National Honey Board®

HONEY MIGHT BE A BETTER CHOICE WHEN IT COMES TO CARDIOMETABOLIC HEALTH[1]

COULD CHOOSING HONEY HAVE A BENEFICIAL EFFECT ON BLOOD GLUCOSE AND LIPIDS?

Study Overview: Honey bees use nectar from flowers to make honey, which comprises a mixture of sugars, including those commonly found in foods as well as some rare sugars, plus organic acids, enzymes, and other bioactives. A study by Ahmed et al. uses state of the art systematic review practices to evaluate the effect of honey on body weight, glycemic control, blood lipids, blood pressure, and inflammatory markers. This approach assesses relationship direction as well as the certainty of relationships found. It was found that honey may decrease cardiometabolic risk factors by improving blood glucose and cholesterol levels, but more studies are required to increase certainty of the evidence.

Method in Brief: Researchers performed a literature search including randomized and nonrandomized intervention trials lasting 7 days or longer with humans of any health background and age. Study outcomes included multiple measures of body fat, blood glucose control, blood lipids, blood pressure, inflammatory markers, and more. A total of 18 reports (making 33 trial comparisons) conducted in 1,105 participants with median age 41.2 years (ranging from 10.55 to 60.7 years) met inclusion criteria. Most participants were adults (90%), and the trials were conducted in Egypt, Germany, Greece, Indonesia, Iran, Malaysia, Pakistan, Switzerland, Turkey, and the USA. Most participants, 92%, were in an outpatient/free-living setting, and median body mass index (BMI) was 26 kg/m2 (ranging from 20.7 to 40.2 kg/m2). Participants were fed on average (median) 40 grams of honey per day and were followed for a median of 8 weeks. Most of the honey was derived from multiple floral sources (n = 24) with the remaining from robinia (n=3), clover (n=3), milk vetch (n=1), and 2 sources were not reported. Honey fed in studies was mostly not specified as being raw or processed (n=20), but a few specified raw (n=5), processed (n=7), or a combination of raw and processed (n=1). For control comparators, participants across the various trials consumed either their usual diets, table sugar, high-fructose corn syrup, or mixed comparators

Findings: Honey had a beneficial effect on several lipid outcomes, fasting glucose, and in the one study that measured it, the enzyme alanine aminotransferase, which serves as an indicator of liver function.

Due to various factors, most differences noted had low to moderate certainty of evidence, however, for high-density lipoprotein cholesterol (HDL-cholesterol), there was a high certainty of evidence for a small, important beneficial effect. On the other hand, researchers found an increase in two inflammatory markers, specifically interleukin 6 and tumor necrosis factor α. Overall, honey had no statistically significant effects on the other outcomes (i.e., measures of adiposity, blood pressure, glycemic and insulin response indicators, apolipoprotein B, inflammatory C-reactive protein (CRP), and uric acid).

Researchers performed sub-group analyses on the small number of studies reporting a single floral source and for just the honey products reported to be processed or raw. Effect modification was noted in both cases. The researchers reported that "raw honey had a beneficial effect on lipid levels and fasting glucose compared to processed honey." Differences in both varietal and processing may be attributed to compositional differences in sugars or to several other bioactive components. Based on these results, future research should report processing conditions, such as filtering or heat treatment, as well as report the floral varietal, particularly when testing a monoclonal honey.

The researchers explained that some of the benefits seen in this research could be due to specific bioactives in honey, such as rare sugars or phenolic compounds. They also hypothesize that the elevated inflammatory markers "may activate and improve the body's immune response." Notably, CRP (another inflammatory marker) was unchanged, providing evidence that honey was not associated with systemic chronic inflammation overall.

Table: Changes Attributed to Honey Overall

Cardiometabolic indicator (number of comparisons)	Mean difference [95% confidence interval]
Large magnitude of effect	
Increased tumor necrosis factor α (TNF-α) inflammatory marker (n=2)	1.44 pg/mL [0.24 to 2.64]
Moderate magnitude of effect	
Reduced alanine aminotransferase (n=1)	-9.75 U/L [-18.29 to -1.21]
Increased IL-6 inflammatory marker (n=5)	0.37 pg/mL [0.37 to 0.74]
Small magnitude of effect	
Reduced total cholesterol (n=29)	-0.18 mmol/L [-0.33 to -0.04]
Reduced low-density lipoprotein (LDL- cholesterol) (n=29)	-0.16 mmol/L [-0.30 to -0.02]
*Increased high-density lipoprotein (HDL -cholesterol) (n=29]	0.07 mmol/L [0.04 to 0.10]
Reduced fasting triglycerides (n=29)	-0.13 mmol/L [-0.20 to – 0.07]
Reduced fasting blood glucose (n=20)	-0.20 mmol/L [-0.37 to -0.04]

* Increase is beneficial.

Limitations: As noted by the researchers, some of the studies included were at risk of bias and some results were inconsistent between studies. For associations in which the quality of evidence was low, the researchers came to more conservative conclusions. More studies are required to increase certainty of the evidence.

Conclusions: Evidence from this systematic evidence review suggests that honey, which contains uniquely metabolized sugars and other potentially beneficial bioactives, can be used in small amounts as part of an overall cardiometabolic healthy diet. In clinical trials, changes in cardiometabolic indicators associated with honey consumption were mostly neutral to beneficial (e.g., increased HDL-cholesterol).

Associations with two inflammatory markers are worth exploring in future research as well as potential differences due to processing conditions and specific floral varietals.

1. Ahmed, A, et al. "Effect of honey on cardiometabolic risk factors: a systematic review and meta-analysis." *Nutrition Reviews*. November 16, 2022. doi.org/10.1093/nutrit/nuac086 https://academic.oup.com/nutritionreviews/advance-article/doi/10.1093/nutrit/nuac086/6827512