INPLASY

Hypoglycemic effects of Sechium edule. A systematic review and meta-analysis of clinical and preclinical trials

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INTRODUCTION

Review question / Objective A systematic review and meta-analysis on the hypoglycemic effect of Sechium edule in older adult patients with DM2 or MS, as well as in preclinical models. Key markers of glycemic control, such as serum glucose and glycosylated hemoglobin (HbA1c), were analyzed to determine their impact on the management of hyperglycemia.

Condition being studied Type 2 diabetes mellitus (DM2) and metabolic syndrome (MS) represent major public health problems due to their high prevalence and strong association with serious complications, such as cardiovascular disease, kidney failure, and neuropathies. The older adult population, in particular, is at significant risk due to factors such as insulin resistance, pancreatic dysfunction, and the accumulation of comorbidities.

MS is a clinical entity that encompasses various metabolic alterations that predispose to the development of chronic diseases. It is defined by the presence of at least three of the following factors: central obesity, dyslipidemia, hypertension, hyperglycemia, and low levels of high-density lipoprotein (HDL). This condition is closely associated with a significantly increased risk of cardiovascular and metabolic diseases. Insulin resistance plays a central role in its pathophysiology, contributing to endothelial dysfunction, oxidative stress, and chronic low-grade inflammation. In Mexico, the prevalence of MS has shown a sustained increase in recent years, reinforcing the need for effective intervention strategies for its management and prevention.
Chayote, whose scientific name is Sechium edule , has been the subject of growing interest due to its potential hypoglycemic effects and its potential use as a therapeutic complement in the treatment of DM2. This fruit, widely consumed in Mexico and

other Latin American countries, has been shown to contain bioactive compounds with beneficial properties for glucose metabolism. Previous studies have identified the presence of flavonoids, polyphenols, and cucurbitacins in Sechium edule , which could play a key role in regulating glucose uptake in peripheral tissues and improving insulin sensitivity, among many other effects. Furthermore, some studies have suggested that its regular consumption could contribute to the modulation of metabolic pathways involved in glycemic homeostasis, making it a promising option for inclusion in complementary therapeutic strategies for the management of DM2.

METHODS

Participant or population Humans with DM2 or MS and laboratory animals.

Intervention Hypoglycemic effect of Sechium edule in Humans or laboratory animals.

Comparator Placebo or control.

Study designs to be included Clinical and preclinical trials.

Eligibility criteria Inclusion Criteria: a) Randomized clinical trials and pre-experimental studies in Spanish, English, and/or Portuguese; b) the use of Sechium edule as a treatment for diabetes or metabolic syndrome; c) placebo-controlled studies; d) evaluation of at least one of the following biochemical markers: serum glucose, HbA1c; e) the participation of older adults or laboratory animals regardless of gender, diagnosed with DM2 or MS.
Exclusion criteria: a) Studies that administered Sechium edule in combination with other compounds or medications; b) patients with gestational diabetes or prediabetics; c) observational studies; d) randomized clinical trials that administered another species of Sechium spp.

Information sources PubMed, Web of Science, Scopus, SciELO and LILACS, in TESIUNAM platform.

Main outcome(s) Hypoglycemic effect after consumption or administration of Sechium edule, measured by serum glucose concentration and the glycosylated hemoglobin marker.

Quality assessment / Risk of bias analysis The risk of bias of the included articles was assessed using the RoB2 scale for randomized clinical trials, and the SYRCLE tool was used to assess the risk of bias of preclinical trials.

Strategy of data synthesis The following information was extracted from the selected full-text articles: surname and first name of the primary author and year of publication; study population for the intervention; frequency and dose used; mean, standard deviation, and sample size for the control and intervention groups for each of the measurements for each marker; and the overall mean and standard deviation difference for each article. For the meta-analysis, the number of participants in each intervention, the standard deviation, and the average obtained from the mean and standard deviation difference were extracted.

Subgroup analysis Stratification 0 to 3 months of intervention and 0 to 6 months in clinical trials.

Sensitivity analysis Low heterogeneity, confidence interval and statistical significance p<0.05.

Language restriction Only Spanish, English, and/or Portuguese.

Country(ies) involved México.

Keywords Sechium edule , hypoglycemic effect, older adults, diabetes mellitus, metabolic syndrome.

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