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Review Mol Nutr Food Res. 2016 Aug;60(8):1837-49. doi: 10.1002/mnfr.201600121.

Epub 2016 Jun 27.

Vinegar as a functional ingredient to improve postprandial glycemic control–human intervention findings and molecular mechanisms

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PMID: 27213723 DOI: [10.1002/mnfr.201600121](https://doi.org/10.1002/mnfr.201600121)

Abstract

Type 2 diabetes prevalence worldwide is increasing and the burden is particularly high in Asian countries. Identification of functional food ingredients to curb the rise of diabetes among various Asian population groups is warranted. Vinegar is widely consumed throughout Asia, where the principle bioactive component is acetic acid. This review has collated data from human intervention trials to show that vinegar consumption seems more effective in modulating glycemic control in normal glucose-tolerant individuals than in either type 2 diabetics or in those with impaired glucose tolerance. The molecular mechanisms by which vinegar can improve glycemic control have been presented using human, animal and cell culture data. These mechanisms include (i) activation of the free fatty acid receptor 2 (FFAR2) receptors localized in the enteroendocrine L-cells of the intestinal lumen, leading to increased glucagon like peptide 1 (GLP-1) secretion, (ii) increased 5'adenosine monophosphate-activated protein kinase (AMPK) activation, leading to increased fatty acid oxidation and decreased hepatic gluconeogenesis, (iii) lowering of free fatty acid in circulation, potentially leading to improved insulin sensitivity, (iv) increased blood flow to the peripheral tissues and (v) increased satiety, leading to lower food intake. The review also discusses why these mechanisms appear more effective in nondiabetics than in diabetics.

Keywords: Acetic acid; Dietary intervention; Glycemic control; Mechanisms; Vinegar.

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