05$  was considered statistically significant.

An initial search yielded 226 studies, nine of which met the inclusion criteria with a total of 768 subjects ( $n=430$  for intervention and  $n=338$  for control). Seven studies used garlic powder tablets, and two studies used aqueous homogenate of garlic. The authors state

that given the forms used, allicin was the primary constituent extracted. Average baseline fasting blood glucose was between 6.2 mmol/L to 12.2 mmol/L and garlic doses ranged from 0.05 g to 1.5 g with a duration between two to 24 weeks. Outcomes were measured between one to 24 weeks for fasting blood glucose, one to four weeks for plasma fructosamine, and 12-24 weeks for HbA1C. Five studies used garlic alone for newly diagnosed subjects, and four studies used a combination therapy of garlic and oral hypoglycemic drugs or insulin for subjects previously diagnosed with T2DM. Risk of bias was rated as moderate-to-low.

Fasting blood glucose, fructosamine, and HbA1C data were compared by subgroup analysis of short-term ( $\leq 8$  weeks) and medium-term ( $> 8$  weeks) treatment periods. Garlic was found to have a significant effect on fasting blood glucose in one to two weeks ( $P = 0.01$ ), three to four weeks ( $P = 0.003$ ), 12 weeks ( $P < 0.00001$ ), and 24 weeks ( $P < 0.001$ ). Fructosamine (one-two weeks,  $P < 0.001$  and three to four weeks,  $P = 0.01$ ) and HbA1C (12 weeks,  $P < 0.001$  and 24 weeks,  $P < 0.001$ ) were significantly decreased in the garlic group. Blood lipids were also compared by subgroup analysis of one to two weeks, three to four weeks, and 12 weeks. Garlic significantly reduced triglycerides at three to four weeks ( $P < 0.001$ ) and improved total cholesterol and LDL at 12 weeks ( $P < 0.001$  and  $P = 0.003$  respectively). HDL also significantly increased at 12 weeks ( $P < 0.001$ ). Meta-analysis found no significant difference in adverse effects (most commonly reported were indigestion and heartburn). A funnel plot analysis found that there was a low risk of publication bias.

The authors conclude that garlic supplementation to enhance the effect of insulin and other hyperglycemia drugs is currently supported by clinical evidence; however, effects are less certain for garlic alone. While no statistically significant relationship was found between dose or duration and fasting blood glucose reduction, there was a clear trend in its reduction. The effects on blood lipids contradicts an earlier meta-analysis that found no positive effect. The authors state this difference may be due to differences in measured time or limited sample size in previous studies. Admitted limitations of the current meta-analysis mainly result from the heterogeneity of the studies, including an uncertain relationship between dose and outcomes, and the use of both monotherapy and combined therapy. Despite these limitations, the authors state, "current data confirms that garlic supplement plays positive and sustained roles in blood glucose, total cholesterol, and high/low density lipoprotein regulation in the management of T2DM."

—*Erin Smith, MSc., CCH*

Referenced article can be accessed at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5642189/>.

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