


## Abstract

# The Impact of Replacing Sugar in Sweets by Isomalt on Blood Glucose Management: Evidence from Recent Randomized, Controlled Trials <sup>†</sup>

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**Abstract:** Background and objectives: National authorities and WHO recommend limiting consumption of added sugars from different foods. Polyols like isomalt can be used as bulk sweetener and thus help the food industry to replace sugar. Isomalt is a naturally sourced sugar replacer and the only one in its kind made from pure beet sugar. It has low physiological energy value (approximately 8.4 kJ/g), is non-cariogenic, and has low glycaemic properties as well as a very limited effect on insulin response. The present investigation aims to provide evidence from a series of recent randomized human intervention trials in which the respective effects of isomalt as low-digestible carbohydrate replacing sugar in various sweets were tested. Methods: Blood glucose and insulin response of different sweets were tested according to standardized test procedure. The sweets (i.e., chocolate, candies, mints and jam) were provided in realistic portion sizes and either contained sugar or sugar was replaced 1:1 by isomalt. Products were comparable in appearance, taste, and sweetness. 10 healthy adults (mean age: 40.6 ± 7.0 years, BMI: 23.5 ± 3.2 kg/m<sup>2</sup>) were randomly assigned to consume the sweets in the morning after an overnight fast. Capillary blood samples were taken at baseline up to 180 min to determine blood glucose and insulin levels. Results: Replacing sugar by isomalt led to significantly lower blood glucose response for all products. This was characterized by a significantly reduced incremental glucose peak (iCmax) ranging from −46% to −83% (all  $p < 0.05$ ) and a reduction of the two-hour incremental area under the curve (iAUC2h) by 5% to 71% ( $p < 0.05$  for candies, mints and jam). The lower glycaemic profile was accompanied by lower insulin levels. Accordingly, iCmax and iAUC2h following isomalt variants were remarkably reduced by 70 to 92% (all  $p < 0.05$ ) and 58 to 87% (all  $p < 0.05$ ), respectively. Discussion: With a series of RCTs conducted according to international standards in blood glucose response testing, we demonstrate reduced postprandial glycaemic and insulin response to various sweets in which sugar was replaced by isomalt. Hence, using isomalt as a naturally sourced sugar replacer is a viable strategy to support a low glycaemic diet.

**Keywords:** isomalt; polyol; sugar replacer; glycaemia; insulin; blood glucose management; sweeteners

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